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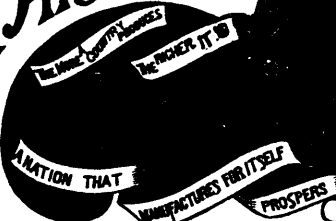
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VOL. 53.

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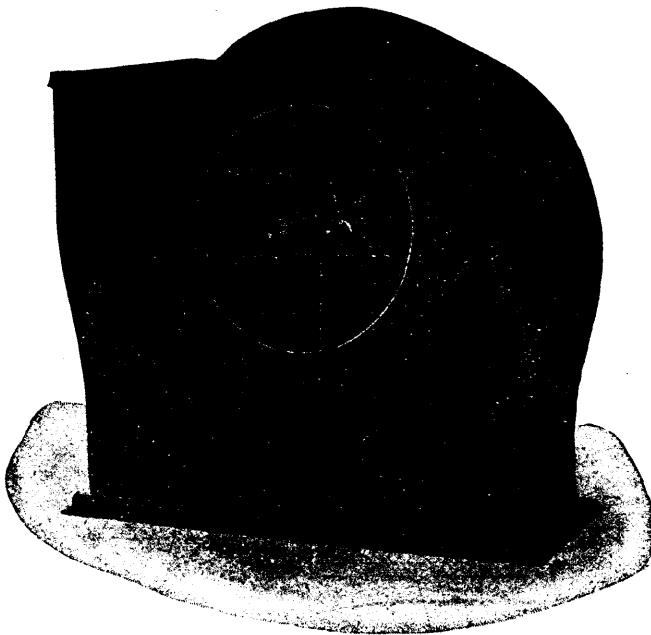
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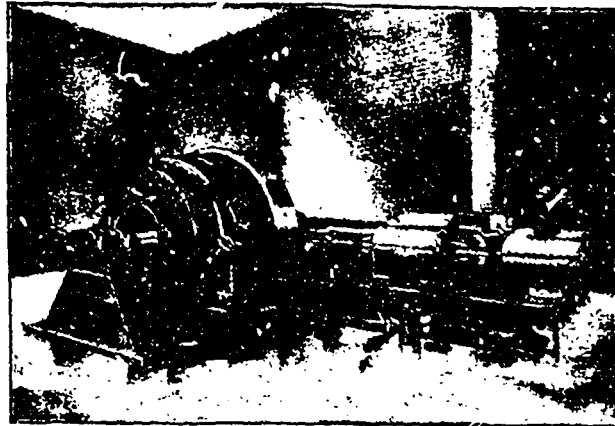
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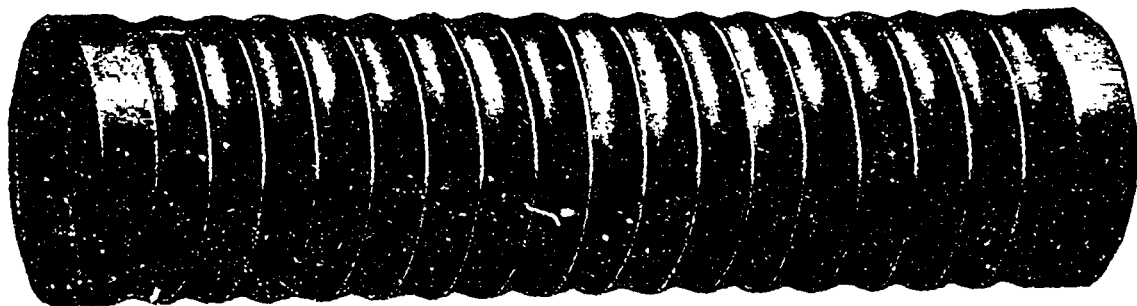
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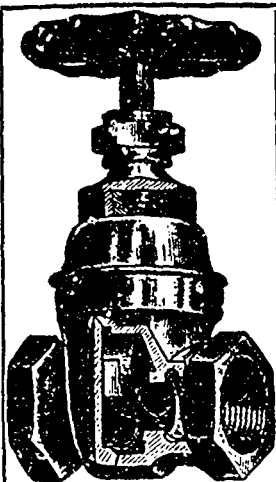
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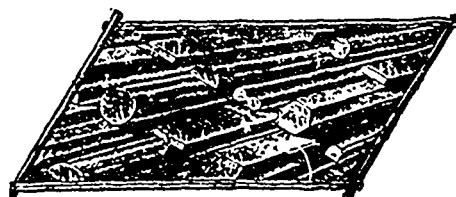
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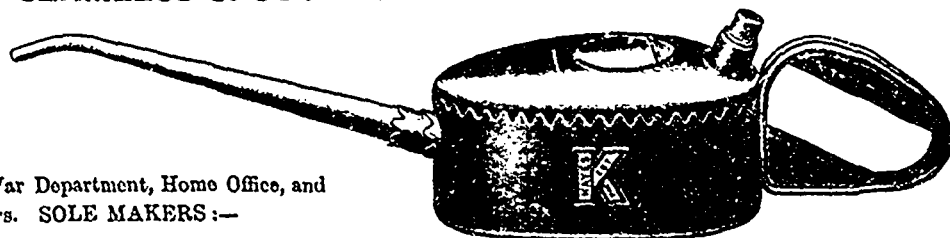
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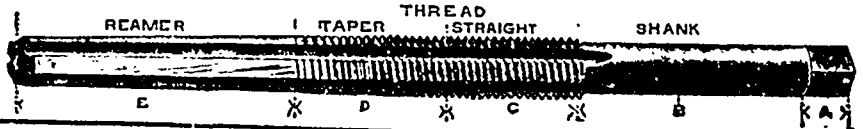
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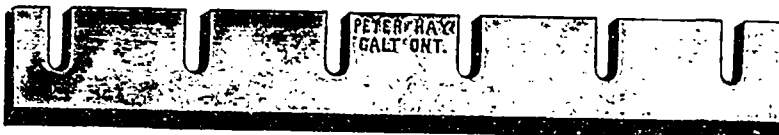
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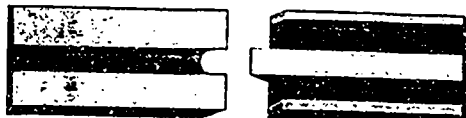
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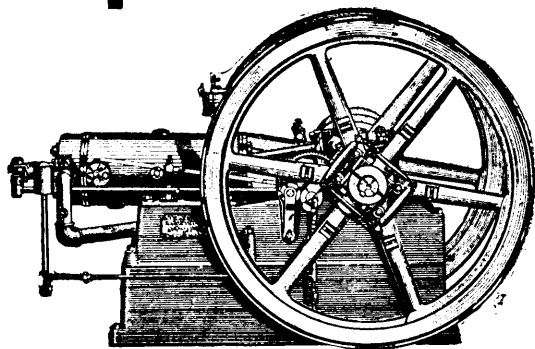
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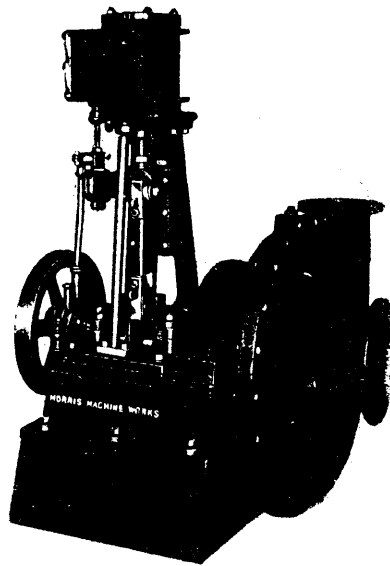
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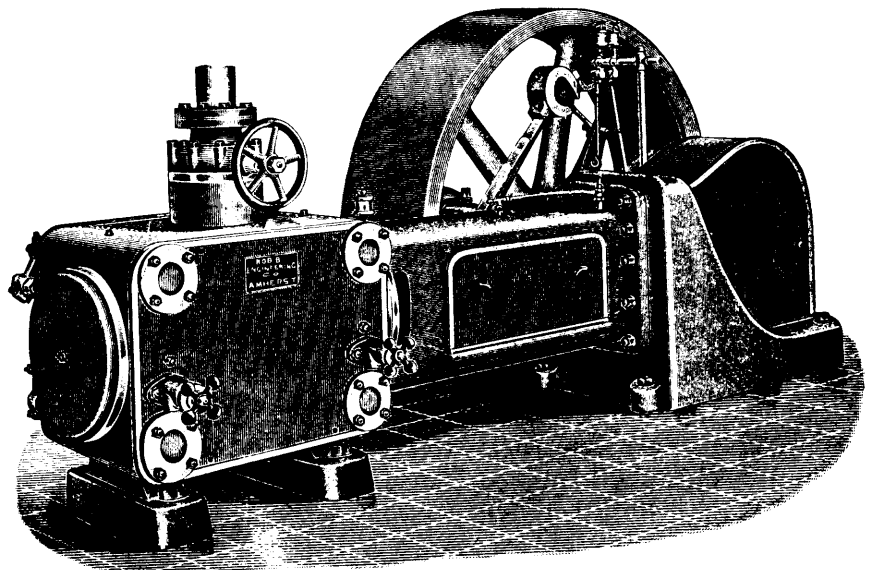
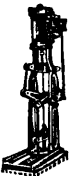
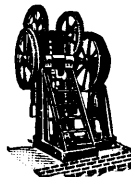
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So simple that anyone can operate it, no matter how excited.

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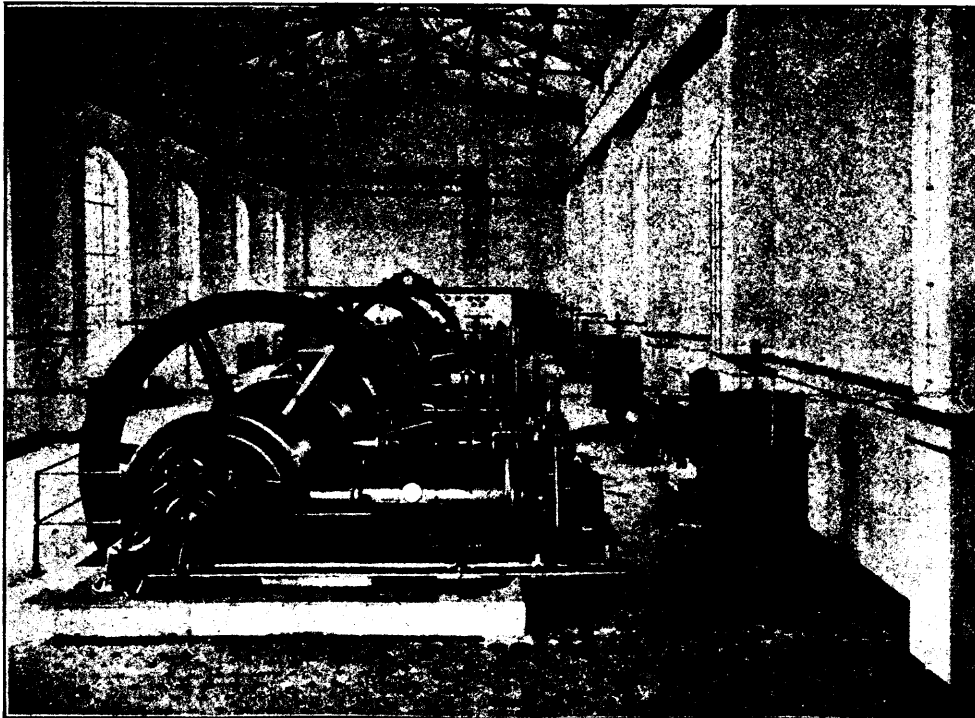
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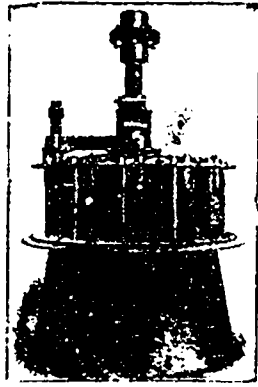
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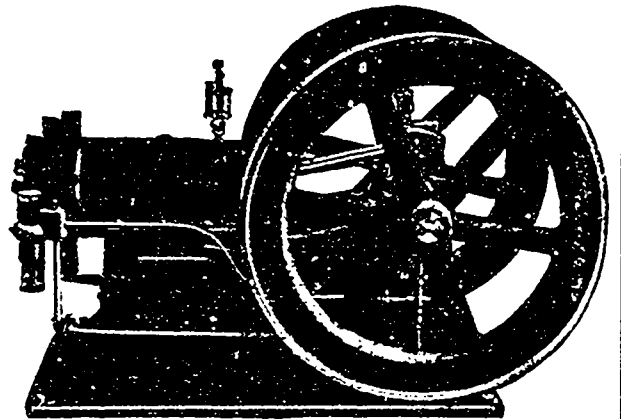


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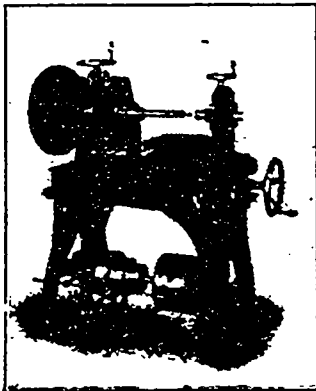


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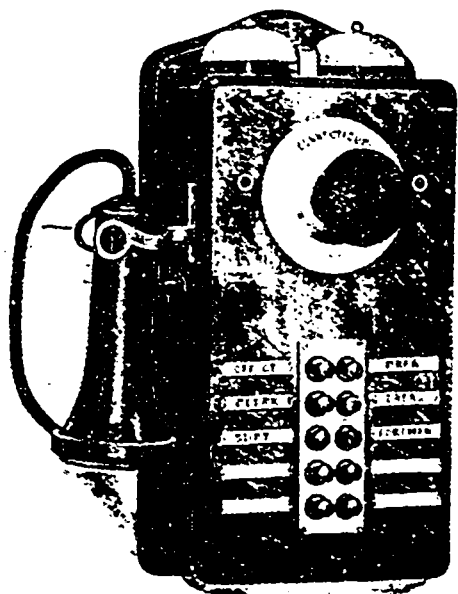
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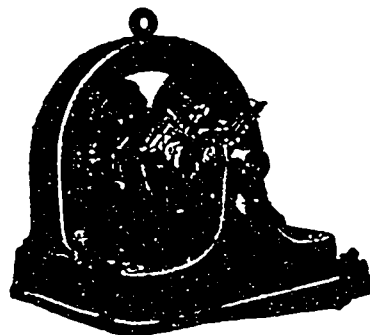


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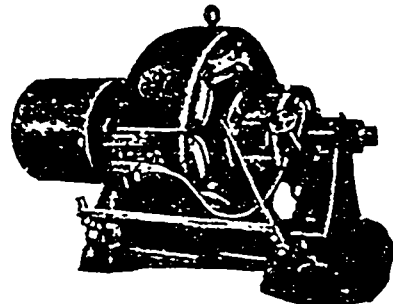
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Steel Shingles

either Galvanized or Painted

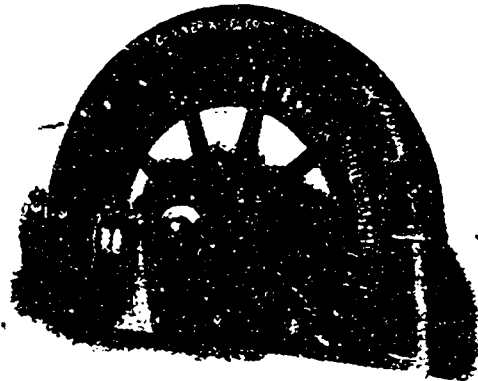
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Reliable They have been thoroughly tested in all kinds of climates, invariably proving Fire, Lightning, Rust and Weather Proof.

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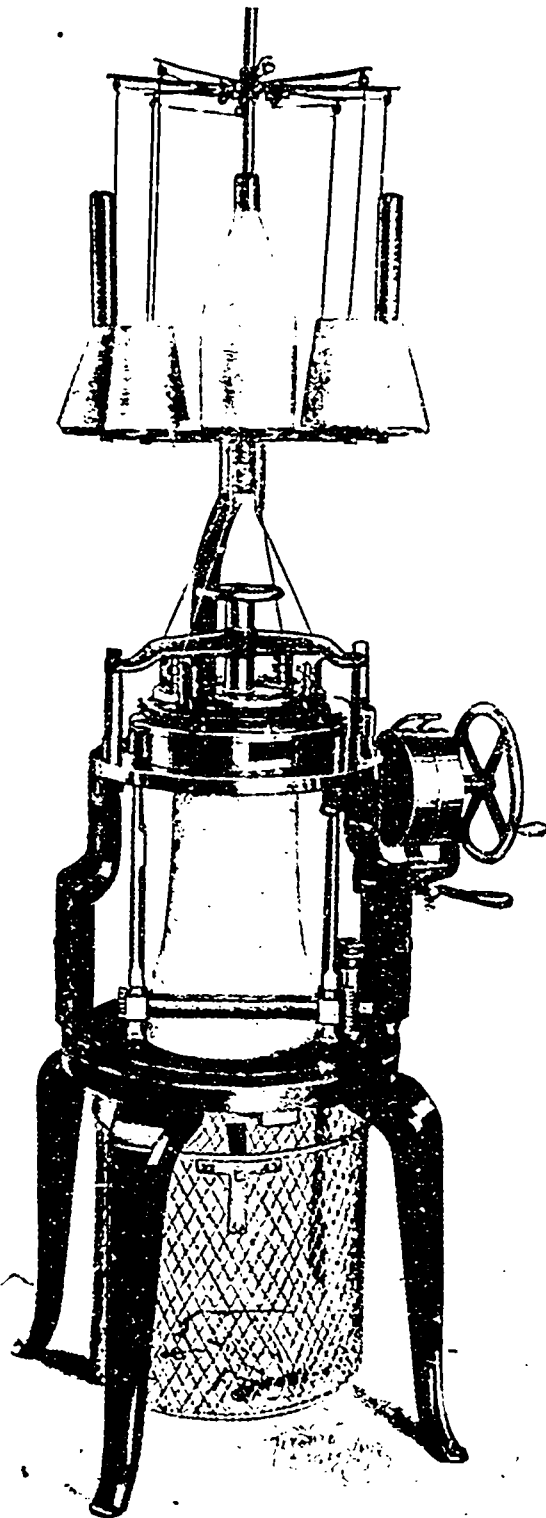
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In bales of 50 lbs., 125 lbs., 250 lbs., 500 lbs.

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By using our wiping rags you
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Try a sample bale.

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with him day and night is the selling problem.

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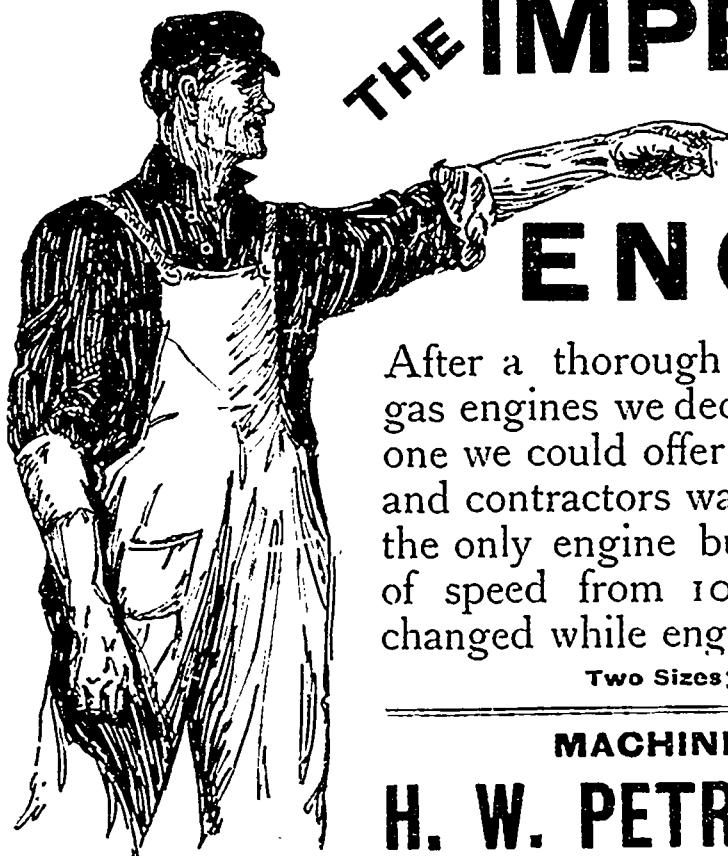
Less than \$10 per H.P. per Annum

By doing what manufacturers have been doing for years in Europe, using **PRODUCER GAS**. Do you realize how much of your profit is lost by not having the most economical power.

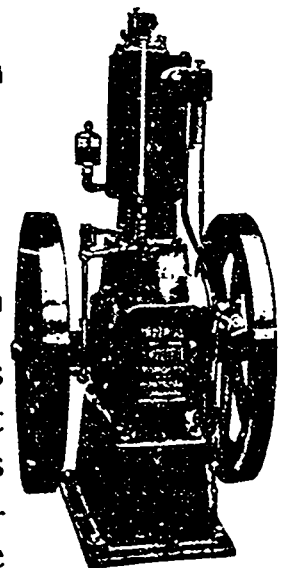
CONSULT US FREE.

Read what the **SIMONDS CANADA SAW CO.**, of Montreal, write: "The fuel costs are only 90c. per day of 10 hours. This means that we are getting 50 h.p. for 9c. worth of fuel per hour

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THE IMPERIAL Gas and Gasoline ENGINE



After a thorough study of various gas engines we decided that the best one we could offer to manufacturers and contractors was the Imperial—the only engine built with a range of speed from 100 to 600 revolutions a minute, changed while engine is in operation.

Two Sizes; Style E, 3-h.p. Style F, 6-h.p.

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H. W. PETRIE, Front St. West, Toronto
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PUBLISHED ON THE FIRST AND THIRD FRIDAYS OF EACH MONTH

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ANOTHER SACRIFICE FOR THE MOTHER COUNTRY.

The Toronto Globe suggests that another important Canadian industry should be sacrificed as an evidence of our love for the Mother Country. It takes its cue from an article in the London Morning Post, which proposes that Canada and the other colonies give Britain a preference by allowing her vessels the privileges reserved to ourselves in our coasting laws. It is argued that Canada has only to act in accordance with our frequent protestations that the Empire is, or ought to be, a political unit to secure a preference for British vessels in every British port throughout the world. No other power, it tells us, which reserves its coastline trade could take offense—that we should run no risk of our legislating against those countries which exclude British ships from their own coastal colonial trade—that the reservation of our coastal privilege exclusively to Britain would be little more than a formality—that, except on the lakes, where natural barriers keep out the world's competition, American vessels could not take advantage of the abrogation of Canada's exclusive coasting laws—that British vessels, relieved of the burden of our protective laws, could crowd the American vessels off the routes, and that, in fact, American vessels could not keep their own coasting trade were it not for the rigid exclusion of British vessels.

The Globe says that Canada, by adopting protection, has killed off our own merchant marine, but (because of protection) still maintains small coasting fleets by excluding other vessels from the trade between our seaports—that Canada at one time had the prospect of a high place in the world's merchant marine, but that that prospect was killed by protection. Were the coasting laws relaxed, this trade—(ship-building)—would also pass to British shipbuilders.

It is to be regretted that The Globe remembers so

little of what every school boy in Canada has been taught, and ought to remember. At one time the shipbuilding industry exceeded in importance all others in the province of Quebec, Nova Scotia and New Brunswick. These provinces abounded in all requisite materials for shipbuilding, and their shipyards turned out as fine ships as ever floated on salt water. Some—many of the speediest and most trustworthy clipper ships that ever made record time between Liverpool and China, in the tea carrying trade, were launched from yards in our Maritime Provinces, and such was the case until the necessities of commerce required that wooden sailing ships should give way to iron vessels propelled by steam. At that time Canada was not even the Dominion it now is, and no such policy was then in existence as tariff protection to the shipbuilding or any other domestic industry. Tariff protection had no more to do with the decadence of the maritime shipbuilding industry than it had to do with the building of the "wooden walls" of old England. Both retired from active service at the same time and substantially for the same causes.

One of the most conspicuous features of current politics, particularly in Canada and in Great Britain, is the constant discussion of what is called "British preference." Why British preference? Great Britain is an old and most prosperous country. She is called the "Mother of Nations." Firmly seated as she is upon her rock-bound island, she is able to defy the world. She is "Mistress of the Seas." She has fleets of the most modern and powerful warships floating upon every sea; and in every harbor and roadstead in the whole world may be seen the "Meteor Flag," covering a greater commerce—much greater than can be claimed by any other country. What's the matter, then, with Great Britain? She's all right. Then why this constant and tiresome talk now so much indulged in about making fiscal and other kinds of concessions to Great Britain?

This last feature regarding a British coasting preference in Canadian waters, now put forward by the London Morning Post and endorsed by the Toronto Globe, is mean, mendacious and greedy in the extreme. There is no country on the face of the earth that allows such absolute free trade in and over its internal and costal waters as The Globe proposes Canada shall grant to Great Britain—in fact no such entire freedom is allowed in the waters of the United Kingdom itself.

We are told that if Canada should do this thing we might thereby be relieved of a part of the burden of protection which we now bear, and at the same time give a reciprocal part of the resultant advantage (?) to Great Britain. The "burden of protection" so disparagingly spoken of is one voluntarily assumed by Canada, and Canada has adjusted it to her own shoulders to suit herself; and Canada has no occasion to ask Great Britain to lift so much as her little finger to ease it. Canada not only adjusts her share of the burden to her own shoulders according to her own ideas, but, as far as Canadian trade with the rest of the world is concerned—as far as the admission of foreign merchandise through her own ports is concerned, adjusts the share

of the burden that Great Britain and all other countries must of necessity bear.

It is a remarkable statement made by The Globe that the giving of Canada's coasting privileges exclusively to Great Britain would be little more than a formality. The Canadian shipbuilding industry has never been specially favored by Canadian tariff laws. Large bounties have been bestowed upon other industries, but not upon shipbuilding. Many other industries have been favored by the free admission of machinery, raw materials, etc., but not shipbuilding to any considerable extent, and until very recently the demands of Canadian trade for shipping have been supplied mostly from British shipyards. The increased wealth and importance of the country of late years induced the investment of much capital in Canadian shipyards, of which, to-day it can only be said that they are infant industries which require in justice higher and more substantial recognition than what is being bestowed upon them; and yet The Globe wishes to strangle the industry in favor of British shipbuilders. With the free and unrestricted competition of British ships in Canadian waters, particularly those of the great lakes, there would soon be a cessation of constructive activity in Canada—in Ontario particularly. Such floating palaces as the *Toronto*, the *Kingston* and the *Chippawa* which bring so many tourists to Canada every season, would have to give way to such sea-sickening affairs as those that conduce to the misery of crossing the British Channel.

AUSTRALIA'S OVER-SEAS TRADE.

Mr. W. H. Hall, Government Statistician of New South Wales, has published an annual statement of the over seas trade of the Commonwealth of Australia for 1906; and following are his tables showing the values of the total trade of the country, both import and export. As compared with the previous year, imports were somewhat heavier, but exports slightly lower, the net result being an increase of £677,708. The imports from the United Kingdom were £23,074,717, or fully 60 per cent. of the whole, a proportion which is about the same as that of the earlier year.

IMPORTS FROM COUNTRIES BEYOND THE COMMONWEALTH.

Items.	United Kingdom.	United States.	Other Countries.	Total.
Anchors.....	£1,453	.....	£ 98	£1,551
Arms, etc.....	567,693	£86,508	96,101	750,302
Bags and sacks...	23,098	.....	835,670	858,668
Belting.....	39,993	1,107	2,732	43,832
Brass.....	19,569	25	2,253	21,847
Brit. metal, etc....	4,995	.....	7,789	12,784
Brushware.....	90,067	6,304	26,480	122,851
Calcium carbide..	2,976	7,835	35,091	46,902
Canvas, etc.....	77,306	4,005	114,701	196,012
Cement.....	26,241	646	38,144	64,831
Chains.....	34,328	4,528	1,531	40,387
China, etc.....	165,114	947	48,239	214,300
Copper.....	30,620	1,402	13,323	45,345
Cordage and twine	141,520	5,151	15,912	162,583
Cutlery.....	106,524	4,723	15,750	126,997
Electrical materials	141,484	18,844	45,498	205,726
Fancy goods.....	148,220	11,698	88,159	248,077
Fibre.....	9,946	.....	129,557	139,503
Filters.....	2,019	211	902	3,132

Items	United Kingdom.	United States.	Other Countries.	Total.
Floor cloths.....	£275,620	£625	£12,897	£289,151
Furniture.....	83,131	57,842	78,030	219,003
Glass.....	38,360	77	69,154	107,591
Glassware.....	54,540	27,171	77,437	159,148
Glue, etc.....	14,563	4,009	3,338	21,910
Greases.....	6,287	8,536	337	15,160
Implements.....	58,530	228,243	45,385	332,158
India rubber.....	182,092	24,310	137,135	343,537
Insecticides, etc..	39,632	2,274	9,735	51,641
Iron and steel....	1,430,983	77,089	121,913	1,629,985
Lamps and lamp-ware.....	34,671	21,065	29,771	85,507
Lead.....	4,127	.....	3,261	7,388
Leaf and foil....	10,462	958	8,994	20,414
Leather and mfrs.	236,241	60,649	302,890	319,833
Machinery.....	1,002,769	463,736	184,517	1,651,022
Machine tools....	41,772	36,674	6,391	84,837
Mats.....	7,721	364	12,595	20,680
Metals, mfrs. of....	1,397,589	426,660	465,333	2,289,582
Naphtha.....	1,159	12,110	6,789	20,058
Oils.....	155,975	490,376	159,215	805,566
Paints, etc.....	236,055	42,081	15,240	293,376
Paperhangings...	33,861	2,080	6,845	42,786
Pitch and tar....	7,786	999	623	9,408
Plaster of Paris, etc.....	655	9,391	498	10,544
Plumbago.....	994	284	1,270	2,548
Quicksilver.....	17,029	.....	2,159	19,188
Rails, etc.....	110,624	52,983	42,484	206,091
Resin.....	3,155	41,391	133	44,679
Ships' fittings....	1,218	.....	811	1,229
Spelter, etc.....	3,407	.....	30,955	34,362
Stone.....	26,307	15,527	18,436	60,270
Tents, etc.....	1,919	.....	367	2,286
Tiles.....	10,523	4,542	11,715	26,780
Timber.....	5,855	377,931	688,489	1,072,275
Tin.....	214,877	.....	777	215,654
Tools of trade....	141,940	123,572	12,115	277,627
Turpentine.....	788	39,672	66	40,526
Varnishes.....	49,540	7,154	535	57,229
Vehicles.....	234,313	100,002	62,945	397,260
Whiting.....	4,640	.....	268	4,908
Wicker, etc., mfrs.	1,005	884	16,653	18,542
Zinc.....	3,040	.....	.....	30,955
Unenumerated...	14,280,787	1,570,124	6,614,964	22,465,875
Total.....	£22,074,717	£4,461,328	£10,781,405	£38,317,450

EXPORTS TO COUNTRIES BEYOND THE COMMONWEALTH.

Item.	Australian Produce.	Other Produce.	Total.
Anchors.....	.....	£586	£586
Arms, etc.....	£2,190	10,651	12,841
Bags and sacks....	1,039	12,120	13,159
Belting.....	744	3,805	4,549
Boats, etc.....	4,774	6,479	11,253
Brass.....	1,084	6,187	7,271
Brit. metal, etc....	3,857	7,517	11,374
Brushware.....	635	1,916	2,551
Calcium carbide..	.....	3,317	3,317
Canvas.....	9	3,891	3,900
Cement.....	1,076	3,089	4,165
Chains.....	35	2,382	2,417
China, etc.....	1,789	3,177	4,966
Coal.....	861,692	.....	861,692
Coke.....	3,105	.....	3,105
Copper.....	2,103,101	3,895	2,106,996
Cordage and twine...	5,631	20,445	26,076
Cutlery.....	119	4,448	4,567
Electrical materials..	697	15,611	16,308
Fancy goods.....	2,076	7,561	9,637
Fibre.....	.....	1,098	1,098
Filters.....	99	62	161
Furniture.....	6,685	5,698	12,383
Glass.....	59	610	669
Glassware.....	11,989	10,450	22,439
Glue, etc.....	12,024	823	12,847

Items.	Australian Produce.	Other Produce	Total.
Gold.....	£5,269,843	£40,079	£5,309,922
Grain.....	5,499,504	26,915	5,526,419
Greases.....	663	1,018	1,686
Implement.....	35,532	11,576	47,158
India rubber.....	26,047	6,471	32,518
Insecticides, etc.....	1,320	1,227	2,547
Iron and steel.....	2,498	36,105	38,603
Lamps and lampware.....	181	3,208	3,389
Lard, etc.....	16,120	43	16,163
Lead.....	828,838	148	828,986
Leather and mfrs.....	528,003	12,652	540,655
Machinery.....	24,950	65,799	90,749
Machine tools.....	194	2,530	2,724
Mats.....	38	182	220
Metals, mfrs. of.....	43,871	60,238	104,109
Naphtha.....	3	1,268	1,271
Oils.....	149,921	43,353	193,274
Ores.....	286,234	77	286,311
Paints and colors.....	1,745	10,804	12,549
Paperhangings.....		14	14
Pitch and tar.....	2,965	251	3,216
Plaster of Paris.....		236	236
Platinum.....	825	684	1,509
Plumbago.....	188	55	243
Quicksilver.....		155	155
Rails, etc.....	88	9,441	9,529
Resin.....		212	212
Shale.....	28,304		28,304
Ships' Fittings.....	21	258	279
Silver.....	1,824,224	1,263	1,825,487
Skins.....	2,112,395	446	2,112,841
Specie.....	4,255,703	1,421,660	5,677,363
Spelter.....	780,003	46	780,049
Stone.....	1,307	336	1,643
Tallow.....	784,709		784,709
Tents, etc.....	663	347	1,010
Tiles.....	1,101	410	1,511
Timber.....	1,011,559	15,933	1,027,492
Tin.....	967,729	1,416	969,145
Tools of trade.....	865	7,537	8,402
Tortoiseshell.....	2,812	1,837	4,649
Turpentine.....		867	867
Varnishes.....	466	1,007	1,473
Vehicles.....	5,838	8,629	14,467
Wicker, etc.....	681	383	1,064
Wool.....	19,822,216		19,822,216
Zinc.....	1,989	1,142	3,131
Unenumerated.....	6,802,038	789,277	7,591,315
Total.....	£54,127,758	£2,713,277	£56,841,035

None of the details of Canadian-Australian trade are given in the above tables.

The import trade for home consumption, of both dutiable and non-dutiable articles, and the export trade of articles of Canadian production in a term of years was as under.

VALUE OF IMPORTS INTO CANADA FROM AUSTRALIA.

	Dutiable.	Free.	Total.
1902.....	\$39,960	\$112,923	\$152,883
1903.....	14,225	82,684	96,909
1904.....	21,350	78,409	99,759
1905.....	29,670	133,296	162,972
1906.....	28,383	195,796	224,179

VALUE OF DOMESTIC EXPORTS FROM CANADA TO AUSTRALIA.

	Home Produce.
1902.....	\$3,840,730
1903.....	1,931,541
1904.....	2,318,859
1905.....	1,880,038
1906.....	2,079,502

JAMAICAN TRADE.

Some rather remarkable trade fluctuations are exhibited in the annual report of the governor of Jamaica for the fiscal year 1905.

The imports amounted to \$8,137,761 and the exports to \$6,991,700, both being, with the exception of the year 1901, so far as imports are concerned, the lowest for the past decade, during which period the import average has been \$8,477,929 and the export average \$8,670,155 per annum. The decline appears difficult to explain since no pronounced cause is apparent, but as regards imports it is not improbable that the heavy customs duties, which amounted to nearly a quarter of the total value of dutiable goods, restricted inward shipments. The value of imports per head in the last five years declined to \$10.49 from \$14.35 for the previous five-year period, the value of exports per head falling in the same period from \$13.27 to \$10.79.

Of the imports Great Britain supplied 21 per cent. and the United States 58 per cent., and much the same proportions prevailed as regards the exports. The most serious decreases occurred in bananas, log-wood, coconuts, ginger, and oranges, which between them represent a fall of \$800,052; bananas alone during the last three years have dropped from \$5,522,504 to \$2,502,354. The only notable increases have been in pimento and log-wood extract, which have come up \$312,429. The value of the total shipments of pimento amounted to \$666,710, the highest of the decade. Tobacco cultivation has made great progress in recent years, and the amount exported in the fiscal year named was \$109,009, which is \$31,632 more than the average of the decade. Other leading products of the island last year, however, compared badly with the decennial average, as witness the following examples:—Sugar, \$566,460, against \$799,079; rum, \$450,637, against \$648,703; coffee, \$414,625, against \$912,468.

A curious point about sugar is the reversal of the proportions taken by Canada and the "States" during the last three years. In 1903 the latter took 150 times as much as the Dominion, now Canada takes 34 times as much as the American Republic.

ADVERTISING A MORE POWERFUL FACTOR.

An American contemporary very correctly sizes up what is probably the greatest reason why British manufacturers do not compete successfully with their American competitors for Canadian trade. It speaks of the flood of literature which overflows from the United States into Canada, carrying the advertising of American houses which has shut out British business to a large extent—that merchants find that advertising overbalances patriotism in commercial matters. It says:

"If the British manufacturers who want to increase their Canadian business would adopt the advice and listen to the appeals set before them by students of the trade conditions existing between England and Canada, they will soon be more largely represented in the advertising pages of Canadian publications than

they ever have been. Englishmen have been trying for a long time to figure out why it is so hard for them to secure Canadian trade while their American competitors experience little difficulty in booking big orders at frequent intervals. Englishmen are now being told with impressive iteration that they fail to get the business because they do not advertise in Canadian papers.

"At the recent congress of the chambers of commerce of the British Empire a resolution was presented by a Toronto delegate and seconded by one from Montreal recording the opinion that the British government should adopt such rates of postage as would encourage the circulation of British newspapers and periodicals in all parts of the empire. The Canadians said that their fellow-countrymen naturally prefer British and Canadian literature rather than the American article, but in absence of what they most desire they have to take what they can most easily get. Canada is inundated, they said, with American literature and advertisements, to the disaster of British trade interests as well as of sentiment.

"According to an Ottawa merchant who has given ample attention to the subject, Americans advertise in Canada to an extent that would surprise most British manufacturers. 'Most of their advertising,' he says, 'may be described as accidental. It is due to the enormous sale which American publications have in Canada. American advertisers use these publications primarily to reach American buyers; but after the enormous protests against this American advertising, which were made before the tariff commission, there can be no doubt that this American advertising in the Dominion, whether accidental or part of the general advertising policy of American manufacturers, transfers an enormous amount of business to the United States, which might under other circumstances be divided between Canadian and British manufacturers.

"Apparently British manufacturers are not convinced that advertising in Canada would do them any service. I am familiar with all the leading papers in Canada, and I have watched their advertising pages with a new interest since I heard so many complaints of American advertising in Canada when I was travelling with the tariff commission, yet as far as I can discover, there are not more than half a dozen British manufacturers who have sufficient faith in Canada to conduct a systematic advertising campaign there. American manufacturers advertise in Canada to create a demand for the output of their factories, and almost every line of American manufacture is advertised in this way. If an American is advertising shoes or dress fabrics he gives a distinctive trade name to his goods, and advertises his specialty to familiarize Canadians with the name, trusting that when once they have become familiar with it and with its advantages, as he has described them, they will ask for his goods, and that as a result of this popular demand the jobbers and wholesalers will be compelled to stock them and offer them to the retailer.'

"A few British manufacturers of proprietary goods advertise in Canada to create a demand at the retail

stores. But not nearly so many of these British proprietary goods are advertised in Canada as in England, while as regards British manufacturers of household and dress fabrics the idea of advertising in Canada so as to create a popular demand on the retailers for their goods has apparently never presented itself to more than two or three firms. In the spring, and again in the autumn, commercial travellers from Great Britain are to be encountered in the smallest Canadian towns.

"It cannot be said that there is any general neglect of Canadian opportunities so far as the sending out of commercial travellers is concerned; but, with few exceptions, British manufacturers do not attempt to prepare the ground for their commercial travellers by advertising. It cannot be objected that there are serious difficulties in the way of advertising. It would be very costly for British manufacturers to follow the example of American manufacturers, and use the advertising pages of the American magazines for the sake of the small section of the circulation of these magazines which penetrates into Canada. But while Canada has no monthly publications of large and Dominion-wide circulations, there is no shortage of newspapers, and as newspaper postage in Canada is exceedingly cheap, there are few Canadian offices or homes, in which newspapers are not received.

"With thousands of immigrants reaching Canada every year from the British Isles, a large percentage of Canada's population is naturally predisposed in favor of British goods, but, as matter of fact, this predisposition amounts to nothing in the face of the advertising which floods Canada from the United States, and which is constantly creating an interest in American goods at the expense of British goods, which both the native Canadians and the new settlers would naturally be supposed to prefer. The Englishmen have discovered that the fact that the United Kingdom and Canada are both under one flag does not alone create a demand in Canada for British goods, or, in other words, that advertising is a more powerful factor in international trade than patriotism."

METAL ROOF CONSTRUCTION.

There has for some time been a dispute between the advocates of tin roofing and various forms of tar and gravel roofing, as to the relative merits of the two materials, particularly as to their power for withstanding fire. Each school of roofing has its strong advocates. The metal trade, as might be expected, is an ardent advocate of tin as a roofing material.

The National Association of Master Sheet Metal Workers at a recent convention proceeded to demonstrate by actual experiments the superiority of tin over other styles of roofing. They went so far as to conduct a fire test which they endeavored in every way conceivable to make as fair as possible, and the result of their tests, according to their reports, is a conspicuous vindication of tin.

It now remains for the advocates of tar, gravel, phalt,

asbestos and similar materials to conduct their tests and report their conclusions. The experiment of the metal workers was held in Indianapolis. There is an immense demand for American roofing materials throughout the countries of Central and South America and South Africa, hence the Indianapolis experiment is naturally of interest to a large portion of export trade. Two small, low buildings, or rather roof supports, were constructed for the experiments. The structures were deemed all that was necessary to demonstrate the relative fire protective qualities of the tin roof and the tar, slag or gravel roof, as it is ordinarily applied.

It was decided that the test be conducted as nearly as possible under the same conditions as those to which a building would be subjected when an adjoining building was on fire and the wind blowing across it. To the insurance interests and roofers this was of special interest, inasmuch as a fire had visited Indianapolis some time since, burning down many buildings. The flames leaped across a building with a tin roof and caught on a building with a tar roof 40 feet from the building that was burning, and thus the conflagration was extended.

The arrangements for the experiment were for a fire to be built alongside of the structures, and a shield was provided to throw the flames directly upon the two roofs. The structures were low, consisting of brick walls inclosing a space 8 by 12 feet in area and supporting timbers which were but two inches above the ground at one end and eight inches at the other. The roof timbers were two by four inches in size and supported on inch yellow pine sheathing. The brick walls, the carpenter work and the timbers were as nearly as possible exactly alike in both cases.

One roof was finished with standing seam tin roof, with a gutter running across the end along which the fire was built. Low battlement walls were on the two sides. The fourth edge of both roofs was finished in a careful and workmanlike manner, as they would be on a regular building. The tar or gravel was covered with three-ply No. 2 felt, laid with 80 pounds of melted pitch, and was given a heavy coat of fine gravel. Along the sides of each roof where the fire was to be built, three two-inch wrought iron pipes bent in a half circle were firmly embedded in the ground at one end, and to the other was attached corrugated iron to serve as a shield to throw the flames from the fire down on the top of the roofs.

Space was provided below the corrugated sheets for the entrance of air to keep up a lively conflagration. The space between the wall and the corrugated iron was 1½ feet. The structures were carefully examined by the representatives of the insurance interests, the tin plate manufacturers and others, among whom there were many who do gravel roofing as well as tin roofing. The fire was lighted with a slight wind blowing from the shields toward the buildings, so as to carry the flames across their surface.

Four minutes after the fire was started the gravel roof was on fire and sending up a dense smoke. At this time it was thought that a more severe test could

be made if the openings were made under each of the buildings, and in consequence on the left-hand side and at the point nearest the fire a break was made in the wall of both structures, so that air could enter freely and on the opposite corner of the structures other openings were made so that there was a circulation of air underneath the roof timbers.

In 10 minutes the gravel roof was completely on fire, and inside of three-quarters of an hour little flames were shooting through the cracks in the sheathing, showing that the whole structure was on fire. At this time the fires were allowed to die down, and in order to discover the condition of the sheathing boards and the roofing, the tin roofing was torn off and the sheathing boards on the gravel roof were opened up.

It was clearly shown that under the tin plate the roof boards were somewhat charred, while the timbers of the gravel roof had been on fire and only needed a little more time to break out in a blaze which would have completely consumed it. The insurance inspectors assured themselves that the conditions under which the test was made were as nearly identical as possible; that the fire applied was practically of the same strength with the same amount of fuel used at both structures, and according to the metal workers, the test demonstrated that, as a protection against fire, the tin roof was vastly superior.

A comparatively new article in the line of metal ceilings is now counted upon to work a veritable revolution in the art of ceiling construction. The new article is known as encaustic metal. It is as distinct from the old-fashioned painted metal ceiling as is tile. Their only point in common is the stamped steel from which both are made.

Encaustic metal is a combination of stamped steel sheets and coatings of patent flexible enamel. Each coat of enamel and also the gold decorations are burned on to the metal separately under intense heat. The finished product is a flexible, durable, enameled sheet that will retain its original beauty of color and finish indefinitely.

Enamel, either porcelain or otherwise, with its hard, non-porous and highly polished surfaces, is always a desirable article to use where it is a question of exposure to wear and tear through daily use or the actions of the elements. Ever since metallic ceilings have come into general use through their many points of excellence over wood and plaster, the need of a better surface than that given by paint has been generally realized and a substitute eagerly sought for.

It is claimed that the new enameling process possesses all the qualities that have for years been sought in order to manufacture a perfect ceiling. The metal cannot rust, for it is thoroughly coated on both sides. The enamel is never brittle, but hard and elastic, retaining its lustre permanently; the gold decorations will not tarnish. These ceilings are said to add 10 per cent. to the light and brightness of a room. In the matter of cost are not as expensive as the ordinary painted metal ceilings, for they never need redecorating, and in beauty are equal to frescoes.

ACETYLENE.

Considering the fact that the cheap production of carbide, of which acetylene gas is produced, is a Canadian invention; and that the utilization of it for domestic and industrial purposes has become prevalent throughout the world, and that the manufacture of both carbide and acetylene apparatus is a most valuable industry in many countries, it is surprising that more attention is not given to it in Canada. In the United States the industry is being followed up most vigorously; and a few weeks ago the International Acetylene Association held a convention at Atlantic City at which much valuable information was made public.

According to the Acetylene men, the development of the industry in the United States during the past 12 months must be considered as a whole, very satisfactory, but the possibilities for the future are limitless, and if the generator manufacturers and dealers and the manufacturers and sales agents of acetylene supplies go forward in a spirit of friendship and co-operation, there can be no doubt that acetylene will more and more rapidly take its proper place in the realm of light.

The number of acetylene town plants in the United States has continued to increase, and most of the new plants have been more carefully constructed and are giving better service and better returns to the investors than plants built in the earlier years. It is true that some of the town plants in the United States are not paying dividends to the owners. Germany, France and other European countries have had the same experience, namely, that the earlier plants were of inferior construction and unnecessarily expensive, and, for these reasons, not profitable. It is hoped that the new plan to sell carbide in special packages and at special prices for town lighting use, will be of material assistance, both to the promoter and the owner of such installations.

At the present time, nearly 100 railroads are using acetylene for locomotive headlights, in station lighting, and for coach lighting. The Great Northern Railway, the Delaware, Lackawanna & Western, and the Canadian Pacific, have adopted and are using acetylene for lighting their regular coaches, and the New York, New Haven & Hartford railroad is just completing its acetylene plant for the same purpose.

Acetylene has come to be the every-night light for automobiles, carriages, yachts, and other moving vehicles, and is rapidly becoming a standard for government lighting for buoys, beacons, and lighthouses. It is now commonly used for heliograph and for the surgeon's use in the army and navy, is displacing oil in mining lamps, is found to be the perfect light for use by manufacturers of steel tools, where the determination of the true color is an important factor, and the use of acetylene for welding all kinds of materials is not only practical but economical.

In Europe more attention has been given to developments along these lines than in this country. Acetylene has not yet come into common use for power purposes, but it seems reasonable to expect that, as both light and power can be carried so conveniently and in such

small space, means to utilize acetylene as power for auto vehicles of various kinds will be invented.

Several European manufacturers of carbide, notably those of France, Norway, and Italy, are experimenting and looking for a very large output of carbide to be used in the production of the new fertilizer, cyanamide, which, it is expected, will largely take the place of the Chilean nitrate. This development, if it proves practicable, will still further increase the general knowledge of carbide and acetylene, and the greater the knowledge of the subject, the more rapidly progress will be made in the use of acetylene for lighting and for commercial purposes.

Perhaps the most important field for the use of acetylene is, however, the individual generator for installations of all sizes, from the cottage, with a half a dozen lights, to the large hotel, with five or six thousand burners. In this field acetylene is becoming more and more largely used, and, what is most encouraging, generators installed during the past two or three years stay in use to a very much greater extent than the generators of earlier makes. As a result we may expect more than a proportional increase in the output of acetylene generators, as the manufacturers now seem to produce generators which a user can recommend to his neighbor, instead of suggesting that he wait a while until the machines are improved.

One of the greatest possibilities for the manufacture of generators and acetylene supplies in the United States, is for the export trade. South Africa, Australia, the Argentine Republic, and other South American countries, are rapidly becoming rapid users of acetylene, and there is a constant and growing demand for practical automatic generators, and it seems that the American manufacturer leads the world in the quality and practicability of automatic machines. Less attention has been given to the exporting of acetylene generators than the possibilities warrant. This is a matter worth the consideration of the manufacturers of generators and acetylene accessories.

In the fire insurance field, there have been no material changes. In certain limited districts, such as New England, and in the suburban territory about Philadelphia, the insurance associations try to insist that all generators, even those on the permitted list, shall go outside the insured premises. It happens, however, that more and more of the large insurance companies are employing their own engineering force and are deciding for themselves whether the introduction of acetylene for lighting increases the fire hazard.

There have been few cases during the past year where the user of a permitted generator has had much, if any, difficulty in securing a permit for its use. In fact, the use of acetylene is becoming so common, that it must soon be considered as one of the ordinary forms of artificial light which all insurance policies contemplate will be used. In other words, it seems that the time is rapidly approaching when issuing a permit for the use of acetylene will be purely a matter of form, provided a properly accredited machine is used.

That acetylene is no more dangerous than other forms of artificial light, and that calcium carbide in the original packages is not hazardous and should not be classed with dynamite and gunpowder, has been amply demonstrated. A fire in a carbide warehouse at Chattanooga, starting from an overturned lantern, consumed a merry-go-round outfit and other material stored in the same room, and practically burned down the building, but did no damage whatever to the stock of carbide. It is also encouraging that city councils, fire marshals, and even insurance inspectors, are gradually becoming familiar with calcium carbide and acetylene, with the inevitable result that they no longer fear it.

It was, perhaps, unavoidable that a new light of better quality than the ordinary artificial illuminants should meet with all sorts of obstacles before it became firmly established, but with the continued increase of trained engineering and business ability in the industry, acetylene has been steadily gaining ground in the field of illumination.

EDITORIAL NOTES.

The total value of dutiable merchandise imported into Canada in 1905 for home consumption was valued at \$150,928,787, the amount of duty collected thereon being \$42,024,339. In the same year, 1905, the total amount of duties collected upon dutiable merchandise imported into Great Britain was £33,565,444, the equivalent of which, in Canadian currency, was \$163,463,712.

The total amount of duties collected upon merchandise imported into the United Kingdom in 1905 amounted to £33,565,444, the equivalent of \$163,463,712. For a free trade country this is doing remarkably well.

Facilities in the way of ports and docks are not keeping pace with the growth of the larger ocean steamships, in size and numbers, we are told by an editorial writer in Engineering News. Large ocean ports, he says, are facing problems of enlargement to accommodate not only the increasing size of steamers, but the growing number of large steamers. An English engineer of large experience in harbor works is quoted as authority for this statement, which is asserted to hold good even with allowance for the fact that commercial and financial conditions limit to a comparatively small figure the number of ports which need to accommodate the largest vessels. The writer goes on to say:

"The ports of this country have the advantage of such moderate ranges of tide level that they do not require such costly enclosed masonry docks, with locks, gates, and operating machinery and other accessories, as are usually necessary at European ports. The vessels merely lie at piers or in open slips, and in such cases the deepening for larger vessels may perhaps be obtained simply by dredging. Even if reconstruction is necessary it will, of course, be a much simpler and less expensive process than that of the reconstruction of masonry docks and their auxiliary works. At the same time it must be borne in mind that several of the important ports of this

country are admittedly defective in their capacity for accommodating shipping, and for the handling and storage of freight. It is highly probable that within the next few years a considerable degree of attention will have to be given to this matter, both by the engineers of the port works and those of the railways having terminals at these ports. Among the improvements to be undertaken will be wider and deeper approach channels, better piers, better warehouses and railway facilities, and a wider introduction of methods for the mechanical handling and conveying of freight. At some of the ports on the Great Lakes, also, the present facilities are proving to be inadequate for the efficient and economical accommodation of the huge modern ore-carriers and freight-boats, so that there will be extensive revision and reconstruction of piers, wharves, river and harbor channels, etc. One other special feature to which reference may be made is that of dry-dock accommodation. There are at present throughout the world very few dry docks capable of taking the largest ships afloat, whether naval or of the merchant marine. Besides the occasional docking for inspection and cleaning, the possibility of accidents has to be reckoned with, and it seems inevitable that the increasing number of large ships must lead to the construction of a number of dry docks capable of accommodating these great vessels."

The first quarter of the present financial year, closed September 30, with a total aggregate foreign trade for Canada of \$150,435,000, being \$26,774,479 more than for the same period of 1905. The imports, including coin and bullion, for this period were \$80,141,527, a gain of \$12,148,682. Exports of all kinds reached a total of \$70,293,473, an improvement of \$14,625,797 as against the first three months of the previous fiscal year. Exports of domestic products were \$9,312,435 more, the total being \$61,938,024. One class of exports showed a falling off, viz., fisheries, amounting to \$380,000. The largest increase in exports of domestic products was animals and their produce, \$3,214,332, lumber came next with a gain of \$3,125,346, and agricultural products third with \$2,515,621. The total betterment in the classes of exports in which the farmers are mainly interested was \$5,729,953. Exports of manufactures were \$326,238 ahead of the first three months of 1905. The comparative statement of imports and exports for the quarter is as follows:

	1905.	1906.
Imports—		
Dutiable goods.....	\$41,516,041	\$48,003,224
Free goods.....	23,796,465	30,405,020
Total.....	\$65,312,506	\$78,408,244
Coin and bullion.....	2,680,339	1,733,283
Grand total.....	\$67,992,845	\$80,141,527
Duty collected.....		
Domestic exports—		
The mine.....	\$7,396,750	\$7,843,749
The fisheries.....	3,100,871	2,720,357
The forest.....	11,176,690	14,302,036
Animals and their produce.....	20,984,300	24,198,632
Agriculture.....	4,827,623	7,343,244
Manufactures.....	5,120,621	5,446,859
Miscellaneous.....	18,734	83,147
Total.....	\$52,625,589	\$61,938,024

CAPTAINS OF INDUSTRY.

The following items of information, which are classified under the title "Captains of Industry," relate to matters that are of special interest to every advertiser in these pages, and to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

The Economic Power, Light & Heat Supply Co., York Street, Toronto, have sold a 90 h.p. Pintsch suction gas plant and National gas engine to Christie, Brown & Co., Toronto.

Canada's foreign trade for the three months ending September 30, 1906, was \$150,435,000, an increase of \$26,774,479 as compared with the same quarter last year. The imports show a gain of \$12,148,682 and the exports of \$14,625,797.

The Robb Engineering Co., Amherst, N.S., have secured the order for new steam plant which Ganong Bros., St. Stephen, N.B., are installing. The plant will be a 150 h.p. Corliss engine and two 150 h.p. boilers.

Hugh W. Glassford has registered as proprietor of the Standard Automatic Sprinkler Co., Montreal.

E. S. Stephenson & Co., engineers and machinists, St. John, N.B., have suffered damage by fire, not insured.

The Windsor, Essex & Lake Shore Electric Railway Co., Windsor, Ont., will erect a power house at Kingsville, Ont.

The Consumer's Gas Co., Toronto, will erect new gas works at a cost of about \$1,000,000 which will increase the city's supply to two and a half million feet.

It is reported that the Canadian Pacific Railway Co. will construct a line from Woodstock to Brantford, Ont., next spring.

Large disposal works and sewerage system will be constructed at Hamilton, Ont., at a cost of about \$100,000.

The ratepayers of Hespeler, Ont., voted favorably on a by-law to loan \$15,000 to the Hespeler Machine & Tool Co., which industry will be established there.

Messrs. Jones Bros., Toronto, manufacturers of fire brick, whose plant was destroyed by fire recently have begun the erection of a new factory.

Messrs. Simon Bros., Warton, Ont., will erect a factory there.

The premises of the Lake View Hotel, Portsmouth, Ont., was destroyed by fire recently. Loss about \$4,000.

The High School Board, Picton, Ont., invite tenders up to November 12 for the construction of a Collegiate Institute building.

A hospital may be erected at Port Hope, Ont., at a cost of about \$40,000.

The Transportation building and grand stand at the exhibition grounds, Toronto, were destroyed by fire recently. Loss about \$200,000.

A fire hall will be erected on Adelaide Street West, Toronto, at a cost of about \$75,000.

The Grand Trunk Railway Co. will erect a station at St. Mary's, Ont.

The J. A. Robertson Co., Toronto, have been incorporated with a capital of \$500,000, to manufacture lumber, timber, metals, sewer pipes, brick, tile, etc. The provisional

directors include J. S. Lovell, W. Bain and W. F. Ralph, Toronto.

The Canadian Refining Co., Ottawa, have been incorporated with a capital of \$2,000,000, to carry on a refining, smelting, milling and mining business. The provisional directors include H. Roy, Ottawa, E. Hoffman, New York City, and R. Dieffenbach, Newark, N.J.

The premises of the Knox Presbyterian church, Kent Bridge, Ont., were destroyed by fire recently.

The premises of the Constructing & Paving Co., Toronto, were destroyed by fire October 21. Loss about \$35,000.

The packing house of the Wm. Davies Co., Toronto, was damaged by fire October 21. Loss about \$6,000.

The Hebrews of Kingston, Ont., will erect a synagogue at a cost of about \$10,000.

The McClary Mfg. Co., London, Ont., will erect a five story warehouse 250x100 feet.

The Kingston Foundry Co., Kingston, Ont., have been awarded the contract to construct a steamer for the Huntsville, Lake of Bays & Lake Simcoe Navigation Co., which will cost about \$22,000.

An addition will be erected to the Hotel Dieu Hospital, Windsor, Ont.

A new Orange hall and club rooms may be erected on Clinton Street, Toronto.

The ratepayers of Gravenhurst, Ont., will vote on a by-law to raise \$45,000, for establishing an hydro-electric power plant at South Falls and transmission to the town.

T. R. White, Almonte, Ont., will erect a new store there.

The ratepayers of Port Colborne, Ont., voted favorably on a by-law to exempt from taxation the Great Lakes Portland Cement Co. and the Canadian Portland Cement Co.

A new boat will be built at Peterborough, Ont., for the Department of Railways and Canals, which will be used next season on the Trent Canal. The cost will be about \$5,000.

The Lake Superior Corporation, Sault Ste. Marie, Ont., will erect an addition of 500 feet to their ore dock. An additional blast furnace is also being considered.

The citizens of St. Catharines, Ont., will construct a turning table and wharf on the Welland Canal at that point.

The Dominion Government will construct a new fish hatchery at Warton, Ont., at a cost of about \$12,000.

C. C. Delbridge, Kenora, Ont., will erect a four story hotel at a cost of about \$80,000.

The General Electric Co., Schenectady, N.Y., will erect a mica factory, 150x70 feet, at the Chaudiere, Ottawa.

Negotiations are under way for the establishing of a carriage frame factory at London, Ont. Mr. Gould, London, Ont., is interested.

It is stated that the United Zinc Co.,

Boston, Mass., will establish a branch at Toronto.

Wm. Neilson, Toronto, will erect a factory and stable on Gladstone Ave. at a cost of about \$15,000.

Tenders are invited up to November 5 for supply of pumping machinery for the waterworks, Preston, Ont.

The ratepayers of St. Mary's, Ont., will vote on a by-law to grant a loan of \$40,000, to the proposed North Midland Railway Co.

The Grand Trunk Railway Co. will construct a spur line at Fergus, Ont.

The Department of Railways & Canals, Ottawa, will shortly call for tenders for the construction of a canal from Newmarket, Ont., to Holland Landing, Ont., the construction of which will afford navigation into Lake Simcoe, and thence into the Trent waterway.

A sewerage system will be installed at Brampton, Ont., at a cost of about \$32,000.

A waterworks system will be installed at New Liskeard, Ont., at a cost of about \$60,000.

The waterworks and sewerage systems, Welland, Ont., will be extended.

It is stated that the Grand Trunk Railway Co. will remove their Stratford shops to Brantford, Ont.

The Central Heating Co., Hamilton, Ont., and the Dominion Heating Co., of the same city, have amalgamated.

J. D. Membery, Hamilton, Ont., will erect an addition to his factory at a cost of about \$500.

The Great Central Oil & Gas Co., Petrolea, Ont., have been incorporated with a capital of \$100,000, to manufacture oil, gas, petroleum, etc. The provisional directors include J. W. Craise, Petrolea, Ont.; H. E. Crandall, and F. A. Ansell, Bradford, Pa.

The Two Lakes Copper Mining Co., Sowerby, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include F. W. Bailey, Sowerby, Ont.; L. L. Lucas and J. P. Russell, Oil City, Pa.

The Cinderella Shoe Co., Hamilton, Ont., have been incorporated with a capital of \$100,000, to manufacture boots, shoes, rubbers, etc. The provisional directors include G. F. Glasco, F. W. Gates and W. A. Stewart, Hamilton, Ont.

The City of Cobalt Mining Co., Cobalt, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include M. Carr, J. H. Hunter, Cobalt, Ont., and W. D. Hogg, Ottawa.

The Courier Press, Toronto, have been incorporated with a capital of \$40,000, to carry on a printing, publishing and engraving business. The provisional directors include J. A. Cooper, W. H. Moore and L. W. Mitchell, Toronto.

The Cleveland Cobalt Silver Mines, Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include H. S. Pritchard, G. C. Campbell and J. Lewis, Toronto.

A four room addition will be erected to the Chesley Avenue School, London, Ont., at a cost of about \$7,475.

Messrs. Baldwin & Haining, Sault Ste. Marie, Ont., have been awarded the contract for the construction of the town hall, Steelton, Ont., at a cost of about \$5,990.

The Rosedale Public school, Toronto, will be enlarged at a cost of \$17,575.

The first part of Riverdale High school, Toronto, will be erected at a cost of about \$57,473.

The ratepayers of Alvington, Ont., will vote on a by-law to raise \$6,000, towards establishing a basket and nail keg factory, and \$3,000 towards the enlargement of E. Warners' woolen mill.

The Stanley Mills Co., Hamilton, Ont., will erect a large building there.

The McGregor-Gourlay Co., Galt, Ont., will erect a new moulding shop, 210x140 feet.

The Toronto Plate Glass Co., Toronto, will erect a new factory at a cost of about \$16,000.

The Minerva Mfg. Co., Toronto, intend erecting a factory at a cost of about \$40,000; also a block of stores on College Street at a cost of about \$60,000.

The Canadian Pacific Railway Co. will erect a large office building at Hamilton, Ont.

The Northern Pyrites Co., Dinorwic, Ont., have bought from Allis-Chalmers-Bullock, Limited, Montreal, a mining plant consisting of a one-half duplex "Ingersoll" air compressor, "Ingersoll" rock drills, "Lidgerwood" hoisting engine, boilers, ore buckets, etc.

The Wet Process Reduction Co., Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include G. E. Kingsley, C. B. Jackes and H. M. Asling, Toronto.

The Canada-American Mining & Development Co., a company incorporated in New York State, have been granted a license to do business in Canada, and have appointed Alexander Fraser, Niagara Falls, Ont., to be their attorney.

A new sanitarium will be erected in connection with the Toronto Free Hospital for Consumptives at a cost of about \$27,000.

The apple evaporator of F. Blonsdale, Delaware, Ont., was destroyed by fire October 25. Loss about \$9,000.

The Adams Furniture Co., Toronto, will erect a factory on Victoria Street, at a cost of about \$30,000.

The Department of Railways and Canals, Ottawa, invites tenders up to November 29, for the surplus water power on the Trent Canal.

Allis-Chalmers-Bullock, Limited, Montreal, recently sold to George H. Archibald, Kenora, Ont., one 100 h.p. induction motor, two 75 h.p., two 40 h.p. and two 7½ h.p. induction motors.

The premises of the Dymont Foundry Co., Barrie, Ont., were destroyed by fire October 23. Loss about \$80,000.

The British American Oil Co., Toronto, have been incorporated with a capital of \$200,000, to manufacture oil, petroleum, etc. The provisional directors include H. Babel, W. A. Manion and A. L. Ellsworth, Toronto.

The Dominion Photo Supply Co., Toronto, have been incorporated with a capital of

\$40,000, to manufacture cameras, photographs, films, etc. The provisional directors include J. L. Ross, A. W. Holmstead and T. A. Silverthorn, Toronto.

The Canada & United States Oil & Gas Co., Chatham, Ont., have been incorporated with a capital of \$30,000, to manufacture oil, gas, etc., and to carry on a mining, milling and reduction business. The provisional directors include E. I. Barnard, J. W. Shay, Pittsburg, Pa., and P. W. Roth, Buffalo, N.Y.

Publishers, Limited, Toronto, have been incorporated with a capital of \$50,000, to carry on a printing and publishing business. The provisional directors include J. D. Spence, G. A. Walker and J. S. Denison, Toronto.

The Erie Natural Gas Co., Dunnville, Ont., have been incorporated with a capital of \$40,000, to manufacture gas, oil, etc. The provisional directors include W. W. Krick, F. M. Waines and A. A. Root, Dunnville, Ont.

The Harley Kay Knitting Machine Co., Georgetown, Ont., have been incorporated with a capital of \$40,000, to manufacture knitting machinery, knitters' supplies, etc. The provisional directors include F. A. Harley, J. L. Counsell and A. F. Hatch, Hamilton, Ont.

The Silver Lion Mining & Development Co., Cobalt, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include Francis Watt, Toronto, John Black, Cobalt, Ont., and R. T. Mullin, Montreal.

Watts Mines, Limited, Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include W. R. P. Parker, J. A. McEvoy and Gordon Russell, Toronto.

The Canadian Copper Co., Copper Cliff, Ont., have bought from Allis-Chalmers-Bullock, Limited, Montreal, a pumping plant consisting of an 8 inch single stage turbine pump driven by a 70 h.p. induction motor.

The Canada Cloak Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture clothing, etc. The provisional directors include R. R. Perry, J. E. Riley and L. C. Todd, Toronto.

The Corporation of Port Arthur have closed a contract with Allis-Chalmers-Bullock, Limited, Montreal, for an addition to their electric light plant consisting of a 600 k.w. water wheel type generator, exciters, switchboard, etc. The plant at present consists of two 250 k.w. alternating current generators and one 250 k.w. direct current railway generator all of the "Bullock" type.

The sawmill of S. Larue, Mountain, Ont., was destroyed by fire recently.

W. Phair, Fort Frances, Ont., is erecting a large business block there.

The Belleville Rolling Mills, Belleville, Ont., under the superintendency of Mr. V. S. Clowes, started operations a few days ago.

The Merchants Check Book Co., Toronto, will erect a two story factory 90x33 feet.

The Canadian Shipbuilding Co., Toronto, have been awarded the contract by the Chicago & St. Lawrence Steam Navigation Co.,

to build a steel freight steamer 510 feet long, 500 feet on the keel, 56 feet beam and 31 feet deep.

Messrs. Copley, Noyes & Randall, Hamilton, Ont., intend establishing a branch factory at Oakville, Ont.

The Union Brewery Co., Montreal, will erect a large brewery at a cost of about \$10,000.

The parish of St. Georges, Granby, Que., will erect a new edifice at a cost of about \$25,000.

The Sailors Institute, Montreal, will be enlarged and remodelled at a cost of about \$60,000.

C. H. Sharpe, Montreal, will erect a four story glass factory at a cost of about \$19,000.

The Rawdon Lumber Co., Rawdon, Que., have been incorporated with a capital of \$49,000, to manufacture lumber, timber, vessels, etc. The charter members include T. Belanger, Valleyfield, Que.; A. Belanger and J. U. Emard, Montreal.

An addition will be erected to the Mount St. Louis school, Montreal, at a cost of about \$60,000.

A new town hall and fire station will be erected at Notre Dame de Grace, Montreal.

The premises of Messrs. A. Ramsay & Son, Montreal, were damaged by fire recently. Loss about \$5,000.

Jas. Robinson, Montreal, will erect six new stores at a cost of about \$16,000.

The Southam Co., Montreal, will erect a printing office at a cost of about \$35,000.

The Canadian Pacific Railway Co., Montreal, will erect a new building, 176x87 feet, at a cost of about \$38,000.

The International Portland Cement Co., Hull, Que., will double the capacity of their plant there.

An electric light plant is being installed in West Shefford, Que.

A Roman Catholic church will be erected at Lapatrie, Que., at a cost of about \$38,027.

The Montreal Street Railway Co., Montreal, will shortly increase their capital by \$2,000,000. This will make their capital stock \$12,000,000.

A. G. Walker, formerly with Messrs. Williams & Wilson, Montreal, has taken over the Canadian agency of the Jeffrey Mfg. Co., Columbus, Ohio.

W. H. Whitehead, Montreal, has been appointed manager of the Montreal branch of H. G. Vogel & Co., New York City, manufacturers of automatic sprinklers and water curtains.

The Calumet Mining & Milling Co., Calumet, Que., have increased their plant by a 12½ by 18 inch "Ingersoll" air compressor driven by a 50 h.p. induction motor both bought from Allis-Chalmers-Bullock, Limited, Montreal.

A new school house will be erected at Bury, Que., at a cost of about \$6,900.

The Rubber Tire Wheel Co., Montreal, will erect a large garage.

The premises of the Sanatorium Hotel, the Hotel Venise and the Great North Western Telegraph office, Riviere du Loup Wharf, Que., were destroyed by fire October 25. Loss about \$10,000.

The Iberville Lumber Co., whose headquarters are in New York City, are establishing a large saw mill at Sault-au-Nouton, Que., a point on the North Shore of the St. Lawrence, some distance below the Saguenay. The contract has been placed with the Jenckes Machine Co., Sherbrooke, Que., covering the turbine plant to furnish power for the saw mill. This plant consists of two 20 inch special crocker turbines each developing 200 h.p., one special 15 inch crocker turbine developing 100 h.p. all operating under 62 feet head. The three turbines are horizontally set in one large steel case to which the water is conducted through a steel penstock 4 feet in diameter by 150 feet long. All of the turbines are of the cylinder gate type.

It is stated that Messrs. Taylor & McKenzie, Guelph, Ont., will move to Sussex, N.B.

Messrs. Rhodes, Curry & Co., Amherst, N.S., have placed the order for the boilers for their new rolling mills with the Robb Engineering Co., Amherst, N.S. There will be four boilers of 150 h.p. each.

The county court house, Halifax, N.S., will be extended at a cost of about \$20,000.

The machinery in the factory of Messrs. Silliker & Co., Amherst, N.S., was damaged by fire October 25. Loss about \$3,000.

A sewerage system will be installed at Sydney Mines, N.S., at a cost of about \$11,000.

The lands of the Gaspereaux Lumber Co., Digby, N.S., consisting of over 45,000 acres, have been purchased by a New York concern, whose intention is to erect a pulp mill on the Gaspereaux river, as well as to operate the general mills now working.

The Canadian Northern Railway Co. will erect a new station at Virden, Man.

The congregation of the Methodist church, Souris, Man., will erect a new church building at a cost of about \$20,000.

The capital stock of the Winnipeg Paint & Glass Co., Winnipeg, Man., has been increased from \$250,000 to \$500,000.

The congregation of the Nena Street Baptist church, Winnipeg, Man., will erect a church building at a cost of about \$30,000.

A four story public school, 80x80 feet, will be erected at St. Boniface, Man.

It is stated the T. Eaton Co., Winnipeg, Man., will erect an addition to their store there.

The Detachable Boiler Flue Mfg. Co., Winnipeg, Man., have been incorporated with a capital of \$150,000, to manufacture machinery, engines, etc. The provisional directors include F. C. Bell, J. Y. Griffin and E. J. Gifford, Winnipeg, Man.

The Frontenac Building Co., Winnipeg, Man., have been incorporated with a capital of \$50,000, to construct buildings of all kinds, etc. The provisional directors include J. B. Lewis, W. B. Paine and D. M. Macdonald, Winnipeg, Man.

The McLean, McKeown Co., Winnipeg, Man., have been incorporated with a capital of \$20,000, to manufacture lumber, timber, pulp wood, etc. The provisional directors include D. H. McLean, D. McKeown and A. W. Jones, Winnipeg, Man.

The Hygiene Kola Co., Winnipeg, Man., have been incorporated with a capital of

\$50,000, to manufacture kola, celery and pepsin wines, etc. The provisional directors include J. Reid, G. Soames and E. L. Howell, Winnipeg, Man.

Wm. McGraw, Elgin, Man., will erect an opera house with a seating capacity of 300.

The undertaking establishment of Messrs. Clark Bros. & Hughes, Winnipeg, Man., was damaged by fire recently. Loss about \$8,000.

The Federal Life Insurance Co., Winnipeg, Man., will erect several large buildings throughout the West during the coming year.

The Western Iron Works, Winnipeg, Man. have increased their capital to \$100,000.

The W. A. Faulkner Co., Winnipeg, Man., have been established to handle Canadian industrial stocks, municipal debentures, and other securities.

The Woods, Limited, Ottawa, wholesale contractors and lumbermen's supplies, have established a branch in Winnipeg, Man.

P. Burns & Co., Strathcona, Alta., are erecting an abattoir and cold storage building, 60x58 feet at a cost of about \$5,000.

The premises of the new Imperial Hotel, Canora, Sask., were destroyed by fire October 25. Loss about \$12,000.

The Canadian Pacific Railway Co. will erect a new building at Moose Jaw, Sask., to supply acetelyne gas for passenger coaches.

The large grain elevator at Grand Coulee, Sask., belonging to J. Glenn, Indian Head, Sask., collapsed October 5.

A Methodist church is being erected at Ototoks, Alta.

The Evangelical Association, Grayson, Sask., will erect a new church there.

Messrs. J. D. King & Co., boot and shoe manufacturers, Toronto, will establish a branch at Calgary, Alta.

E. H. Rowley, manager of the E. B. Eddy Co., Hull, Que., states there is a strong possibility of the company starting a branch factory at Edmonton, Alta.

Messrs. Chas. Hyman & Co., London, Ont., will erect a large warehouse in Regina, Sask.

The Christian Mission congregation, Ponoka, Alta., will erect a new church building.

Parliament buildings will be erected at Edmonton, Alta.

The council, Saskatoon, Sask., will erect a municipally financed hospital at a cost of about \$30,000.

A city hall and fire hall will be erected at Saskatoon, Sask.

Messrs. Davidson & Co., Strathcona, Alta., will erect a planing mill there.

The Masonic fraternity, Calgary, Alta., will erect a Masonic temple there.

It is stated that the T. Eaton Co., Toronto, have purchased a site in Edmonton, Alta., for a branch of their departmental business.

O. S. Pelitel, Milestone, Sask., will erect an hotel at a cost of about \$40,000.

The congregation of the Roman Catholic church, Saskatoon, Sask., purpose erecting a hospital there.

Messrs. H. F. Anderson & Co., implement dealers, Winnipeg, Man., will establish a branch at Regina, Sask.

The Robb Engineering Co., Amherst, N.S., have received an order from Allis-Chalmers-Bullock, Limited, Montreal, for three 125 h.p. engines for the Canadian Pacific Railway Hotel, Vancouver, B.C.

The first cargo of lumber to leave British Columbia ports for Valparaiso, owing to the recent earthquake in the South America port, is now being shipped from the Fraser River saw mills.

H. J. Gaine and A. Wheeler, of the Canadian Mine & Smelter Supply Co., Victoria, B.C., will erect a factory for the manufacture of mining machinery at Victoria, B.C.

An industrial school will be erected at the St. Eugene Catholic mission, Cranbrook, B.C., at a cost of about \$40,000.

Messrs. Pather & Leiser, Victoria, B.C., will erect a five story warehouse there.

A sewerage system will be installed at Oak Bay, B.C.

FINANCIAL.

The Eastern Townships Bank are erecting a bank building at Cowansville, Que.

The Union Bank of Canada will erect a bank building at Fort William, Ont.

The Crown Bank of Canada have opened a branch at Bath, Ont.

The Sovereign Bank have opened a branch at Bredin, Ont.

The Bank of Ottawa have secured premises at Tisdale, Sask., where they will open a branch.

The stock of the Bank of Ottawa has been sold at an average of a little over \$225.50 per share.

The Union Bank of Canada have opened a branch at Cowley, Alta.

The Bank of Montreal have opened a branch at Rosenfeld, Man.

The Union Bank of Canada have opened a branch in West Saskatoon, Sask.

The Bank of Toronto will erect a bank building, corner of Elm and Elizabeth Streets, Toronto, at a cost of about \$20,000.

The Bank of Commerce will erect a building at Saskatoon, Sask., at a cost of about \$60,000.

The Home Bank of Canada have opened a branch at Bell River, Ont.

The Imperial Bank have opened a branch at Brantford, Ont.

The Royal Bank of Canada will open a branch at Peterborough, Ont.

The Bank of Commerce have opened a branch at Lindsay, Ont.

A branch of the Royal Bank has been opened at Cornwall, Ont.

The Bank of Commerce will erect a building on the corner of King and Jarvis Streets, Toronto.

The Dominion Bank will erect a bank building on the corner of King and Sumach Streets, Toronto.

The Bank of Nova Scotia will erect a building at Winnipeg, Man., at a cost of about \$200,000.

The Bank of Montreal may open a branch in Winnipeg, Man., near the centre of the city.

The Sovereign Bank have purchased a site on the corner of King and George Streets, Toronto, and will erect a bank building.

The Bank of Montreal will shortly open a branch in Summerland, B.C.

PUBLICATIONS.

The publishers of The Canadian Manufacturer solicit in advance, if possible, catalogues, circulars, and other industrial publications issued by manufacturers. We wish to review such literature, and bring the principal points to the attention of our readers.

THE SILENT PARTNER.—The October issue of a most delightful house organ issued by The Globe Machine & Stamping Co. Instead of display advertising the firm place their arguments before the reader in terse, logical reason interspersed with epigrams regarding business and social matters that interest is sustained from start to finish. Readers of this paper may have copy by writing for it on their own letter paper.—The Globe Machine & Stamping Co., Hamilton Avenue, Cleveland, Ohio.

Welland.—A folder giving a synopsis of the advantages which Welland, Ont., has to offer manufacturing concerns looking for a site for plant in Canada. The Welland Realty Co., Welland.

Westinghouse Type S. Dynamos and Direct Current Motors.—Circular No. 1068 superseding circular issued in September, 1904, and giving full information regarding Type S motors, with illustrations showing many uses to which these motors are now being put; also showing the various parts of the motor.—The Canadian Westinghouse Co., Hamilton, Ont.

The Selling Magazine.—This magazine, devoted to the discussion of ways and means of marketing machinery, tools, equipment and supplies, is steadily growing in interest and should be in the hands of every machinery sales manager in Canada.—The Selling Magazine, Postal Telegraph Building, New York.

Graphite as a Lubricant.—The tenth edition of the work under this heading issued by the Joseph Dixon Crucible Co. This work takes up the subject of lubrication in general and graphite lubrication in particular, most exhaustively. All the good features of the previous edition are retained, but the very latest information—both scientific and practical—that has to do with the subject is added, making it valuable to the student of theory and the man of practice. The publication is arranged and indexed so as to readily enable the reader to find the information he is most interested in. Copy will be sent to manufacturers on request.—The Joseph Dixon Crucible Co., Jersey City, N.J.

Lux.—A miniature magazine presenting in ingenious but thoroughly effective manner arguments in favor of the Nernst lamp for many purposes.—The Nernst Lamp Co., Pittsburg, Pa.

Six Lamps in One.—A folder describing the Jandus interchangeable arc lamp for public and private arc lighting.—The Packard Electric Co., St. Catharines, Ont.

Some Sea Specialties.—A cloth-bound catalogue describing various cruisers, torpedo-

boat destroyers and merchant marine vessels fitted with steamship specialties sold by The See Engineering Co., 1 Broadway, New York.

City Roads and Pavements.—The third edition, revised, of an elaborate work on the above subject, 200 pages, bound in cloth, by Wm. Pierson Judson. The contents include "Preparation of Streets for Pavements," "Ancient Pavements," "Modern Pavements," "Concrete Base for Pavements," "Block-Stone Pavements," "Concrete Pavements," "Wood Pavements," "Vitrified Brick Pavements," "American Sheet Asphalt, Artificial and Natural," "Bitulithic Pavements," "Broken Stone Roads." Price \$2.—The Engineering News Publishing Co., New York.

PERSONALS.

Mr. J. C. Royce, consulting engineer, Toronto, has returned from a business visit to principal European centres.

Messrs. Russell A. Stinson and Fred. J. Bell, who are to represent the Packard Electric Co. of St. Catharines in Montreal, have registered under the style of Stinson & Bell.

Mr. Albert E. Hawkee has opened an office in the Canadian Building, 86 Victoria St., Toronto, on behalf of the Cleveland Engineering Co., consulting engineers. Mr. Hawkee will make a specialty of assaying and testing materials, chemical analysis, testing efficiency of existing plants as well as mechanical, steam, hydraulic, electrical and chemical engineering, etc.

NEW CORUNDUM FACTORY.

The Star Corundum Wheel Co., Detroit, Mich., have found it necessary, owing to the steady expansion of their business, to purchase a whole block of land upon which they will at once erect a new factory, 175x170 feet. The building will be of reinforced concrete and steel, absolutely fireproof.

The business of the concern is the making of emery and corundum wheels. With the opening of the new plant the manufacture of these goods will be on a much more extensive scale plan than at present, three processes being used, the vitrified, silicate and elastic. The output will be three or four times greater than at present, and the number of employees will be increased probably 150 men within the coming year and to a greater number later on.

In addition to an extensive business throughout America the company do a big export trade with European countries.

NEW CHEMICAL PLANT.

The Nichols Chemical Co., of Canada, with main offices at Montreal, have begun the construction of a plant for the manufacture of sulphuric and other mineral acids on their property at Sulphide, on the main line of the Canadian Pacific Railway about five miles from Tweed, Ont. The company own large ore deposits at that place, and as the acid plant will be at the mouth of the mine, and of the most modern character, it will be particularly well situated to supply users of acids in Ontario. The investment is about \$250,000.

BUSINESS EXHIBITION AT MONTREAL.

Arrangements have been completed for holding in Montreal an exhibition of office equipment from December 10 to 15 inclusive. This will be the first business show ever held in Canada, though similar shows held in New York and Chicago in recent years have attracted many Canadian business men to those cities.

The Royal Scots' Armory, where the exhibition is to be held, is a suitable building, providing space for booths at sides and ends and for three rows in the centre.

There is space for 52 booths and although the show is still weeks in the future more than half of the space has been taken.

The show is under the management of Col. J. W. Ritchie, who has had wide experience with such affairs. Among some of these that he has so successfully handled may be mentioned: The International Printers' Art and Appliance Exhibition, held at the Crystal Palace, London, England, in 1900; the great World's Firemen's Tournament, held in conjunction with the Omaha Exhibition in that city, in which every modern device and appliance for fighting flames was exhibited that the effective outfit of the firemen should embrace. The most recent of these successful exhibitions which Colonel Ritchie had the arrangement and management of, was that of the American Society of Municipal Improvements, which was held at the Crystal Rink, Montreal, in September, 1905.

WATER POWER EQUIPMENT.

The Maine & New Brunswick Electrical Power Co., who are developing a water power at Aroostock Falls, N.B., have awarded contracts for the necessary equipment. The turbine plant will be built by the Jenckes Machine Co., Sherbrooke, Que., and will be composed of two 900 h.p. units each, consisting of a pair of special 21 inch cylinder gate crocker turbines, each pair mounted on a cast iron draft tube discharging centrally, set in concrete flume and running 600 r.p.m. under 72 inch head developing 80 per cent. efficiency at full gate. The turbine runners are cast bronze and the construction throughout is of the most substantial character. One Lombard type "P" water wheel governor will be attached to each unit. A steel penstock 6 feet 6 inches diameter by 75 feet long conveys the water from forebay to each unit. Each unit will be direct connected to a generator, the order for which was placed with the General Electric Co., Schenectady, N.Y. The headquarters of the Maine & New Brunswick Power Co. are at Presque Isle, Maine, and the order for the turbine plant was placed in Canada only after the most thorough investigation and comparisons with the product of American turbine makers who were tendering.

REMOVAL OF SALES OFFICE.

The Ontario sales office of the Jenckes Machine Co. has been moved from 12 Lawlor Bldg., Toronto, to St. Catharines, Ont., where it will in future be operated in conjunction with the extensive branch works of the company there. Mr. W. G. Chater, as formerly, will be in charge.

SECRETS OF GERMAN INDUSTRIAL SUCCESS.

A holiday tour, extending over a month, has considerably added to my knowledge of German business methods, and opened my eyes to some of the secrets of German industrial and commercial success, says a writer in "Commercial Intelligence." I am not, as a rule, an admirer of German business methods, some of which, as I have frequently pointed out, are such as no honest trader would descend to; but I must frankly acknowledge that I have been astonished at the amount of "go" manifested in most of the manufacturing towns I have visited. This remark is particularly true of the towns engaged in the chemical industries which form one of the sources of the colossal fortune of the Empire, and I have been assured by a competent authority that the 9,000 factories and the 200,000 workmen engaged in the chemical industries of Germany will this year turn out products of which the value will be about 1½ milliard marks, and that the value of the chemical exports will probably establish a record. And yet this industry is scarcely 30 years old! "Yes," said a manufacturer to me, "30 years ago England was mistress of the market for salt and alkalies, as well as for coloring matter extracted from coal tar. To-day Germany is at the head of all the manufacturing nations of the world, not only for dyes, but for chemical and pharmaceutical products, and this in spite of her poverty in matieres premieres." There is much truth in this remark, and if one wishes to have an idea of the importance of the chemical industry of Germany one has but to remember that Germany produces annually a million tons of sulphuric acid and 500,000 tons of soda. As to pharmaceutical products, the quinine alone exported from the Fatherland is valued at about 14 million marks, and antipyrine and antifebrine at an equal amount. The colors, acids, and manures exported are valued at about 700 million marks. "One may then assert without fear of contradiction," said a manufacturer to me in speaking of the results achieved, "that to-day Germany furnishes five-sixths of the dyes used in the whole world."

SOME GERMAN CHEMICAL FACTORIES.

The most important chemical factories are (1), those of Frederic Bayer, at Elberfeld; (2) the Badische Anilin und Soda Fabric at Ludwigshafen on the Rhine, where the new indigo was first produced; (3) those of Meister Lucius and Bruning at Hoechst on the Main; and (4) those belonging to Cassella & Co. at Mainkur, near Frankfort. The three first establishments are united by a cartel; the two latter also. I was particularly interested in the factories at Hoechst and Mainkur, where, thanks to a letter of introduction, I was most cordially received. At Mainkur about 2,000 men are employed; at Hoechst about 5,000, in addition to about 1,000 employes. At Mainkur dyes are chiefly produced; at Hoechst chemical products.

THE ADVANTAGE OF A CARTEL.

"The two factories once competed," said the manager to me, "but we have found it more profitable to unite our interests, and since the establishment of our cartel each factory has been able to reduce its expenses considerably. The general cost of our travelers and of our advertising has diminished

one-half. The purchases of the matieres premieres necessary for the two enterprises are now made in larger quantities, and consequently cheaper; and now the acids and salts used at Mainkur in the production of dyes are furnished by the factory at Hoechst, where they are produced in enormous quantities—another source of profit. Then, again, the two factories do not compete abroad. Mainkur has branches at Lyons and at Riga; and Hoechst has branches at Creil, Moscow, Augsburg and at Milan. Yes, we have done very well since we established our cartel; in fact, all the cartels of the chemical industry—and there are about 40 of them in Germany—have rendered, and are still rendering, immense service to the trade." As may be supposed, it is no easy matter to gain admission to a German chemical factory. An experienced eye might discover in the laboratory traces of an experiment, or in the workshop methods of manufacture. Only visitors of whom they are sure—that is, whose ignorance is apparent, are usually admitted; in fact the rule appears to be—none but the ignorant need apply.

My letter of introduction certified that I was in no way connected with the chemical industry, but notwithstanding that, I was hurried over the factories at Hoechst and Mainkur as if I had been a veritable expert, and in the pay of some important British firm. I saw everything, without being able to observe anything in detail. I remember a forest of pipes, horizontal and vertical. I saw masses of what looked like red and yellow mud, which I was told was bichromate of potash. I remember a large number of barrels filled with dark looking powders, and I still hear the manager saying in excellent English: "Look, this scarlet will be used to dye the velvet of court dresses; this blue is sky blue, and will dye the fine silks worn by the native ladies of India; and this yellow and this violet will be used to dye the robes of the mandarins of China." "And is it possible," asked I, "that all these beautiful colors are made from coal tar—this blue, so lovely, and this yellow, the color of gold?" "Yes, all of them," was the reply, "and we are still in search of others." It would be impossible to name half the things during my "run" over these factories. One of them, however, made a great impression upon me. While crossing one of the courts I saw a number of immense pieces of blue stuff lying on the ground. I asked what they were. "They represent," exclaimed the manager, "a fifteen years' struggle—a terrible struggle, now almost finished—against indigo." Then, with a smile of satisfaction, he added: "Natural indigo is dead. Ten years ago we imported natural indigo worth 20 million marks; to-day we export artificial indigo dye worth 30 million marks, and this is but the commencement. We leave these pieces of calico exposed to the rain and sun for weeks, and we observe which has best supported the trial, for some of the pieces have been dyed in different chemical mixtures, and others with natural indigo. It is said that our discovery has almost ruined many of the indigo planters of India, and of course it has not given pleasure to the English. They have struggled and are still struggling, but they are vanquished." The words went home. Twenty years ago, when I first arrived in India, the indigo planter was a king. German science has dethroned

him. The pieces of blue cloth lying in the courtyard were evidences of his fall.

THE SECRET OF GERMAN SUCCESS.

As regards the chemical industries of Germany, it may be safely said that the Germans are the architects of their own fortune. They have employed an army of scientific men, and they are now reaping the benefit of their expenditure. At Hoechst alone no less than 190 chemists work all the year in search of new products. I was rushed at such a "gallop" through the central laboratories of the establishment that I had scarcely time to observe anything practical. I passed along corridors leading to scores of rooms. All the doors were closed. There was no sound. The seekers after new products were at work—"and must not be disturbed." Everywhere there was an exemplary cleanliness, and no other noise than that of the machines in motion. I was particularly struck with the precautions taken to safeguard the factory in case of fire.

These were really remarkable. In each corner of the factory, and on each landing the name of a workman was posted up on the wall. At the first sound of the whistle announcing the outbreak of a fire the man had to run to the spot where his name was posted up, and there remain until the arrival of the engineer or the foreman of his department whose duties were strictly regulated. The working of the system was shown to me. While crossing a landing leading from one laboratory to another, the manager blew a whistle. Immediately a man appeared on the landing. I was requested to ask him his name. I did so. It was the same as the name on the wall. To me the system seemed perfect, and might with profit be introduced in the workshops of other countries than Germany. Space will not permit me to go more fully into this subject; the gleanings, however, of my holiday tour will be very useful to me. From all I heard and saw, I am of opinion that the chemical industries of the German Empire are in a most flourishing condition. The factories at Mainkur and Hoechst, notwithstanding the immense sums annually devoted to the comfort and amusement of their workmen, pay handsome dividends—in fact, dividends large enough to make an ordinary manufacturer grow green with envy.

Messrs. I. L. Scheinman & Co., Detroit, Mich., are sending out circulars drawing attention to the fact that their removal to a new factory, equipped with latest machinery, puts them in excellent position for supplying the trade with washed and fumigated wiping rags at 5 cents per pound, or unwashed but fumigated stock at 3½ cents per pound; also drawing attention to their second-hand burlaps at 3½ cents for 7½ to 8-oz. for rubbing at 3½ cents and 12 to 14 oz. for upholstery at 6½ cents per pound.

Robert W. Hunt & Co., engineers, The Rookery, Chicago, Ill., have been appointed consulting, designing, and constructing engineers for the new municipal electric lighting plant for the City of Milwaukee, by Mr. Chas. J. Poetsch, city engineer. This appointment has been unanimously confirmed by the city council, the site for the plant has been purchased, and work will immediately start upon plans and specifications, estimated cost, \$700,000.

CONSTRUCTION AND EQUIPMENT

Giving information regarding modern materials and methods for the construction of factories, mills, etc., and about machinery and power appliances for their equipment.

Factory Illumination.

In choosing a factory site to-day the majority of companies are locating in the smaller towns or cities and in some cases are building complete towns in previously uninhabited sections. This is not altogether due to the desire to obtain low prices on real estate, exemption from taxes, etc., but also due to the fact that managers now realize that better light, better air, and improved sanitary conditions for employes are conducive to better results and larger output of the factory.

Though a great deal of care and expense has been devoted in many cases to the arrangement of buildings in order to obtain large volumes of daylight by the aid of skylights and prism glass windows, it is surprising to note that so little thought has been devoted to the artificial lighting which is even more essential than the illumination in day time. The factory which is well lighted during the day presents a gloomy and desolate appearance at night at the very time when it should be made as cheerful as possible, on account of the employes having worked their full number of hours during the day; their labor is not as efficient at night and an ill-lighted room tends to add to the drowsiness of the employes compelled to work there. It is therefore, just as essential to employ up-to-date methods of artificial illumination as to use modern machine tools.

Gas as an illuminant for factories is so little used that we will not consider it but rather confine ourselves to the use of electric light. The plan generally adopted is to use incandescent lamps, giving each operator a sixteen candle power lamp equipped with a metal shade located immediately over his work and generally placed on the line of vision or in some cases below it. Where this method is adopted some large units of light such as the arc lamp or Nernst lamp should be used for general illumination. Where such an illumination is supplied it is invariably so meagre and so poorly looked after that it is practically of no account.

Such a system though probably the cheapest to install is without doubt the most expensive to operate, due to the high current consumption per square foot illuminated and to the breakage of lamps and cords which are continually in the operator's way.

From the standpoint of the employe the manager who compels him to work under such conditions is causing him to very rapidly ruin his eyesight, this being due to the continual expansion and contraction of the eye in endeavor to accommodate itself to first the exceedingly bright spot immediately beneath the lamp and the total darkness beyond.

The use of any form of light placed close to the work and fitted with an opaque shade is an equipment which has been handed down to us first from the time of candles,

then through the stage of oil lamps, and was adopted for the incandescent lamp because of its hereditary use.

In any artificial illumination the best method to pursue is to duplicate the daylight arrangement as nearly as possible. This can be accomplished with surprising success from overhead units of light. The best type of lamp to use for this work is either the arc lamp or the Nernst lamp, preference being decidedly in the favor of the latter. Some of the objections to the arc lamp are as follows:

The smaller units are not efficient.

The current consumption is great for a sufficient amount of light necessitating a large investment in copper.

The light is unsteady, developing sharp shadows.

Where alternating current arcs are used



THE NERNST LAMP.

the kaleidoscopic effect is annoying and detrimental.

They cannot be used on low frequencies so often used for machine drive.

Among the many advantages of the Nernst lamp for this class of work it may be of interest to enumerate a few. First of importance is the large assortment of units enabling the user to place no more light at a given spot than is necessary. The light is absolutely constant and steady even on frequencies as low as 25 cycles. The candle power characteristic of the lamp with its maximum amount of light in the lower vertical makes it particularly adaptable for this style of illumination as the light is naturally thrown on the benches and machine tools. The lamp itself is absolutely dust proof and the source of light well protected against dirt without obstructing the light. The color of the light, is very pleasing and closely akin to that of

daylight, which lends a cheerful and pleasing appearance to the space illuminated.

It has been demonstrated by actual operation that machine shops, foundries, tool rooms, wood-working establishments, cotton mills, weave rooms and almost any mill or factory can be lighted from overhead by the aid of the Nernst lamp.

It is a mistaken idea that lights cannot be so placed that belts and machine tools will not cause objectionable shadows. There are cases, however, where localized light is absolutely essential, even in day time, for the lighting of boring mills, slotting machines or any other work which would be in an intense shadow from skylight illumination in the daytime.

If a factory manager and the architect will work jointly with the illumination engineer most excellent results can be obtained as is attested by the fact that such large companies as the International Harvester Co. of America, the Illinois Steel Co., the American Radiator Co., of Chicago, the United States Steel Corporation, the Riter-Conley Co., the Pennsylvania Railroad Co., of Pittsburg, Pa., the Lunkenheimer Co. of Cincinnati, the Riverview Worsted Mills, Waterville, Maine; the Arlington Mills, Lawrence, Mass., and other large and prominent companies in United States have adopted this method.

Although the Nernst lamp has been manufactured in Canada for less than a year, among the first to avail themselves of it for this type of illumination were the International Harvester Co. of Canada, Hamilton; the John Bertram Sons & Co., Dundas, Ont., and many of the numerous factories now being built in and around the Niagara Peninsula will without doubt adopt this method of lighting.

The cost of maintenance of the Nernst lamp per k.w. hour does not exceed that of arc lamps and has decidedly the advantage of having no "outs". The lamp is simple in construction and can be easily taken care of by inexpensive labor with very little instructions.

It is safe to assume the Western wheat crop of this year will be about 90,000,000 bushels. Supposing this to be the case, one-fifth of the total crop has already been shipped east over the C.P.R. lines. The total grain receipts up to last week were 14,472,000 bushels of wheat and 805,000 bushels of other grains. Up to about the same date last year the amount marketed was 9,006,000 bushels, all of which, with the exception of 361,000 bushels, was wheat. The high standard of the wheat, which was a matter of surprise earlier in the season, continues to be maintained.

The Jeffrey Mfg. Co., Columbus, Ohio, have established a new Canadian branch office in Montreal, at Lagachetiere and Cote Streets.

Steel Trust Official Preaches Enthusiasm.

"Wear a smile—it will help you get a job."

"Enter upon your work with enthusiasm—therein lies greatness."

"Remember that a sunny disposition is the only umbrella in this vale of tears."

These were sentiments expressed by James Gayley, first vice-president of the United States Steel Corporation, in his address to the graduating class of the Michigan College of Mines, Houghton, Mich., at the class day exercises at the Kerredge theatre, Hancock.

Mr. Gayley, in his opening remarks, compared the meagre opportunities for a thorough training as a mining engineer in the days of his college career with the opportunities afforded to-day in such an institution as the Michigan College of Mines, a particular advantage in the latter case lying in the atmosphere of mining with which the college is surrounded in its location in the centre of the lake copper belt. However, a man must not expect to become an expert merely by his college training. That portion of his work rather provides him only with a tool, through the instrumentality of which he must shape his further progress.

The speaker said that genius is the ability to express work efficiently. A young engineer need not worry about the line of engineering he had best choose, for in time, if he exercises the highest ability that is within him, the call for the line to which he is best adapted will come with such force that he can not do otherwise than respond. And, he declared, the world is full of golden opportunities, incidentally pointing out in this connection that the man who does more than is expected of him and who gathers bits of information about the work which lies out of his own narrow pathway will be noticed by those who are in command of the greatest opportunities. The chemist who makes analyses all day and retires to his bed to dream of precipitates all night will never make a manager, he said. He pointed out the more successful way: Let the chemist spend his evening and his spare moments around the works, absorbing the knowledge that is necessary to conduct other lines of the institution with which he is associated. Then his opportunities will broaden. "The man who does only the work for which he is paid only gets paid for the work which he does," the speaker asserted.

OPPORTUNITIES ARE ABUNDANT.

Mr. Gayley said that the opportunities are just as great to-day as they ever were in history, if not greater. It is only the one who shrinks from the ore paint of the mine, from the grease and grime of machinery or from the smoke of the furnaces that misses the great things which line the pathway of the engineer. Having found the opportunity, the speaker pointed out, the rising engineer will find difficulties coming hard and fast. But it is meeting and overcoming difficulties that make men great. Such achievement is not by long flights, but step by step until success crowns the effort. He quoted Bill Nye's description of Wagner's music, "For one who understands it, it is not half so bad as it sounds," to emphasize the point that difficulties are not half as bad as they seem.

ACCURACY IN DETAILS.

Accuracy in details is a prime essential, Mr. Gayley said. Engineering is an exacting profession and there is little of forgiveness in it. He pointed out that an error at a vital moment might be the undoing of the greatest opportunity, because there can be but one greatest opportunity and that may be the one in hand. Concentration was another essential for the engineer to cultivate. Just as concentration is performed in minerals, so it must be practiced in the mind of the engineer. The vein may be wide and it may be deep, and to recover its values and turn them to the uses of man the ore must be concentrated and the dross eliminated. He held as almost the best advice ever given him the orders of an early employer that he should sit down one hour daily in the midst of a busy life and concentrate his mind upon the mental contemplation of the work in his charge.

Expression with the engineer is by three main channels, said the speaker. It may be by reports, by estimates and by spoken words. Then he pointed out the need of a thorough training in the English language. Reports are written to be read, he said, and therefore the proper use of language is essential, so that the idea may be as clearly conveyed to the reader as it exists in the mind of the writer. Instill in a man a love for the best in literature and give him touch with the great minds of the world, and he will have no time left for sordid companionship.

Integrity was dealt upon as the crowning attribute, which should be held sacred above all else that the engineer represents. He said that many engineers' reports dwell not upon statements of conditions but upon speculation of possibilities, representing, in the words of Mark Twain, "The greatest return of conjecture for the least expenditure of facts." "Be truthful," he said, "no matter what your employer may demand of you. It is true that you may lose one employer by such a policy, but you will find many employers waiting for your services because of that virtue, and when you have sped the last arrow from your bow and it falls from your failing grasp, the world can utter no word of shame to your memory."

Mr. Gayley took up the discussion of mistakes. He said that men who are not making mistakes are not doing anything in the world and a man who is not active enough to make mistakes should make the greatest mistake of his life and retire to a monastery. "Mistakes are the result of personal effort," he said, "and the man who never takes a chance will never recognize a good thing when it comes his way. If there were no fools to rush in, the world would be at a standstill, but thank God we have fools to rush in where angelic conservatism fears to tread. The late Marcus Daly could excuse a man who made a mistake, but said he had no regard for the man who let a thing get away from him for want of trying."

WEALTH OPENS WAY FOR THOUGHT.

In his final words Mr. Gayley said that those who attacked the acquisition of wealth were enjoying in life the very advantages that exist by virtue of the wealth which they

assail. He said that the Middle Ages the great wealth-acquiring period; this wealth brought leisure, leisure brought opportunity for mental repose and thought, thought brought about the Italian renaissance, and it also brought the learning and taste for literature, which had as its fruitage the translation of the Bible, the enlightenment of the masses, the reformation and the rich learning which has followed. Then following this freedom from mental slavery, came the impulses which demanded freedom from feudal vassalage, culminating in the French revolution and the beginning of democratic governments. Why may not the world to-day, he queried, be living in an age that is a duplication of those times, and thus awaken to a higher and grander understanding of the Fatherhood of God and the brotherhood of man than the world has ever known? A new revolution by which the rights of man will be established on a grander scale will result.

LUMBER PRICES ADVANCING.

A few years ago the pine forests of Canada seemed to be without limit. But as the United States forests have been depleted, and the lumbermen of that country turned their attention and planted their big mills in Canada, and as the Canadian sawmills increased their staffs and their equipment to satisfy the quickly expanding demand at home, the fact has been made clear and all have been forced to recognize that the great drain on Canadian forests must inevitably result in shortage and in compelling the lumber camps to go farther and farther north.

Already the result of this is being emphasized in a manner that will effect every class of citizen from the farmer to the manufacturer.

The extraordinary cutting of Canadian forests during recent years has necessitated going farther back for logs. This means greater outlay for transporting supplies and delay in getting the logs to mills—in some cases taking two seasons to get logs from camp to mill.

Added to this a sharp increase in the cost of labor and the shortage of logs at mills, especially in the Ottawa district, owing to low water and to the serious fire of the Fraser lumber, all resulting in a shortage of over 20 per cent., coupled with the exceptionally heavy demand, particularly for lower grades suitable for cheap houses, barns, packing cases, etc., has resulted in a steady stiffening in the price of this class of lumber.

In fact, the aggregate advance in the last few months has been practically from \$3 to \$5 per thousand, and the tendency seems to be toward still higher prices.

James Cowan, Winnipeg, Man., who has several large contracts on the Canadian Northern Railway construction, has just closed the largest tie and timber contract with the company that was ever awarded to one man in this country. This contract calls for the delivery of 1,000,000 ties, 6,000,000 feet of logs and 300,000 feet of piling, to be delivered on the Canadian Northern Railway before spring. Mr. Cowan will take out the ties and timber in the country around Mistateur, in Saskatchewan, just beyond the northwestern corner of Manitoba.

Care of Belts in the Factory.

By C. J. MORRISON.

One great item of expense in every machine shop receives, as a rule, very little attention, and that attention is usually given by an unskilled laborer. This item is the belting. The expense comes not only from the outlay for belting and supplies, but also from the delays caused by failures. In many shops it is a common sight to see high-priced machinists standing idle waiting for a belt to be repaired. There is probably no belt-repair room and no one really knows how to care for a belt. This is an expensive mistake. In a shop of any considerable size, there should be a regular belt room, fitted up with a complete outfit for repairing belts. This room should be about 35x10 feet, centrally located, well lighted, and locked at all times so that the belting will not be stolen. The room should be provided with facilities for heating glue and a rack for storing the belting. The tools should consist of a 100 foot steel tape, a belt trimmer, a smoothing plane with 1½-inch blade, pliers, clamps, punches, hammer, awl, 3 straight edges, a tank for belt dressing, heavy letter press, and tools for making whatever kind of lace is used. There are many kinds of laces, but it is not within the province of this article to say which is best, although tests and actual service have proved one kind to be far ahead of all the others.

The total cost of maintaining the belting, including labor, supplies and belting, should be between 14 and 25 per cent. per year of the inventoried value of the belting when new. In many shops the cost is over 100 per cent. The belt failures per month should not be more than three to every 100 belts. No main-drive belt should ever be allowed to fail and no delay of over ten minutes due to any failure should be tolerated. These results cannot be obtained by haphazard methods. In a shop running 800 or more belts there should be a regular foreman to keep the records and direct the work. The foreman can also take charge of the oiling and the abrasive wheels. In a smaller shop the foreman would also be expected to work. No one should be allowed to draw any belting from the storehouse except the belt foreman. A record of every belt should be kept. All possible repairs should be made outside of working hours.

The following simple rules cover about all there is to the care of belts.

CEMENT SPLICES.

The first thing to be noted in making a cement splice is to see that the pieces put together are of about the same grade, width and thickness and that the splices lie in same direction in the same belt. Splices should be made of the length given in the table.

Width of Belt.	Length of Splice.
1 in.	5 in.
2 in.	5 in.
3 in.	6 in.
4 in.	6 in.
5 in.	7 in.
6 in.	8 in.
7 in.	8 in.
8 in.	9 in.
9 in. to 18 in.	Same length as width.
Over 18 in.	18 in.

Splices should be worked down to a perfectly smooth even surface, square with the edge of the belt both at the point and back. Care should be taken that the splice is no thicker than the rest of the belt. If the splice is thick the belt will not run even. Square both ends of the splice from the same edge of the belt. Work on a perfectly smooth flat surface. After dressing the ends for the splice, place them together on a board 1 inch longer and ½ inch wider than the splice. Place the edges from which the splices are squared in a perfectly straight line. Tack the belt to a board just back of the splice. Open the splice and spread on hot glue, place another board on top of the splice and clamp tightly with hand clamps or in a press. (An old letter press makes an excellent belt press. If a press is used, ten minutes is long enough to keep pressure on the belt, but if hand clamps are used they must be left on for three or four hours. In either case, the belt should not be put under tension for at least five hours after gluing. Paper placed between the boards and the belt will prevent the belt from becoming glued to the boards.

Greasy belts should be cleaned with gasoline before attempting to cement them. Any grease in belts or glue is liable to cause the splice to fail. No rivets, wire, pegs, or any other fastenings aside from cement should be used in splicing belts. Ordinary furniture or pattern-maker's glue is satisfactory for belting.

TENSION AND THICKNESS OF BELTS.

Belts should have a tension when at rest of about 100 pounds per square inch of width of good double belting. If not practicable to measure the tension on the belt, make the cut length 1 inch per 100 feet less than the tape-measured length over the pulleys. A steel tape should be used. Great care should be used to prevent the running of too tight belts and consequent burning of bearings.

Double belts should not be run on pulleys less than 6 inches in diameter, nor triple belts on pulleys less than 20 inches in diameter. Belts should sag onto pulleys and not away from them. Very short drives (belts under 20 feet long) should be avoided. Whenever possible, run up-and-down belts on a slant so that belt will sag onto the pulleys.

ENDLESS BELTS.

All machines furnished with any means of taking up the stretch should have endless belts. Large overhead-drive belts (over 6 inches wide) should be made endless as soon as the stretch is taken out. It is not advisable to make new belts endless at installation on account of the stretching. Wood-working machinery having belts which do not require too frequent tightening will run better with endless than laced belts. Side and bottom head belts on planers, matchers, etc., should be run endless.

CLEANING AND OILING.

Belts which have become too greasy and dirty should be cleaned with gasoline, then

scraped, and wiped with waste. In dry, dusty places it is well to brush them occasionally with a broom or stiff brush.

No resin or belt dope should be used except fish oil and tallow mixed in equal parts. Apply hot with a brush when the belt is running or dip the belt in the dope tank, then dry and wipe off any grease which may have hardened on the belt. If applied while running, care should be taken not to get too much on the belt, or it will cause it to slip.

No mineral or oil should be allowed to come in contact with belts. New belts should be treated with fish oil and tallow before using, and any belt which becomes dry, hard, and glossy in service should have an application of the dressing. This is especially true of belts in blacksmith shops. The oil will check to some extent the evil effects of the smoke, sulphur gases and dirt, and the life of belt will thereby be lengthened.

INSPECTION OF BELTS.

Close attention should be given to condition of belting, to prevent damage to it and delay to machines. Such delays can be reduced to a minimum by making repairs as soon as weakness develops. Main-drive and section belts should be watched very closely since a failure of one of them may shut down a number of machines for a considerable length of time.

OPERATION OF BELTS.

The most essential thing to the successful operation of belts is that pulleys and shafting be properly lined and in good repair. It is bad practice to throw a pulley out of line to favor a bad belt. Belts should be run with the hair side to the face of the pulleys. Run belts so that the outside point of splice trails. This will avoid opening the splices by the action of the air. Belts should never be run twisted or cross-stepped on cones.

Keep pulleys clean and avoid having mineral oil or grease coming in contact with belts. If hard grease or dirt is allowed to pile up in corners of cones so as to form a fillet, the belt will be very likely to climb, turn over or twist. In turning faces of cones, a clearance should be cut in the corners.

A belt should never be dampened in order to open a splice. An awl should be used, gradually scratching or ripping the splice apart.—American Machinist.

LOW SUMMER TOURIST RATES WEST.

During the entire summer the Chicago & North-Western Railway will have in effect very low round trip tourist rates to Colorado, Utah, California, Oregon, Washington, and British Columbia points. Choice of routes going and returning with favorable stopovers and time limits. Very low excursion rates to the Pacific Coast from June 25 to July 7. For further particulars, illustrated folders, etc., write or call on B. H. Bennett, General Agent, 2 East King Street, Toronto, Ont.

At a meeting of the shareholders of the Canadian Barcalo Co., at Welland, Ont., a few days ago H. L. Hatt was elected president; L. C. Raymond, vice-president; W. I. Crombie, secretary, and Wm. Goudy, treasurer. The plant is kept running overtime to keep up with orders.

Alcohol and the Future of the Power Problem.

BY ELIHU THOMSON, IN CASSIER'S MAGAZINE.

Modern civilization is based upon the use of power—upon engines of one type or another. In large measure the power is derived from fuel. In cooler climates our comfort in winter is to a great extent a question of cheap fuel, while the various processes, such as the smelting and working of metals, the making of glass, the baking of porcelain, and so on, are factors in the gradual exhaustion of available combustibles—coal, peat, oil, gas and wood of the forests.

Practically our whole problem of over-sea transportation is a fuel problem. Our land transportation is the same to an almost equal extent. Occasionally a water-power is available, to furnish, through the agency of electricity, the energy required for a railway, but the coal or oil-consuming locomotive will, doubtless, hold its own for a long time, except in the most densely populated districts. Where electric locomotives or trains are used, the power station will still depend in most cases upon fuel.

The population of the world and the expenditure of fuel for heat, light, and power steadily rises. A time must come when, under the continued and increasing drain, the cost of fuel will be increased, and the available supply diminished, until the advancing cost due to scarcity and distance of haul will at last check the consumption. Our heating in winter is a peculiarly wasteful process. Our buildings leak heat all over. We consume enormous amounts of fuel to maintain temperature conditions which are worse than wasteful. We oftentimes maintain temperatures indoors in winter in excess of those we seek in summer when we flee the city.

In our heating and ventilating systems we assume that when we discharge the air we must discharge it hot, and take in fresh, cold air, giving it fresh heat from fresh fuel. This is all wrong. What we will be compelled to do when our fuel cost is increased will be to transfer the heat from the escaping warm air to the cold supply by a system of regeneration, supplemented by a construction of buildings which will cut off heat leakage and waste from that cause. In this way the air leaving a building will pass through a structure like a regenerator and will there deliver its heat to the incoming fresh air. Such regenerators can work at quite high efficiencies. The regenerating system will also be applied more extensively than at present to furnace processes, and waste furnace heat will be conserved for various uses.

But when all this and more is done the fuel question will still exist. The crisis, though delayed, must assuredly come. It avails little to say that in China there is coal to supply the world for hundreds, if not thousands of years. We may not control that supply; the cost of transporting it may make its use almost prohibitive.

Our fuel supply is the result of solar radiation in the geological past. Energy of the sun was stored in the earth millions of years ago. Our water-powers are the result of solar radiation in the present; the water evaporated from the tropic seas is deposited on the cooler heights of land, and we inci-

dentally use a small fraction of the energy play involved.

Solar radiation must continue to be the source of our power and heat. The growing plant can, by cultivation in the favored districts, be encouraged to assimilate, so to speak, the solar energy. We already have the timber of the forests, the brush wood, the straw of the wheat field.

The ideal fuel, however, is, undoubtedly, liquid fuel of a nature to be readily vaporized. If the liquid be of a limpid, non-viscous character, the difficulties found in pipe-line transportation with the thick fuel oils will not stand in the way of such transportation and distribution.

Fortunately, we have in ethyl alcohol an ideal fuel—colorless, limpid, of moderate boiling point, about 50 degrees below that of water, non-freezing, burning without smoke, mixing with water in all proportions, and, therefore, its flame extinguished by water, cleanly, drying off completely when spilled, not attacking rubber gaskets or packings, and non-corrosive for metal tanks and holders.

The fact that its flame is bluish, or so-called non-luminous, means that the flame is almost devoid of free carbon particles, with their intense heat-radiating power, a fact of considerable importance. When gasoline or heavy oils are burning, the flame, loaded with free carbon or soot, radiates heat to such a degree that it is not possible to approach near the conflagration, and combustible surroundings are readily fired by pure radiation of heat.

The production of alcohol on a large scale is very simple, and the raw materials already exist in considerable variety. All saccharine or starchy growths are available. Saccharine wastes are now largely used in Cuba for alcohol production. At present it is said that the low grades of molasses can be delivered at American coast cities at about three cents per gallon. About three gallons of this crude product will be required to produce a gallon of refined spirit, or 90 per cent. alcohol, and the cost of production may be estimated at from three to four cents, making the cost of the alcohol per gallon about twelve cents.

This alcohol will, in a properly organized engine, equal, volume for volume, gasoline now sold at a much higher price, in producing power. Even in the immediate future, then, it is evident that alcohol has a large field of usefulness. The farmer need not depend on wood, coal, or oil for his power. His agricultural wastes will furnish it. His fields need only receive the sunshine, and be given sufficient water, and thence any crop yielding starch or sugar, however unmarketable otherwise, may be made the source of power, light, and heat.

The use of alcohol as a fuel, and as a source of power, will grow gradually. It would be idle to look for any sudden revolution in methods. It would, in fact, be very undesirable. Revolutions are destructive. Evolution, a slower process, is constructive. Gradually a system of production and distribution must be evolved, even for present needs.

But when we extend our vision into the far future, we can only speak of possibilities

or probabilities. There is always a possibility of new discoveries modifying conditions to such an extent that our best present judgment may be in error. But assuming that increasing scarcity and cost of mineral fuels will gradually stimulate the selection and use of substitutes, it seems reasonable to predict that the one substitute which possesses the most desirable qualities is ethyl alcohol. The amount that can be produced is practically unlimited.

A very important fact distinguishing alcohol production by agriculture from the production and shipment out of the land of food products, meat, etc., or even wood, is that in the former the land is not impoverished, as the mineral and nitrogenous matters can be returned to it, while in the food and wood carried away the richness of the land is passing away, too.

Alcohol contains only carbon, hydrogen, and oxygen, all of which come from the air itself. The transformation is begun in the carbonic acid and water of the air reaching the growing plant under the influence of sunshine, and completed in the fermenting vat and the still under human direction. Vigorous plant growth is a cooling process; solar energy is rendered latent or potential. It would even be possible to calculate from the fuel value of any growth or crop the proportion of the solar energy so stored up. Fermentation renders the energy stored more available, and distillation finally yields a concentrated product.

It is not unreasonable to expect that, in large engines of the internal combustion type when highly developed, we may attain efficiencies of 30 to 40 per cent. This means that of the heat units potential in the fuel, and liberated when it is burned with the oxygen of the air, about one-third may be converted into available power. It may even be that future invention will carry this proportion up to about one-half. With alcohol at a cost of ten cents a gallon—a price even now realized in Cuba—the cost of the fuel per kilowatt hour would be about one cent and a quarter on an assumed efficiency of 33 per cent. in the engine.

It is not to be imagined that where coal or oil can be obtained at anything like the present costs there is at present any possibility of their replacement. Neither is it likely that water-power, developed under favorable conditions, can ever have as a rival artificially produced fuel.

But inasmuch as the fuel cost is only a relatively small fraction of the total cost of operation of a great system of distribution, such as that of an electric lighting plant or railway, it is evident that, considering the great convenience and adaptability of the alcohol vapor internal combustion engine, a wide field may open for its application, as the cost of the fuel alone is a relatively unimportant item. Certain it is, that for isolated small powers the alcohol motor can soon be used with convenience and economy in America, following the recent legislation there, removing the onerous tax.

As to the more distant future period, we need have no misgiving. We are assured that mankind, by the introduction of methods of economizing heat, and by artificially producing liquid fuel, will be able to maintain those activities demanding heat and power until "the sun himself grows dim with age, and nature sinks in years."

On A Bigger, Broader Basis.

FOR six months we have been planning improvements for THE CANADIAN MANUFACTURER, so as to place it on a bigger, broader basis, to make it stronger and more useful to reader and advertiser than it has been.

Some improvement has been made so far (if you have any March or April numbers compare them with this issue). But we feel we have only made a beginning. In the next issue we will add at least four, possibly eight, pages to the paper and we hope to almost at once make the paper so much stronger in appearance that its real worth may be better understood.

In the matter of circulation we are willing to have detailed comparison with any other paper in Canada, knowing we cover our field well and believing we cover it better than any other paper.

In the matter of rates we are "too low"—but this is not to the disadvantage of advertisers—and they are to be advanced.

We recognize that our need is to make the paper more attractive. We have made some progress in this direction and we promise more.

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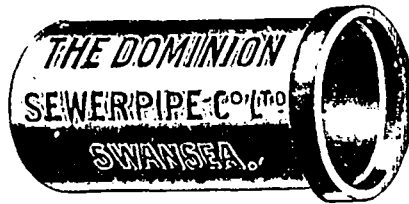
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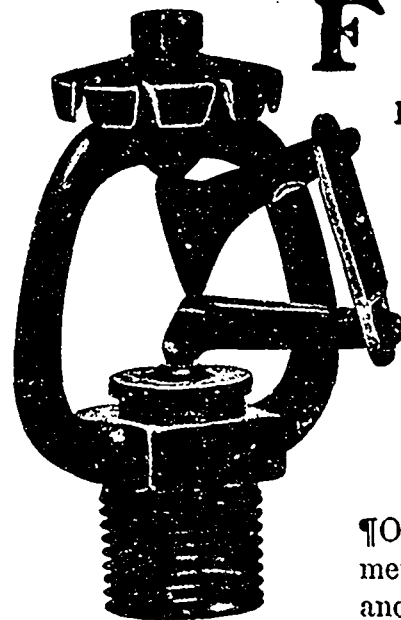
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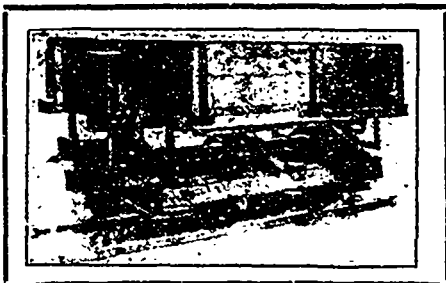
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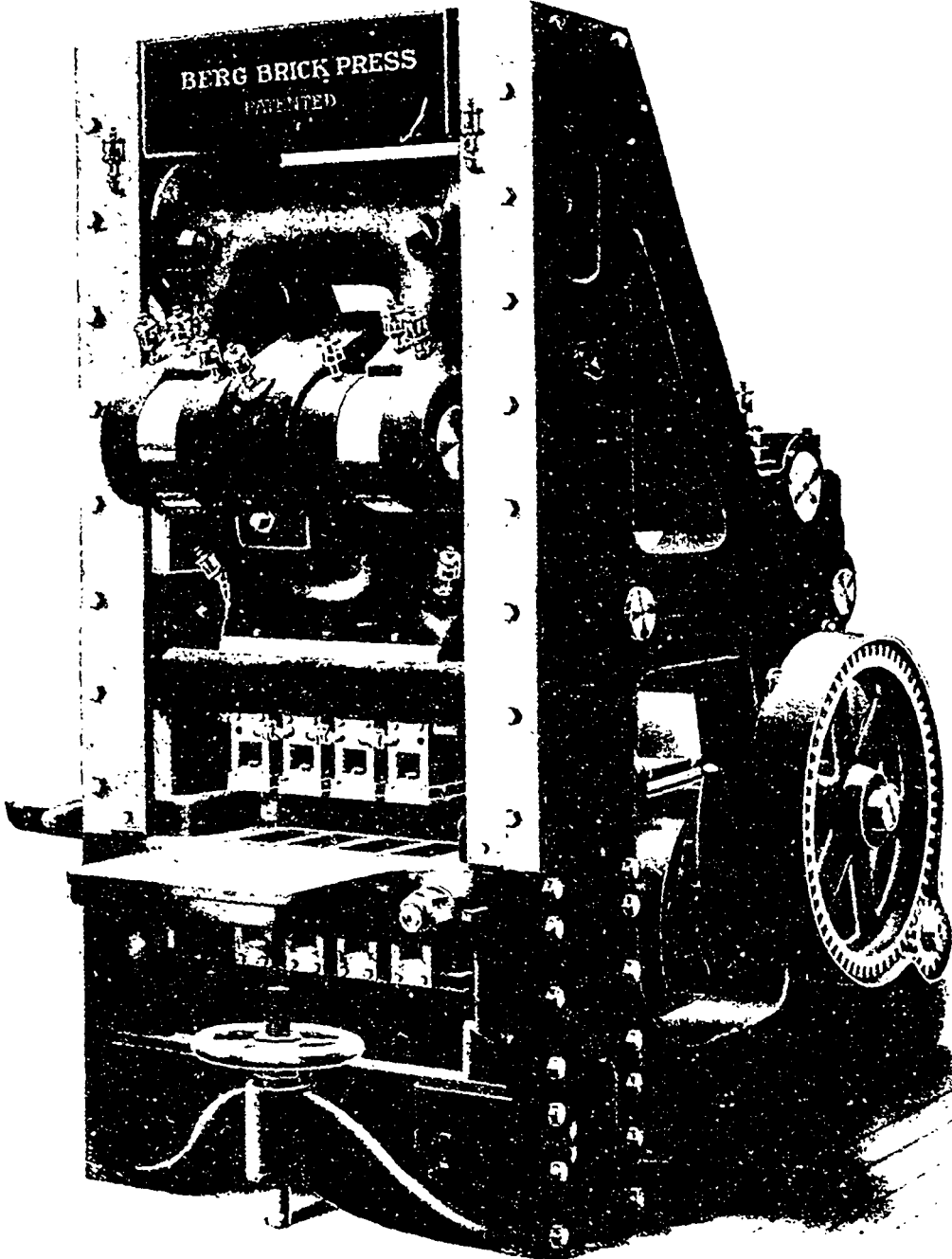
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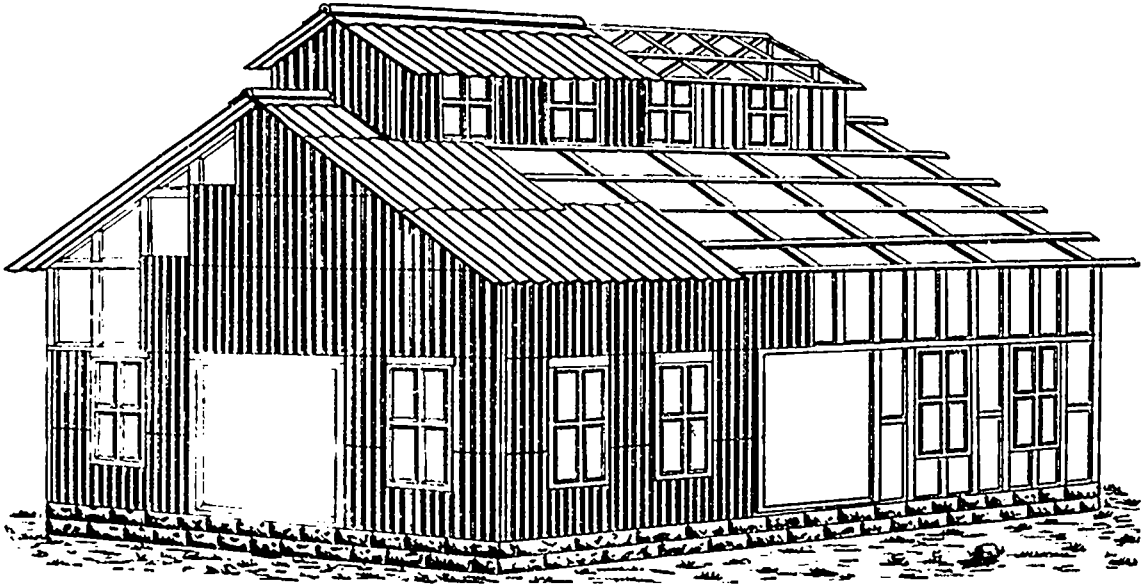
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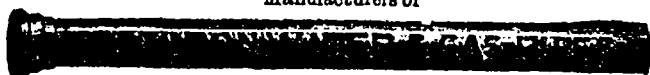
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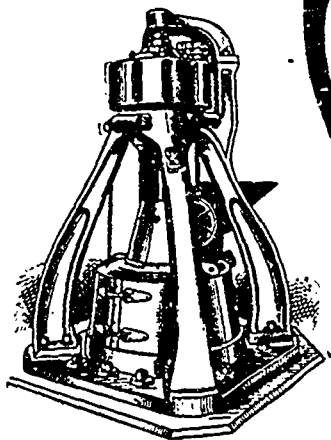
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TALK TO "THE MAN WHO BUYS" WITH A SMALL "AD." ON THIS PAGE

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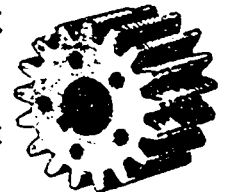
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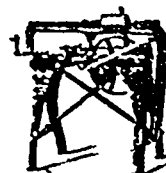
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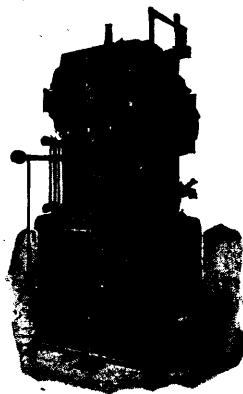
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Hamilton Facing Mill Co., Hamilton, Ont.

Boiler Inspection

Boiler Inspection & Insurance Co., Toronto.
Canadian Casualty & Boiler Insurance Co., Toronto.

BOILERS (See Engines and Boilers)**Bolts and Nuts**

London Rolling Mills, London, Ont.
Morrow John Machine Screw Co. Ingersoll, Ont.

Brass Founders

Hamilton Brass Mfg. Co., Hamilton, Ont.

Building and Paving Brick

Dunbar Fire Brick Co., Pittsburgh, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Pennsylvania Fire Brick Co., Beech Creek, Pa.
Queen's Run Fire Brick Co., Lock Haven, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Building Iron and Steel

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Metallic Roofing Co., Toronto.
Pedlar People, Oshawa, Ont.

Builders' Materials

Albert Mfg. Co., Hillsboro, Ont.
Canada Foundry Co., Toronto.
Conduits Company, Limited, Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Gartshore, John J., Toronto.
Hopkins, F. H. & Co., Montreal.
Metallic Roofing Co., Toronto.
Pedlar People, Oshawa, Ont.
Sheldons, Limited, Galt, Ont.

Burlap (Decorative)

Dominion Oil Cloth Co., Montreal.

Business Methodizers

Viau, Henri, Montreal.

Cables

Dominion Wire Rope Co., Montreal.
Greening, B. Wire Co., Hamilton, Ont.
Phillips Eugene F. Electrical Works, Montreal.

Canada Plates

Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Caps

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Card Clothing

McLaren D. K., Montreal and Toronto.

Cast Iron Pipe

Canada Foundry Co., Toronto.
Montreal Pipe Foundry Co., Montreal.
McDougall, John, Caledonian Iron Works Co. Montreal.

Castings (Grey Iron, Malleable Iron and Brass)

Jenckes Machine Co., Sherbrooke, Que.
Kerr Engine Co., Walkerville, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
McKinnon Dash & Metal Works Co., St. Catharines, Ont.
Maxwell, David & Sons, St. Mary's, Ont.
Smart-Turner Machine Co., Hamilton, Ont.

Cement Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Bradley Pulverizer Co., Boston, Mass.
McDougall, John, Caledonian Iron Works Co., Montreal.

Centrifugal Pumping Machinery

Morris Machine Works, Baldwinsville, N.Y.
Smart-Turner Machine Co., Hamilton, Ont.

Chain Making Machinery**(Welded Coil Chain)**

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Channels

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow N.S.

Charcoal Pig Iron

Canada Iron Furnace Co., Montreal.
McDougall, John, Caledonian Iron Works Co. Montreal.

Chemicals

Canada Chemical Co., London, Ont.
Canada Process Co., Toronto.
Nichols Chemical Co. of Canada, Montreal.

Chemists

Heys, Thomas & Son, Toronto.

Clay Working Machinery

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio

Coal, Coke and Charcoal.

Bourne-Fuller Co., Cleveland, Ohio.
Hamilton Facing Mill Co., Hamilton, Ont.

Coal Cutting Machines

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus, Ohio.

Coal Tipples

Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.

Coil Chains

Greening, B. Wire Co., Hamilton, Ont.
Leslie, A. C. & Co., Montreal.

Coke Oven Brick

Dunbar Fire Brick Co., Pittsburgh Pa.
Stowe-Fuller Co. Cleveland Ohio.

Collection Agency

Petrie, H. D., Hamilton, Ont.

Concrete Mixers

Hopkins, F. H. & Co., Montreal.

Condensers

Smart-Turner Machine Co., Hamilton, Ont.

Conduits (Interior)

Conduits Company, Limited, Toronto.

Contractors' Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Gartshore, John J., Toronto.
Hopkins, F. H. & Co., Montreal.
Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Contractors' Plants

Allis-Chalmers-Bullock, Limited, Montreal.
Hopkins, F. H. & Co., Montreal.
Jenckes Machine Co., Sherbrooke, Que.
Petrie, H. W., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.
Williams A. R. Machinery Co., Toronto.

Conveying Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Jeffrey Mfg. Co., Columbus Ohio.
McDougall, John, Caledonian Iron Works Co. Montreal.
Perrin, William R. & Co., Limited, Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

Copper Materials

Greening, B. Wire Co. Hamilton, Ont.
Phillips, Eugene F. Electrical Works, Montreal.
Syracuse Smelting Works Montreal.

Corrugated Iron

Metallic Roofing Co., Toronto.
Pedlar People, Oshawa, Ont.

Covers

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Cranes (Electric and Hand Power)

Smart-Turner Machine Co., Hamilton, Ont.

Crayons

Lowell Crayon Co., Lowell, Mass.

Crucibles

Dixon, Joseph, Crucible Co., Jersey City, N.J.
Hamilton Facing Mill Co., Hamilton, Ont.
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Crucible Caps

Hamilton Facing Mill Co., Hamilton, Ont.
McCullough-Dalsell Crucible Co. Pittsburg, Pa.

Crucible Covers

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Cutter Grinding Machines

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Dashes

McKinnon Dash & Metal Works Co. St. Catharines, Ont.

Dies (Socket, Sewer Pipe and Tile)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Directories

Kelly's Directories, Limited, Toronto

Draw Benches (Wire)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Dredges

Allis-Chalmers-Bullock, Limited, Montreal.

Drill Chucks

Krug & Crosby, Hamilton, Ont.

Drills

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Petrie, H. W., Toronto.

Drills (Pneumatic and Rock)

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus, Ohio.

Drop Forgings

Globe Machine & Stamping Co., Cleveland, Ohio

Drop Forging Dies

Globe Machine & Stamping Co., Cleveland Ohio.

Dry Kiln Apparatus

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Dust and Shavings Separators

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co. Boston, Mass.

Dye Stuffs and Chemicals

Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Canada Chemical Mfg. Co., London, Ont.
Canada Process Co., Toronto.
Casella Color Co., New York City.
McArthur, Corneille & Co., Montreal.
Nichols Chemical Co. of Canada, Montreal.
Winn & Holland, Montreal.

DYNAMOS (See Motors and Dynamos)**Electric Meters and Transformers**

Allis-Chalmers-Bullock, Limited, Montreal.
Packard Electric Co., St. Catharines, Ont.

Electric Mine Locomotives

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.

Electrical Repairs

Keystone Engineering Co., Toronto.

Electrical Supplies

Allis-Chalmers-Bullock, Limited, Montreal.
Bristol Co., Waterbury, Conn.
Canadian General Electric Co., Toronto

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

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(CONTINUED).

Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jones & Moore Electric Co., Toronto
Keystone Engineering Co., Toronto.
Packard Electric Co., St. Catharines, Ont.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Elevators and Conveyors

Allis-Chalmers-Bullock, Limited, Montreal
Darling Bros., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.

Elevator Insurance

Canadian Casualty & Boiler Insurance Co., Toronto.

Emery and Emery Wheels

Forman, John, Montreal.
Hamilton Facing Mill Co., Hamilton, Ont.
Petrie, H. W., Toronto.

Engineers (Chemical)

Heys, Thomas & Son, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

Engineers (Civil)

Parke, R. J., Toronto.
Vogel, C. H., Ottawa.

Engineers (Consulting)

Aitken, K. L., Toronto.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
Hunt, Robert W. & Co., Chicago, Ill.
Keystone Engineering Co., Toronto, Ont.
Marion & Marion, Montreal.
Parke, R. J., Toronto.
Perrin William R. & Co., Limited, Toronto.
Vogel, C. H., Ottawa.

Engineers (Contracting)

Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Electrical Construction Co., London Ont.
Fensom, C. J., Toronto.
Keystone Engineering Co., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.

Engineers (Electrical)

Aitken, K. L., Toronto.
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Ltd., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Crocker-Wheeler Co., St. Catharines, Ont.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
Jones & Moore Electric Co., Toronto.
Keystone Engineering Co., Toronto.
Marion & Marion, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Engineers (Mechanical)

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Hunt, Robert W. & Co., Chicago, Ill.
Kerr Engine Co., Walkerville, Ont.
Marion & Marion, Montreal.
Robb Engineering Co., Amherst, N.S.
Sheldons, Limited, Galt, Ont.
Smart-Turner Machine Co., Hamilton, Ont.

Engineers (Mill and Hydraulic)

Fensom, C. J., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.
Vogel, C. H., Ottawa.

Engineers (Mining)

Heys, Thomas & Son, Toronto.
Mills, S. D. Toronto.

Engineers and Contractors

Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.
Smart-Turner Machine Co., Hamilton, Ont.

Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.

Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hopkins, F. H. & Co., Montreal.
Jenckes Machine Co., Sherbrooke, Que.
Morris Machine Works, Baldwinville, N.Y.
McDougall, John, Caledonian Iron Works Co., Montreal.
Petrie, H. W., Toronto.
Robb Engineering Co., Amherst, N.S.
Sheldons, Limited, Galt, Ont.
Smart-Turner Machine Co., Hamilton, Ont.
Sturtevant, B. F. Co., Boston, Mass.
Williams, A. R. Machinery Co., Toronto.

Engravers

Canadian Manufacturer, Toronto.
Jones, J. L. Engraving Co., Toronto.

Exhaust Fans

Hamilton Facing Mill Co., Hamilton, Ont.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Exhaust Heads

Darling Bros., Montreal.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Hyde Park, Mass.

Exhausters

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Hyde Park, Mass.

Factory Sites

(See Factory Locations, page 31.)

Feed Water Heaters

Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Pittsburg Filter Mfg. Co., Pittsburg, Pa.
Robb Engineering Co., Amherst, N.S.
Smart-Turner Machine Co., Hamilton, Ont.

Feed Water Purifiers

Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Files

Spence, R. & Co., Hamilton, Ont.

Fillet (Pattern)

Hamilton Facing Mill Co., Hamilton, Ont.
Sadler & Haworth, Montreal and Toronto.

Filters (Oil)

Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin William R. & Co., Limited, Toronto.

Filters and Filtering Systems (Water)

Babcock & Wilcox, Limited, Montreal.
Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Financial

Bradstreet's, New York City.
Dun, R. G. & Co., Toronto.
Neff & Postlethwaite, Toronto.
Petrie, H. D., Hamilton, Ont.

Finials

Metallic Roofing Co., Toronto.
Pedlar People, Oshawa, Ont.

Fire Brick and Clay

Dunbar Fire Brick Co., Pittsburgh, Pa.
Elk Fire Brick Co., St. Mary's, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Harbison-Walker Refractories Co., Pittsburg, Pa.
Pennsylvania Fire Brick Co., Beech Creek, Pa.
Queen's Run Fire Brick Co., Look Haven, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Fire Escapes

Darling Bros., Montreal.

Fireproof Partitions

Metallic Roofing Co., Toronto.
Pedlar People, Oshawa, Ont.

Flour Mill Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Goldie & McCulloch Co., Galt, Ont.

Forges and Blowers

Canada Foundry Co., Toronto.
Hamilton Facing Mill Co., Hamilton, Ont.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Founders

Canada Foundry Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.
Smart-Turner Machine Co., Hamilton, Ont.

Foundry Facings and Supplies

Hamilton Facing Mill Co., Hamilton, Ont.

Fuel Economizers

Babcock & Wilcox, Limited, Montreal.
Sturtevant, B. F. Co., Hyde Park, Mass.

Furniture (Lodge, Opera and School)

Canadian Office & School Furniture Co., Preston, Ont.

Galvanizing

Ontario Wind Engine & Pump Co., Toronto.

Galvanizing and Tinning Machinery and Furnaces (Wire)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Gas and Gasoline Engines

Economic Power, Light & Heat Supply Co., Toronto.
Morrison, T. A. & Co., Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Gauges (Recording Pressure)

Bristol Co., Waterbury, Conn.

Gauges (Steam)

Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto

Gauges (Water)

Babcock & Wilcox, Limited, Montreal

Generating Sets

Sturtevant, B. F. Co., Hyde Park, Mass.

Generators

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Phillips, Eugene F., Electrical Works, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Gloves, Mittens and Moccasins

Storey, W. H. & Son, Acton, Ont.

Government Notices

Factory Inspectors.
Minister of Agriculture.

Graphite

Dixon, Jos. Crucible Co., Jersey City, N.J.
Hamilton Facing Mill Co., Hamilton, Ont.
McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Hack Saws

Krug & Crosby, Hamilton, Ont.

Hames.

McKinnon Dash & Metal Works Co., St. Catharines.

Hardware

Butterfield & Co., Rock Island, Que.
Gartshore, John J., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.
Hopkins, F. H. & Co., Montreal.
Morrow John Machine Screw Co., Ingersoll, Ont.

Heating and Ventilating Apparatus

Darling Bros., Montreal.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Hoisting Engines

Allis-Chalmers-Bullock, Limited, Montreal.
Jenckes Machine Co., Sherbrooke, Que.

Hoists (Chain and Pneumatic)

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Hopkins, F. H. & Co., Montreal.

Hose (Fire and Pneumatic)

Gutta Percha & Rubber Mfg. Co., Toronto.

Hydrants

Kerr Engine Co., Walkerville, Ont.
Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Accumulators

Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Hydraulic Machinery

Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jenckes Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

HARRISON-WALKER REFRACTORIES CO

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K



THE standard shapes and sizes of McCullough-Dalzell Crucibles will enable you to change readily from other makes. Our crucibles run three pounds of molten metal to the number. Write for prices.

McCULLOUGH-DALZELL CRUCIBLE COMPANY, PITTSBURG, PA.



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WALKERVILLE, ONT.

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CLASSIFIED INDEX.

(CONTINUED).

Insulated Wires and Cables

Phillips, Eugene F., Electrical Works, Montreal.

Iron and Steel Specialties

Armstrong Mfg. Co., Bridgeport, Conn.
 Bourne-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.
 Leslie, A. C. & Co., Montreal.
 London Rolling Mill Co., London, Ont.
 Lysaght, John, Limited, Bristol, England and Montreal.
 Metallic Roofing Co., Toronto.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Pedlar People, Oshawa, Ont.
 Petrie, H. W., Toronto.
 Union Drawn Steel Co., Hamilton, Ont.

Injectors

Canada Foundry Co., Toronto.
 Hamilton Brass Mfg. Co., Hamilton, Ont.
 Williams A. R. Machinery Co., Toronto.

Iron and Steel Inspection

Hunt R. W. & Co., Chicago, Ill.

Lamps—Electric

Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian General Electric Co., Toronto.
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.
 Forman, John, Montreal.
 Packard Electric Co., St. Catharines, Ont.

Lathes

Petrie, H. W., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Lathes (Wood-working)

Goldie & McCulloch Co., Galt, Ont.
 Petrie, H. W., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Linoleum

Dominion Oil Cloth Co., Montreal.

Lubricators

Hamilton Facing Mill Co., Hamilton, Ont.

Machinists

Goldie & McCulloch Co., Galt, Ont.
 Krug & Crosby, Hamilton, Ont.
 Robb Engineering Co., Amherst, N.S.
 Smart-Turner Machine Co., Hamilton, Ont.

Machinists' Supplies

Armstrong Mfg. Co., Bridgeport, Conn.
 Butterfield & Co., Rock Island, Que.
 Goldie & McCulloch Co., Galt, Ont.
 Gutta Percha & Rubber Mfg. Co., Toronto.
 Hopkins, F. H. & Co., Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Morrow, John, Machine Screw Co., Ingersoll, Ont.
 Petrie, H. W., Toronto.

Machine Tools

Becker-Brainard Milling Machine Co., Hyde Park, Mass.
 Darling Bros., Montreal.
 Petrie, H. W., Toronto.

Malleable Castings

McKinnon Dash & Metal Works Co., St. Catharines, Ont.
 Smith's Falls Malleable Castings Co., Smith's Falls, Ont.

Marine and Stationary Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
 Jenekes Machine Co., Sherbrooke, Que.
 Smart-Turner Machine Co., Hamilton, Ont.

Mechanical Draft

Babcock & Wilcox, Limited, Montreal.
 Sheldons, Limited, Galt, Ont.
 Sturtevant, B. F. Co., Boston, Mass.

Metal Doors

Metallic Roofing Co., Toronto.
 Pedlar People, Oshawa, Ont.

Metal Stamping

Globe Machine & Stamping Co., Cleveland, Ohio.
 Metallic Roofing Co., Toronto.
 Pedlar People, Oshawa, Ont.

Metallurgists

Mills, S. D., Toronto.

Mill Machinery and Supplies

Allis-Chalmers-Bullock, Limited, Montreal.
 Armstrong Mfg. Co., Bridgeport, Conn.
 Becker-Brainard Milling Machine Co., Hyde Park, Mass.
 Darling Bros., Montreal.
 Gartshore, John J., Toronto.
 Goldie & McCulloch Co., Galt, Ont.
 Gutta Percha & Rubber Mfg. Co., Toronto.
 Hamilton Brass Mfg. Co., Hamilton, Ont.
 Hamilton, Wm., Mfg. Co., Peterborough, Ont.
 Hay, Peter Knife Co., Galt, Ont.
 Hopkins, F. H. & Co., Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jenekes Machine Co., Sherbrooke, Que.
 Morrow, John, Machine Screw Co., Ingersoll, Ont.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 McLaren, D. K., Montreal and Toronto.
 Petrie, H. W., Toronto.
 Robb Engineering Co., Amherst, N.S.
 Smart-Turner Machine Co., Hamilton, Ont.
 Spence, R. & Co., Hamilton, Ont.

Milling Cutters and Machines

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Miners' Lamps

Allis-Chalmers-Bullock, Limited, Montreal.

Mining Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian Rand Drill Co., Sherbrooke, Que.
 Gartshore, John J., Toronto.
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Hopkins, F. H. & Co., Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jenekes Machine Co., Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Perrin, William R. & Co., Limited, Toronto.
 Petrie, H. W., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Motors and Dynamos

Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian General Electric Co., Toronto.
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.
 Electrical Construction Co., London, Ont.
 Forman, John, Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jones & Moore Electric Co., Toronto.
 Keystone Engineering Co., Toronto.
 Petrie, H. W., Toronto.
 Sturtevant, B. F. Co., Hyde Park, Mass.
 Toronto & Hamilton Electric Co., Hamilton, Ont.

Moulding Sand

Hamilton Facing Mills Co., Hamilton, Ont.

Moulders Supplies.

Hamilton Facing Mill Co., Hamilton, Ont.

Municipal Filtration Plants (Water)

Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Nickel

Canadian Copper Co., New York, N.Y.
 Orford Copper Co., New York, N.Y.

Nozzles

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Office and Bank Fittings

Canadian Office & School Furniture Co., Preston, Ont.

Oils and Lubricants

Dixon, Jos. Crucible Co., Jersey City, N.J.
 Hamilton Facing Mill Co., Hamilton, Ont.
 Imperial Oil Co., Petrolia, Ont.
 Queen City Oil Co., Toronto.

Oil Cloth

Dominion Oil Cloth Co., Montreal.

Paints and Colors

Berry Bros., Walkerville, Ont.
 McArthur, Corneille & Co., Montreal.

Paper Manufacturers

Barber, Wm. & Bros., Georgetown, Ont.
 Toronto Paper Mfg. Co., Cornwall, Ont.

Patents

Budden, Hanbury A., Montreal.
 Fetherstonhaugh & Co., Toronto.
 Marion & Marion, Montreal.

Patterns (Wood and Iron)

Maxwell, David & Sons, St. Mary's, Ont.

Perforated Metals

Globe Machine & Stamping Co., Cleveland, Ohio.
 Greening, B. Wire Co., Hamilton, Ont.
 Metallic Roofing Co., Toronto.
 Pedlar People, Oshawa, Ont.

Personal Accident

Canadian Casualty & Boiler Insurance Co., Toronto.

Phosphorizers

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Pig Iron

Bourne-Fuller Co., Cleveland, Ohio.
 Canada Iron Furnace Co., Montreal.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Syracuse Smelting Works, Montreal.

Pipe (Riveted, Iron and Steel)

Babcock & Wilcox, Limited, Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Pipe Threading Machines

Armstrong Mfg. Co., Bridgeport, Conn.
 Butterfield & Co., Rock Island, Que.
 Petrie, H. W., Toronto.

Pipes and Tubes

Bourne-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.
 Montreal Pipe Foundry Co., Montreal.

Plaster

Albert Mfg. Co., Hillsborough, N.B.

Plates

Bourne-Fuller Co., Cleveland, Ohio.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Plumbago

Hamilton Facing Mills Co., Hamilton, Ont.
 McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Pneumatic Tools

Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian Rand Drill Co., Sherbrooke, Que.
 Hamilton Facing Mill Co., Hamilton, Ont.

Pointer Rolls (For Rods and Wire)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Power Plants—Equipments

Allis-Chalmers-Bullock, Limited, Montreal.
 Babcock & Wilcox, Limited, Montreal.
 Canadian General Electric Co., Toronto.
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.
 Darling Bros., Montreal.
 Economic Power, Light & Heat Supply Co., Toronto.
 Electrical Construction Co., London, Ont.
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 Perrin, Wm. R. & Co., Limited, Toronto.
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Producer Gas Plants

Economic Power, Light & Heat Supply Co., Toronto.

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Allis-Chalmers-Bullock, Limited, Montreal.
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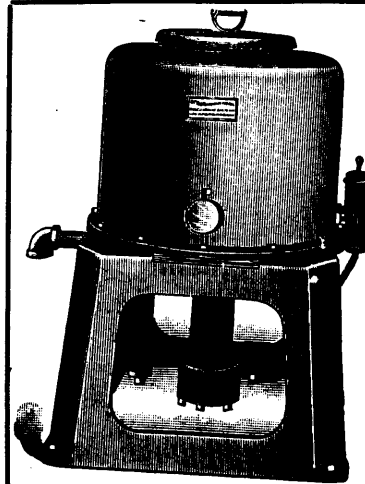


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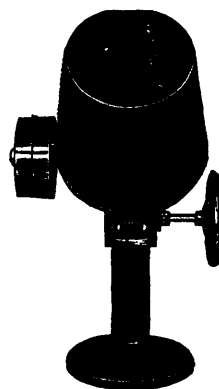
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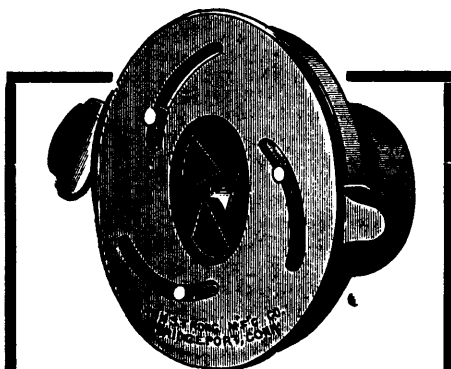
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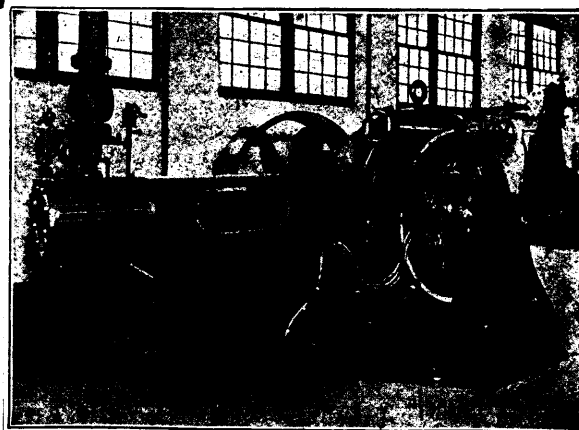
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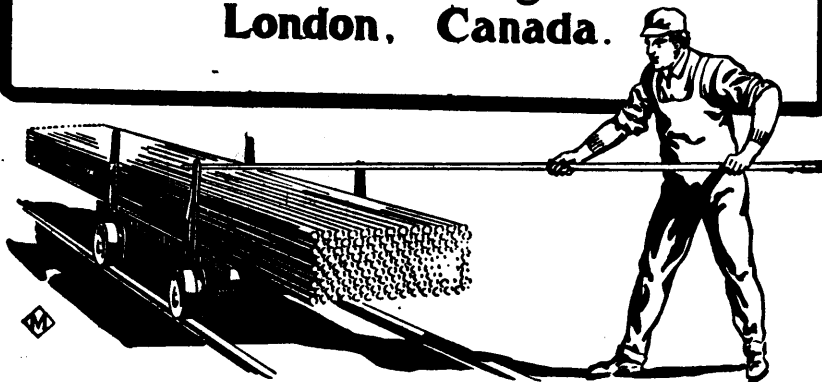
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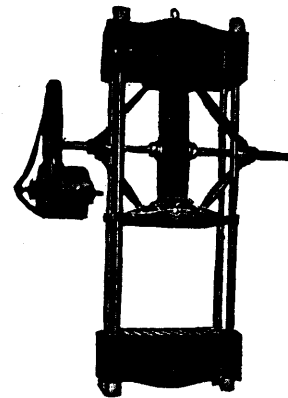
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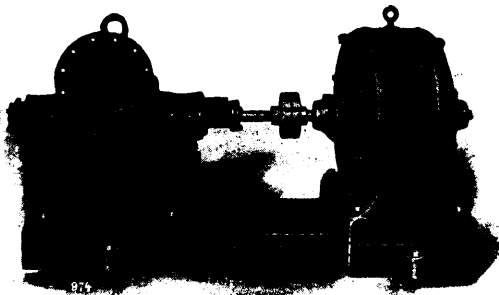
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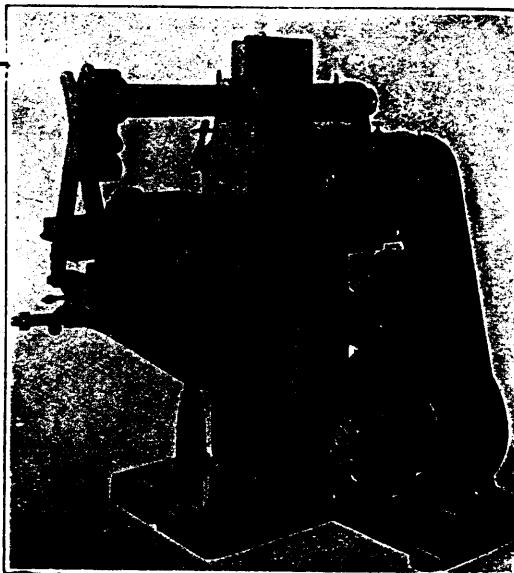
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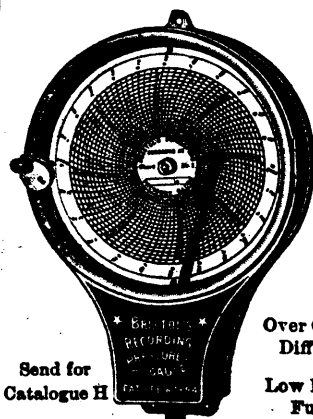
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