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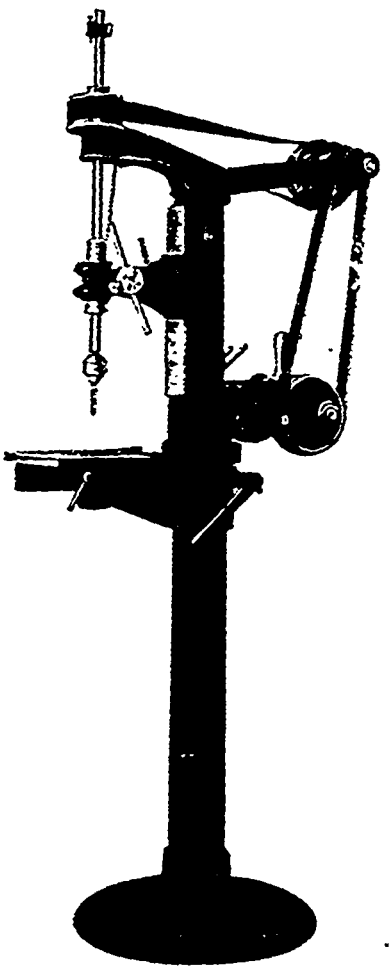
Sensitive Drilling Machines



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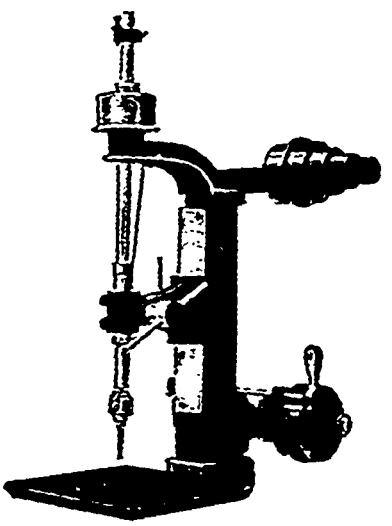

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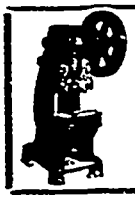

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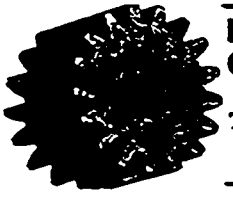

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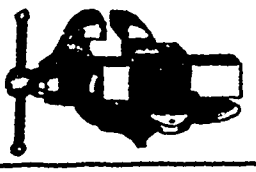

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CANADIAN MANUFACTURER
and Industrial World

A Semi-Monthly Newspaper devoted to the Manufacturing Interests of Canada—A Newspaper, Not an Organ.

Established in 1880. Published 1st and 3rd Fridays.

The Canadian Manufacturer Publishing Co., Limited

Office of Publication: 408 McKinnon Building, Toronto

D. O. McKINNON—Managing Director

Montreal Office—204 St. James Street,

ARTHUR B. FARMER—Representative

London, Eng., Office: 16 Devonshire Square, E.C.

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THE BUSINESS SITUATION IMPROVING

At no time of the year are manufacturers more interested in the business situation than in August when the harvesting of the year's crop in all parts of the Dominion is being done.

This year has been one of especial anxiety. Leaders in industry, commerce and banking have agreed that next winter's prosperity will largely depend upon this fall's harvest. If it had proven a short crop the contraction of demand noted last winter would have been accentuated. This is not the case, however.

Reports from the Eastern Provinces are least encouraging. The drought in June and part of July materially curtailed growth, and it is doubtful if the crop in that section of Canada will be larger than usual. Ontario has been favored with a good average crop with values on the whole as high as usual.

It is, therefore, to Western Canada that business men of all classes turn with constant interest if not anxiety for information as to whether the production will be below or above the average. In the older provinces mixed farming has reduced to a minimum the possibilities of loss in bad years. The Western Provinces are still devoted almost entirely to wheat growing, so the farmer there is almost entirely dependent on Nature. If the wheat crop is generous the Western farmer reaps larger returns for his year's work than does his Eastern brother, but if the wheat crop is meagre he must be "carried over till next year," by local retailers and money lenders, hence the never-dying interest in the Western wheat crop.

It is pleasing, therefore, to know that every day has added to the certainty of a record wheat crop in Western Canada. The most general estimate of the crop this year is 120,000,000 bushels, or about 50 per cent more than was produced last year.

Already the effect of this reassuring information is felt by manufacturers. Retailers not only in the West but in the older provinces are showing increased confidence by buying fall and winter lines earlier than last year and with more confidence. Western retailers are, in fact, insisting that deliveries be rushed as a freight blockade is feared when the crop movement begins.

There is still room for shrewd, cautious study of the market, but the great desideratum in manufacturing this year is courage to dare what one's judgment declares wise to attempt.

It is the manufacturer who goes after business with the most persistent aggressiveness who will most quickly feel the improvement in the business situation.

INFLUENCE THE PRACTICAL MEN

As a country grows in population and in industrial magnitude the character of its leading manufacturing concerns must change. Instead of the personal element which is so dominant in an industry appealing to a limited market, the work of the concern must be so organized that authority is divided and the responsibility for the conduct of various departments, must be given to specialists.

The office work of a large manufacturing concern, for instance, must be in charge of a specialist in such work, an accountant in many cases. Associated with him will probably be several high-grade specialists in office work.

An entirely different organization is necessary for mechanical work in such a concern. There must be a master mechanic, to use the railroad shop term, or a superintendent, to use the term generally adopted in factories and mills. Under him will be the foremen of various departments.

The intricacies of the power plant are so great, too, that the responsibility for the operation of the engine and for the economical transmission of power throughout the plant is generally placed upon the engineer and his assistants.

The influence of these men is too important to be neglected by the sales forces of concerns who desire to sell office supplies, machinery, power equipment, etc., to manufacturing concerns. They are hard men to reach for the reason that salesmen are not given an opportunity to influence them.

To influence these men is the great purpose of the technical paper.

Hence as Canada grows the technical press of the country must become more and more specialized. A paper which is of value to the office men cannot be of interest to mechanical superintendents. Nor will a paper devoted to the operation of machinery be of value to the men whose attention is centred on keeping the power plant at highest efficiency.

To meet this condition we are making some changes in THE CANADIAN MANUFACTURER. Full details of these will be given in the next issue.

Editorial Opinions From Our Exchanges

PREVENTING FLY WHEEL EXPLOSIONS

The frequency with which fly-wheel explosions occur reveals that the dangers of the steam plant are not confined to the boiler room alone. The increasing number of these accidents suggests lack of proper vigilance on the part of the engineer in detecting faulty conditions. We have yet to learn of a fly-wheel failing from weakness or faults of construction while operating under normal conditions.

Usually the blame is placed on the governor, as failing to govern properly. This makes an excellent excuse; it is to the point, and no one can contradict the assertion. It lets the engineer "down easy," and usually satisfies the owner. What seems farthest from the minds of all concerned is, why did the governor fail to govern? The owner does'nt know, and if the engineer knows he does not tell.

There have been many fly-wheel explosions where the circumstances were such that the utmost vigilance on the part of the engineer could not in any way have prevented them; but, on the other hand, scores of fly-wheel accidents have been caused by neglect, carelessness and lack of common sense.

No good engineer would think of washing out a boiler without examining the braces, rivets, etc., yet there is no more reason to expect that these particular features have become defective than that the bolts in the rim and hubs of a fly-wheel have loosened up, or that the safety devices on the engine have become deranged. Probably one reason for strict attention being paid to the vital parts in boiler inspection is due to the constant pointing out of the necessity of so doing, while the vital points regarding the safety of the engine are more often passed over. When an engineer omits to examine frequently his fly-wheel, safety devices and apparatus which can in any way contribute to an accident, he is guilty of gross neglect of duty. If he thinks of doing these things, but puts it off from day to day, he is guilty of carelessness of the worst kind. If he does not remove the safety pin (if the engine is so equipped), if he removes the safety knock-off block for various reasons, or if he permits an old oil-soaked belt to drive the governor, he is lacking in ordinary common sense.

You, Mr. Engineer, are operating an engine. You would be offended should one venture to call you neglectful, careless or lacking in common sense; but what precautions are you taking to prevent your engine from running away? We will venture to say that not more than one in one hundred engineers who are operating high-speed engines has ever taken the time and trouble to disassemble the fly-wheel governors to clean them and examine them for defects. The policy seems to be that just so long as the governor operates "after a fashion" there is little use of inspecting it.

Not infrequently we hear of a governor failing to govern properly because it had become gummed up. This is no excuse for such trouble, as we all know; it is nothing but the result of neglect. The breaking of belts, shafts and pulleys and neglected safety pins and cams are responsible for most fly-wheel explosions, other than those due to faults in the governor. In nine cases out of ten a careful examination of the parts enumerated would have disclosed flaws which later proved disastrous.

That an engine is equipped with automatic safety stops and the like is no reason why the engineer should lie back and assume that the safety devices will always operate properly and never get out of order. They do get out of order, as so many fly-wheel explosions testify. As a means of reducing the number of fly-wheel explosions we would suggest greater care and more frequent attention to such points as can in any way retard the functions of the governor.

THE "DUMPING" OF WOOLLENS IN CANADA

A matter that is likely to be heard of further is the dumping of Yorkshire woollens that is said to take place in Canada. A plea for the appointment to the Customs department of expert assessors of textile values is now before the Government, and the Minister of Customs would seem, under the terms of the law, to have power to appoint such at any time. The officers would single out for examination suspected cases of under-valuing, and would help to make operative the existent anti-dumping rules Under these it is laid down that articles sold to Canada at a price lower than "the fair market-value of the same article when sold for home consumption in the usual course" become liable to a special duty—not in any case to exceed 15 per cent.—designed to equate the difference between the two sets of prices. This plea for special valuation is apart from the demand for an increase in the tariff on English woollens, which latter some well-informed authorities think we are approaching. Certainty on either point would be premature at present; but there are good grounds for saying that this subject of dumping is one on which the Canadian authorities are bestowing attention in England as well as in Canada.

Supposing action to follow—in the way of an appointment of experts in textile values—our manufacturers have little more than some annoyance to fear. It is fairly certain that inquisitions into comparative costs and the reasons for cheapness, with consequent delays, would be more frequent. Shipments of job lots are even now held for inquiry occasionally, and such instances would be more numerous. However, it is reasonably clear on

general grounds that dumping from England can hardly assume the serious proportions that some Canadian agitators affect to believe. The home market is an open one; is a larger, a richer, and a more keenly-contested one than the Canadian; and there are no means by which manufacturers can maintain an artificial level of prices within it. Without tariffs or trusts, and even without loose associations of manufacturers, how can it be possible to make prices unnaturally dearer at home than abroad in any systematic way? Our woollen firms act independently, and according to desires which lead them inevitably to seek a good price rather than a poor one. They are without incentive to do for Canadian customers what they would not do for others equally good; and it follows irresistibly as a general proposition, that on a balance Canada pays neither more nor less for her English woollens than do other markets. It will be plain to the responsible authorities in Canada that our woollen manufacturers lack utterly all those special enablements that might make dumping a virulent disorder.

It is not impossible that a Judgment Day revelation of all things would find some Canadian buyers paying more or less even than other Canadian buyers for one and the same article. The same inconsistencies may as likely occur when comparison is made with prices paid by buyers other than Canadian; but that the effect of open competition is to smooth all down to one ultimate rate is indubitable. Even were it shown that a worsted manufacturer habitually made prices slightly lower to his exporting than to his home-trade customers, this need not betoken, of necessity, anything more than a difference of conditions. If the buyer from abroad places larger quantities, pays more quickly, or saves the manufacturer expenses of travelling or of patterns, he is not, therefore, in effect, buying "below the fair market value for home consumption." He is buying on different terms, is bearing expense that the manufacturer himself would otherwise be saddled with, and is thus entitled by all the laws of practice and "fair play" to a proportionate abatement in charges.

It is not inconceivable that such circumstances might reveal themselves to officials who proved sufficiently lynx-like—albeit hardly without an immensity of labor. Indeed the lot of those who may have to conduct such investigations on behalf of the government could not be an enviable one. The task of seeing that declared values are true in themselves—without having to see that they correspond with some second set of values—is heavy enough for most men. For, apart from all qualifying circumstances as to quantities and terms, there is always the possiblity that goods of the exact kind popular in Canada have no home consumption at all. While it must be admitted that the Canadian Customs might put themselves to much expense, or put Canadian importers and British manufacturers and merchants to considerable annoyance, by a rigorous scrutiny of all woollens entering the country, it cannot be thought for a moment that they are likely to do themselves or Canadian manufacturers any corresponding good.—Power.

THE GOVERNMENT'S REMITTANCE BUSINESS

Both in the States and Canada a good deal is heard, from time to time, about the competition between banks and express companies for the small remittance business. Across the line some of the bankers are disposed to view with considerable bitterness what they term the unwarranted invasion of the banking field by the companies. Indeed some efforts have been made to have the selling of money orders by express companies declared illegal; but nothing of consequence has been achieved in that line, and if the bankers want to overbear the express company competition they will have to give better service than their rivals for the prices charged.

In the Dominion the competition has not assumed the bitter tinge. As a matter of fact the express companies here enjoy a very profitable connection with the big banks. There is in Canada a movement or carriage of funds larger relatively than takes place in the States. It is the result of our practice of frequent redemption and re-issue of bank notes. Thus the banks probably have proportionately, to their size, more business for the express companies, and it may be that their good will is valued more.

Though not so much notice is taken of it, there is a third competitor for the small remittance business whose turnover has been increasing perhaps as fast or faster than the other two. The following table shows the growth of the money order business of the Canadian post office since 1871.

	No. of Post Offices	No. of Orders Issued	Value	Average value each order
1871.....	3,943	120,521	$4,546,434	$38
1881.....	5,935	338,238	7,725,212	23
1891.....	8,061	855,619	12,478,178	15
1901.....	9,834	1,151,024	17,956,258	16
1905.....	10,879	1,924,130	32,349,475	17
1906.....	11,141	2,178,549	37,355,673	17
1907.....	11,377	1,845,278	32,160,098	17

The commissions or gross revenue from this business in 1906 and 1907 must have amounted to a very considerable sum in each year (assuming that it contains no deadheading), and there would of course be collateral profits. —Chronicle, Montreal.

CONCENTRATING UPON ONE'S BUSINESS

It is easy to let the mind drift, or to permit it to run on agreeable things, but to think steadily upon a useful subject and reach a conclusion is work. But those who are in a position to know most about the management of the mind tell us that if we would but concentrate when there is need for it, we would achieve vastly better results in our work, and also have more fun in our play. A man often thinks he is at work because his body or his surface faculties are busy, when, in fact, he is just killing time.

It is one thing to dispose of the morning's mail in a mechanical listless way, with the best mind temporarily out of commission, and a very different thing to dictate

with every faculty alert and one's best resources right on tap.

The salesman who goes through with a visit in a perfunctory sort of fashion, with poor grasp of his story, and no thought of the possible wants of his customer, is doing a thing which is exceedingly easy to fall into without knowing it.

The fact is, it is real hard work to use the mind to the full, and it takes a conscious effort to do it. But where most of us fall down is, in yielding to the inclination to let the mind drift the moment the immediate business pressure is removed. On the train, in the hotel or at home, we drop what has been the drudgery of business, and either think consciously of something different, or let the mind wander. Of course, one needs rest and change, but there is no perfect rest till one has done his work well. And doing one's work well, means, in the case of a business like marketing well-formed and well-executed plans for translating ideas into results.

Marketing is not essentially a business of routine and drudgery. The sales department is a laboratory for turning thoughts into profits. Except in a small part of the clerical work, the man who is a mere machine has no place in the sales department. The marketing department is more and more calling for men of active available resources, and the buyer is demanding that the salesman shall be a specialist on the product he sells.

Reading, studying, thinking and scheming are the conditions of success. Not only must a man think and plan, but he must be so informed as to the methods in use elsewhere that he will not waste time in his own office experimenting over things which have been thoroughly tried out, perfected and made everyday practice elsewhere.

Reading about one's business not only gives information as to how others do it, but stimulates thought, and tends to make the reader think more highly of his business. The fact is, that marketing is as large a business as the marketer will make it, depending upon the amount of thought and study put into it.

If summer or slack trade give some leisure, can it not be well expended in re-planning campaigns and getting a larger grasp upon the principles which make for success? —Selling Magazine.

THE GEORGIAN BAY CANAL.

Certainly vital interest attaches to the report of the Georgian Bay Canal survey presented to Parliament this week, by Hon. Dr. Pugsley, Minister of Public Works. Two routes are outlined, the divergence being at the Montreal end of the system. Each provides for a minimum depth of 22 feet between Port Arthur and the head of ocean navigation. Route A, from Montreal via Lake St. Louis and Ste. Anne de Bellevue, is estimated at a cost of $99,689,000; route B, via Riviere des Prairies, north of Montreal Island, at $93,890,000. In either case two or three millions more would undoubtedly be required to provide for enhanced land values in paying damage eight or ten years hence.

The first plan would utilize existing port facilities as the new canal would enter Montreal Harbor at its upper end. By the second route, however, the St. Lawrence ship canal is joined at Bout de l'Isle, some seventeen miles below the city Custom House.

The method of navigation proposed is that known as the "dam and lock system" with slack water reaches between structures. The plan provides for the passage of vessels of 600 feet in length by 60 in breadth, with a draft of 20 feet—lock chambers to be 650 by 65 feet, with a minimum of 22 feet of water on the sills. There will be in all 26 or 27 locks ranging in lift from five to fifty feet. The scheme calls also for 45 dams of various sizes, in addition to those connected with storage reservoirs. The latter are planned to retain surplus waters during flood seasons for release during low water periods- a matter of importance to both navigation and manufacturing interests dependent upon water power.

From Port Arthur or Fort William to Montreal via the proposed waterway would be about 935 miles. By Lake Erie and the Welland Canal it is 1,216 miles; while via Buffalo, and the Erie Canal to New York, the distance is 1,358 miles—giving a difference in favor of the projected route of over 280 miles, as compared with the present St. Lawrence route, and over 420 miles as compared with the Buffalo and New York route.

Comparing relative distance from Fort William to Liverpool we have: Fort William to Liverpool via Georgian Bay Canal, 4,123 miles; Fort William to Liverpool via New York, 4,929; giving a difference of more than 800 miles in favor of the Georgian Bay-Montreal route.

It is recognized in the report, however, that saving in distance is not always equivalent to saving in time. Of the 440 miles of the waterway from the Georgian Bay to Montreal there will be about 100 miles or so of canal cutting, submerged channels, lock approaches, etc., through which transit will be necessarily slow; and a computation of the speed allowable in the different stretches, with about three-quarters of an hour allowed for delay in the passage of each lock, gives about seventy hours as the time of transit from Georgian Bay to Montreal.

It is reckoned, therefore, that the route will be from one and three-fifths to two days faster than any other existing water route from the head of the Great Lakes to an ocean port, apart from also having an enormous superiority as to carrying capacity.

There are still to be considered, of course, the relative cost and practical effect of deepening the existing St. Lawrence route to a 22-foot minimum. If, as is considered probable, the number of locks could be materially reduced, the advantages of longer stretches of open water might possibly offset the new route's saving in actual distance. This phase, doubtless, will be given due and prompt consideration.—The Chronicle, Montreal.

The Warren Vertical Gas Engine and Producer.

DETAILS OF CONSTRUCTION.

It is generally recognized by power users that the great desideratum in any type of power plant is reliability. As this is the quality most insistently claimed for the Warren vertical gas engine and producer, a detailed description illustrated by drawings, of that type of equipment will probably be of much interest to readers of THE CANADIAN MANUFACTURER.

The outstanding features of this apparatus are:

First. The well known difficulty of maintaining an accurate alignment of main crank shaft bearings in vertical engines, has been provided for in no uncertain manner.

on top of the cylinders, convenient for inspection, and adjustment, without the necessity of opening the crank case doors.

Taking up these features in succession, the crank shaft bearings are supported by large bolts, two to each bearing, which extend through to the top of crank case, as seen at A, Figure 2. Top half of bearings is fixed in place and alignment of same never varies. Adjustment is made by removing or inserting the necessary number of brass shims between the halves of bearing. These shims are made accurately to a uniform thickness of 1-1000 of an inch each, and no matter what force is exerted on the wrench at top of large

tion are obvious. Round rubber gaskets form the slip joint, and this joint prevents any leakage of water from the jacket.

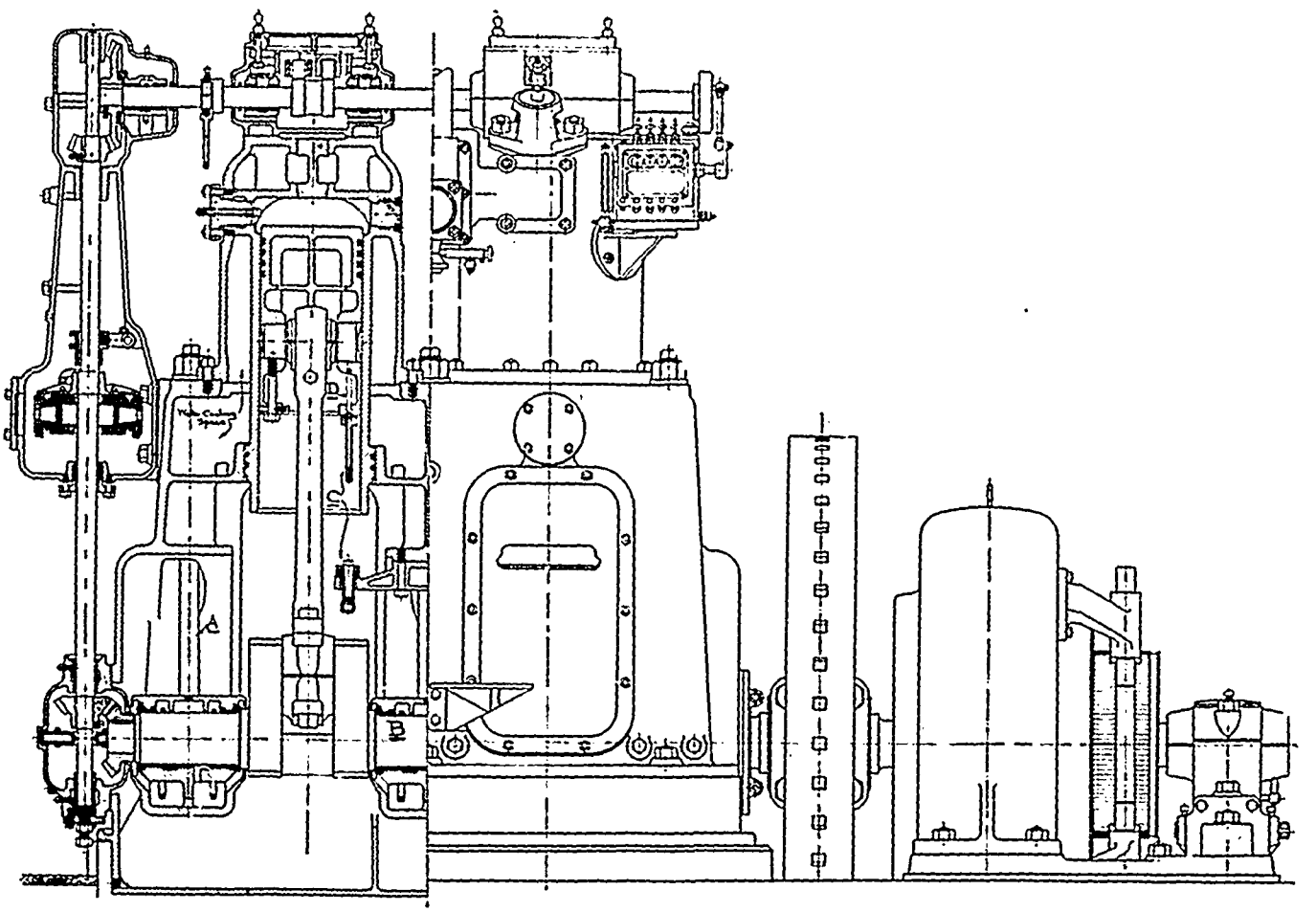
The expansion of the inner cylinder wall being independent of the balance of the casting and in a downward direction.

The head is cast integral with the cylinder, thus obviating the necessity for a packed joint, and insuring an absence of jacket water in the interior of cylinder proper.

Instead of the "splash" or "gravity" oiling systems, ordinarily employed, all parts of this machine are positively lubricated.

The cylinder walls are lubricated by force feed oilers (two oil pipes to each cylinder) fed by lubricator on right hand cylinder in Fig. 2, main crank shaft bearings and cam shaft bearings are ring oiling type, provided with gauge glasses.

The wrist pin bearing is lubricated by means of a tube, fitted with a ball check



Second. As the unequal temperatures to which the inner and outer walls of a gas engine cylinder are subjected to during operation, usually bring about distortion in the cylinder casting, a design has been provided, which while preventing any leakage of water into the explosion chamber, permits the inner cylinder to expand independently of the water-jacket casting.

Third. A system of lubrication differing radically from that heretofore employed on engines of this type.

Fourth. The arrangement of both inlet and exhaust valves, in easily removable cages.

Fifth. In the location of the cam-shaft

bolts, adjustment cannot be made to a greater extent than the combined thickness of such shims as have been removed or inserted, thus making it impossible to pull one bearing out of alignment with another. The only point necessary to watch is that the same number of shims are inserted or removed from each bearing.

The middle bearing, shown at B Fig. 2, is made of size equally as large as the end bearings: the usual practice being to make this bearing smaller.

At A, Fig. 1, can be seen the arrangement which permits the inner wall of cylinder to expand when subjected to the heat of burning gases. The advantages of this construc-

valve, as shown at C, Fig. 2, on every down stroke of pistons, this tube enters oil receptacle shown, and the oil is pumped to each wrist pin bearing. It should be noted that this bearing is much larger than is common and is readily adjusted as seen in Fig. 1.

Inlet and exhaust valves seat on independent cages, and can be removed easily by loosening two nuts, thus lessening the work necessary in regrinding.

The exhaust valve cages are water-cooled, and the inlet valve cage is so designed that the air and gas forming the explosive mixture enter the cylinder separately. The air entering first, effectively cools the inlet valve. Since the mixture is not effected until

both gas and air have entered the cylinder, there is no possibility of back-firing or pre-ignition.

The cam shaft located at top cylinders is readily accessible by lifting off the covers shown in Fig. 1 and Fig. 2.

The cams dip in oil at every revolution; thus prolonging their life.

The governor shown on vertical shaft in Fig. 2, controls the speed closely enough to permit the parallel operation of alternating current generators, being sensitive to a high degree.

The point of ignition can be varied while engine is running, thus permitting the highest economy.

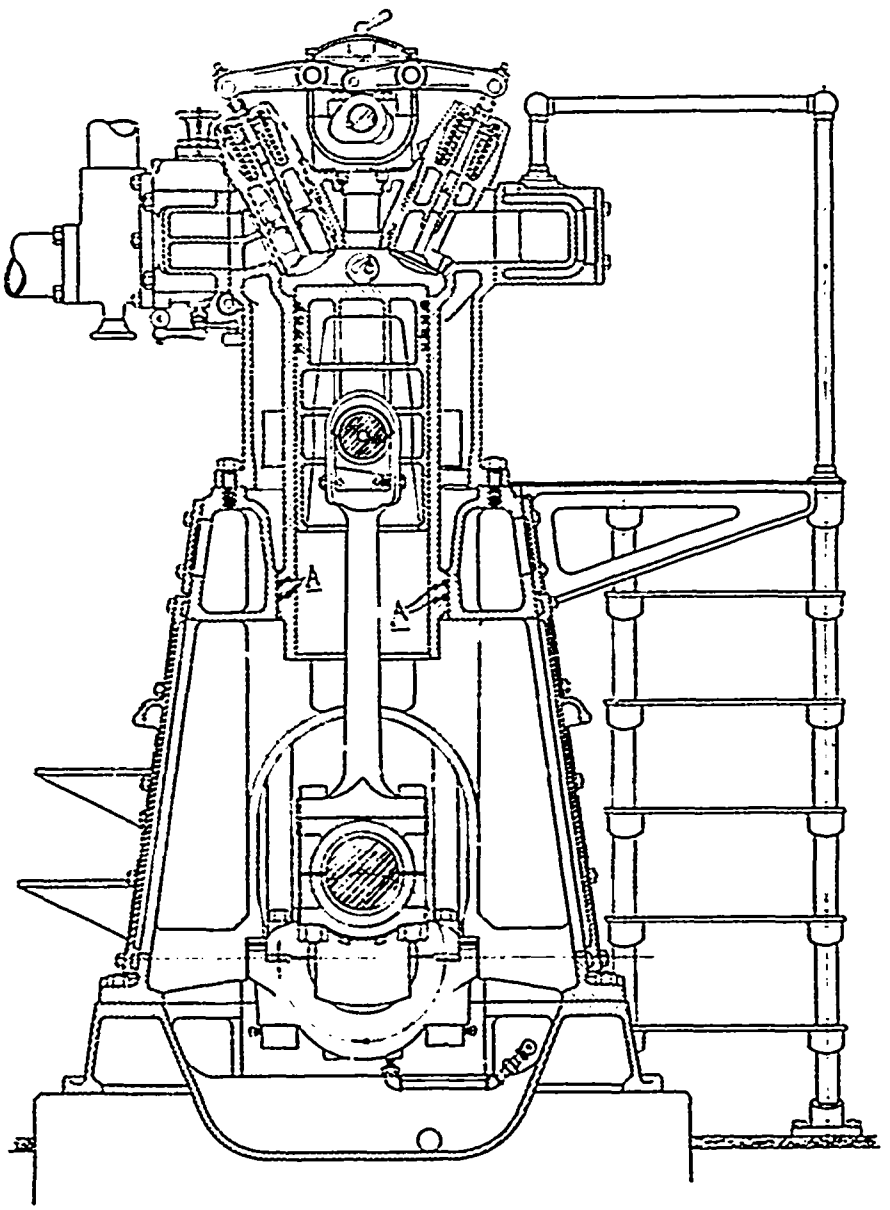
Water cooling space shown in Fig. 2, is carried down into crank case, to cool the cylinder wall at the lowest point of the stroke.

In conjunction with this engine is the Warren Automobile Suction Gas Producer, which is designed for all kinds of fuels. The features of the producer is the flash boiler, the pre-heating of air before it enters the fire space, the unusually great thickness of fire brick lining in the producer, the rotary grate and the method of taking the gas from the producer.

An elbow projects down into the incandescent zone, thus preventing any dust from fresh charges and ashes, from getting drawn over with the gas. This elbow is cheaply replaced when necessary.

The scrubber or gas cleaner is unusually liberal in proportion, and the entire producer plant for a given h.p. is much larger and heavier than in ordinary practice.

This apparatus is made by Struthers, Wells Co., Warren, Pa., U.S.A., who also build horizontal and tandem types of engines. W. H. Oliver & Co., McKinnon Bldg., Toronto, are their sole Canadian representatives.



Industrial Education in Foundry Work at the Winona Technical Institute.

ADDRESS BY PROF. E. A. JOHNSTON, INDIANAPOLIS, IND., BEFORE AMERICAN FOUNDRYMEN'S ASSOCIATION AT TORONTO.

Having now completed our second year's work, graduating eight students in foundry work, we are in a position to know to a great extent, what can be accomplished along this line.

Our aim at the start was to produce with two years of training, men who would be just as practical, produce just as good work, and have just as much speed as the journeyman with many more years experience; coupled with this, enough applied theoretical and technical work, we felt would produce the highest efficiency in our graduates in carrying along foundry operations. Men trained in general foundry work, and not specialty men, was our purpose.

We have demonstrated that this is possible, as has been shown in the work produced in a commercial way for a large number of firms in Indianapolis, also in the general knowledge of foundry work at the completion of the course. This is verified constantly by letters from these firms. Understand that these were not simple castings but were produced in large quantities.

In order to bring about this result it became necessary to have a variety of commercial work; without this we could accomplish very little along practical lines. The castings that we are now producing are as follows: Steam engine work, electrical, drop forge, canning machinery, brick machinery, air brake work, automobile, gasoline engine, steam pump, besides the jobbing work that we get due to our reputation for producing good castings. This gives us the required variety.

Methods pursued in training the student in foundry work are as follows:

Upon entering the student has explained to him the rules which govern the department, time card methods, etc., after which he has explained to him elementary foundry terms, their meaning, etc., foundry work, what it is, production of castings, requirements in castings, etc. Green sand moulding is then taken up and explained in detail. Moulding sand for green sand work, what composed of, why bond is necessary, why porousness is necessary, the grades of sand and their use in the various kinds of work, light, medium or heavy.

TEMPERING SAND.

At this stage the student is placed on a green sand floor, with a dried out heap of moulding sand, the tempering is explained to him and he is not allowed to proceed until he masters this part of the work.

After this has been done he is given a course in moulding in green sand, a set of exercises in which are embodied all the fundamental principles of ramming, venting, jointing, use of runners, gates and risers, setting and relieving vents on plain vertical cores, horizontal cores, irregular cores, securing the sand by means of gaggers, etc., use of split pattern etc.

The student is shown how to produce the

mould for the first exercise, after which he proceeds with this same exercise on his own resources until the mould is completed. The mould is then examined and if correct he is allowed to go on, if not he is required to repeat the operation, after he has received required instructions on the details which he had over looked. After compleing this course of exercises the student is given commercial work of a simple form in green sand, and is allowed to go on according to his own ability with the aid of instruction, until he gets through the variety of light and medium work. He is then placed on the core bench under a more advanced student and remains there until he becomes acquainted with mixtures, methods, etc., for producing cores. After this he is placed on heavy work in green sand under a more advanced student in this line, and finally is placed on a floor by himself. He then passes on to the dry sand work in the same way, and then on to sweep moulding.

From here he goes to the cupola, again under an advanced student, and from this to the moulding machines, finishing up the first round with enough time in the cleaning room to acquaint him with methods used in cleaning castings. Until the student has mastered one stage of the work he is not allowed to pass to another.

From this stage he again is placed on a green sand floor and is given a general run of work, after which he is placed on the core bench in charge of this department, then on the heavy work in green and dry sand and then in charge of the cupola, then again back to moulding.

Finally he is given full charge of the shop with the responsibility of not allowing productions to decrease, checking out patterns to the men, obtaining the weight of the heat, determining the mixtures (by analysis), and charges, etc., in fact has control of the entire production.

This is an outline of the practical course in which the student averages seven hours per day for two years. Coupled with this the student is given eight hours per week in applied foundry chemistry, and four hours in mechanical drawing, besides shop talks each week.

The shop lectures cover all the applied technical work. Work commences at 7 o'clock in the morning and continues until 6.30 p.m.

The shop is run on a commercial basis giving exact commercial conditions, at the same time being self supporting, and also allowing the boy to earn while he learns; by this method any worthy boy with an eight grade school education can take this course and pay his expenses while at school.

While we have accomplished a great deal along this line of work, we expect to move right along and develop still further, and make the course more complete, if possible.

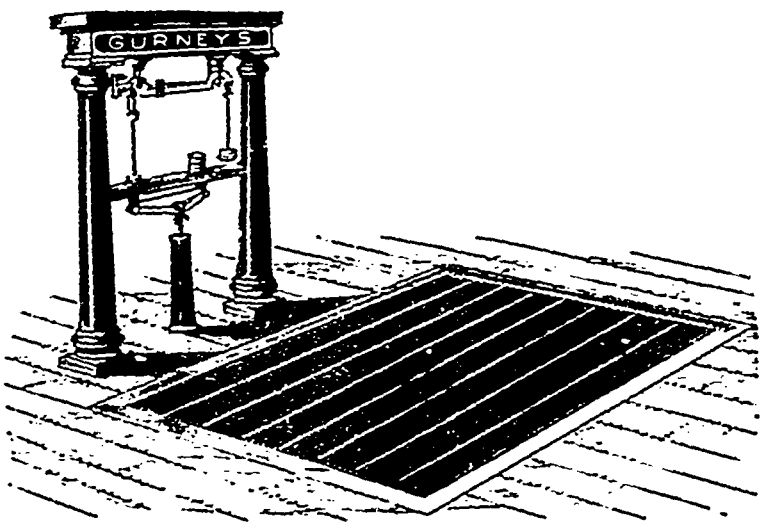
Note by the Secretary.—At the conclusion of the above paper, Prof. Johnston, a series of illustrations with the lantern, elucidating more clearly the above course in foundry work. Prof. Johnston will be glad to send the full description of the courses given by the Winona Technical Institute on application.

The ratepayers of Hamilton, Ont., will vote on a by-law to raise $88,000 for extension to waterworks.

Scale in Constant Use for Fifty-Two Years.

A Gurney Scale in Wood, Vallance & Co.'s Warehouse at Hamilton Still Being Used, Though Purchased in 1856—Can This Record be Beaten?

A platform scale that has seen service for fifty-two years may be considered a veteran among weighing machines. That is the life history of a scale now in use in the wholesale hardware house of Wood, Vallance & Co., Hamilton, but that bald statement does not give the whole of the facts. The scale in question has had the hardest kind of service. For, in each of the fifty-two years of its service, it has been used to weigh many thousand tons of iron, and that is probably the hardest service that can be imposed upon a scale. And, the scale is still in use; and, while its platform shows signs of hard work, the the machine as a whole is apparently as good as new, and able to do duty for many years to come, says Hardware and Metal.



The Gurney Type of Scale.

This scale was built by E. W. Ware, the founder of the company now known as the Gurney Scale Co. Mr. Ware established the first scale-making industry in Canada, coming from Vermont for that purpose. The business grew rapidly, and after some years, E. & C. Gurney acquired an interest in it. But it was some years before the firm name was changed that this scale was built. It was purchased by the late Senator A. T. Wood in 1856, at the time of dissolution of the partnership between himself and Joel Carpenter, when he went into business for himself in the premises now occupied by Wood, Vallance & Co.

This scale is almost identical in pattern with the scales now turned out by the Gurney Co. On its beam the name of E. W. Ware, Hamilton, Canada West, is still legible, though it has been almost obliterated by time and repeated polishings. The words "Canada West" indicate that the machine is older than that great political entity which we proudly own as the Dominion of Canada. Indeed, it was made eleven years before the Dominion had being, when the present province of Ontario was known as Canada West. On the side, and worked in the wood, was a number 100, showing that it was the one-hundredth of that size of scale made in the factory. When Mr. William Vallance, the senior member of the firm of Wood, Vallance & Co., drew your correspondent's attention to this number, the thought naturally arose, Where are the other ninety and nine of the old standbys and how many of them are still in use? It may be doubted if there is another scale in America which has seen so much service as this scale, and is still doing duty on the firing line, after a life of over fifty years.

WM HAMILTON CO. MAY RE-START.

The Peterborough, Ont., Review states that it is reported there that the Wm. Hamilton Co., manufacturers of sawmill machinery, water wheels, etc., of that city will be opened in the near future and a large number of hands employed. It is said that a syndicate composed of Toronto and Peterborough men, has been organized and will manage the works. The above information was given the Review by a gentleman who is well versed as to what is happening in connection with the Hamilton plant. The Peterborough member of the syndicate is understood to be a bank.

A 53rd WEDDING ANNIVERSARY.

Mr. and Mrs. D. K. McLaren celebrated the fifty-third anniversary of their marriage July 30th, and both are enjoying the best of health.

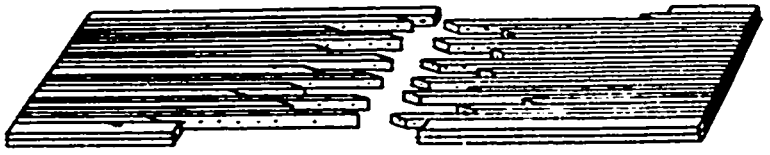
Mr. McLaren is president of D. K. McLaren, Limited, manufacturers of leather belting and mill supplies, and has been in the leather business for the past sixty years and still takes an active part in the business. On account of the enormous expansion of his business it was formed into a stock company in the early part of 1907, his sons, Mr. W. Fred. McLaren and Mr. R. M. W. McLaren, who have been associated with him for the past twelve years, being appointed vice-president and secretary and managing director.

Laminated Leather Belting.

An interesting departure in leather belt construction is shown in the accompanying illustration.

Laminated leather belting, as the name suggests, is composed of a number of strips of leather sewn together, a construction for which a number of advantages are claimed.

In the first place, it is possible to take the stretch out of a narrow strip of leather much more completely than from larger



pieces. Consequently, it is claimed, laminated belts seldom require shortening.

No glue is used.

The strips are placed edgewise. Thus the belt runs on the inside fibre of the leather, and no dressing is ever required.

By this construction great flexibility is secured, the belt readily adapting itself to either flat or crown faced pulleys.

The illustration shows the two ends of a belt before being pinned up for splicing. To pin up the belt, bring both ends together, insert a pin through the outside edge about the centre, then place each alternate strand on the pin. The other pins will then go through easily. The simplicity of the splicing operation makes it possible to have a practically endless belt in any situation, and the method is such that there is no danger of a crooked splice.

Hendry's Patent Laminated Leather Belting has been used with success for a number of years in England. Mr. J. W. Williamson, 54 Notre Dame Street East, Montreal, has recently secured the Canadian agency.

THE SMOKE NUISANCE: A WORLD-WIDE COMPLAINT.

According to Sir William Richmond, the Coal Smoke Abatement Society, which organization takes upon itself the duty of advising manufacturers in the matter of smoke prevention, has made remarkable progress, says the Textile Mercury. Presiding at the annual meeting in London a few days ago, he said that during the past year 1,262 cases of smoke pollution, observed by the Society's inspector, were dealt with. He expressed the opinion that smoke was an absolutely unnecessary evil; indeed, the society is convinced that manufacturers have more to gain than lose in providing consumers of smoke in connection with their works. We are sure, at any rate, that the appearance of our towns would be improved if such an action were taken. Dr. H. A. des Vœux thinks that the metaphor "as dirty as Sheffield" is no longer applicable to that centre of steel and iron works. Smoke has been so reduced there, he contends, that the town now enjoys more sunshine than other work-a-day centres in England. He is reported to have said "than any other town in England," but that can hardly be true! We should think, too, that there is certainly room for improvement in the town of steel blades—at least, one feels inclined to that opinion when approaching Sheffield in a railway train from the sweeter valleys of Yorkshire. However, contrasted with Manchester, the doctor has remarked that the smoke in the latter city is "perfectly abominable."

Too much smoke, of course, becomes objectionable. One now hears complaints from the famous city of Cairo of smoke nuisances due to an increasing number of factories and workshops. Sir Wm. Richmond remarked that it is often enveloped in a smoke fog. Not long ago we read a journalist's description of a train of smoke reaching from the factory chimneys of Cairo to the ancinet tombs of th Caliphs outside the boundary of the beautiful city. This is hitching old-time conditions to modern instances with a vengeance. However, the most zealous manufacturer would hardly admit that the stately mosques of this Arabic-looking city display themselves as favorably in a fog of factory smoke as under the blue skies which are characteristic of the eastern end of the Mediterranean. Of beautiful cities, Cairo is not alone in having a smoke nuisance. Other places where costly and exquisite art works are preserved are becoming louder in their complaints. So that, as long as coal is used, the adoption of smoke consumers is likely to be more strongly urged. We were told a few weeks ago that Nottingham—noted for cleanliness—keeps its atmosphere brighter than other textile towns, because the manufacturing of lace necessitates the use of a superior quality of coal. However, the Coal Smoke Abatement Society believes that smoke could be done away with to-morrow without any detriment to industry, and that it might be considerably abated if pubic authorities did their duty with greater persistency.

THE NEW I.C.R. SHOPS AT MONCTON.

The machinery installed in the planing mill at the Intercolonial Railway new shops was given a trial test Saturday morning. The machinery was kept in motion for two hours and gave every satisfaction. The work at putting the present machinery up has been going on for about a month with Mr. H. D. Rolfe, of Ottawa, in charge of the electrical department, while Mr. H. McKenzie had charge of the mechanical part.

It is expected that by the end of September the big new shops now under construction will be ready to be handed over to the Intercolonial Railway for occupation.

The passenger car shops are nearing completion, with only about half the floor to be laid, while the hanging of the doors has yet to be done. The laying of the floors and the putting in of the partitions in the stores and office building is now being done, after which all will be in readiness for occupation.

There is only a small portion of concrete to be placed on the south end of the locomotive shops which will be ready in about six weeks' time.

The power house is about two-thirds completed, and the walls will all be finished by the end of next week. The roofing will also be completed by that time.

The gas producer house is now ready for the bringing of the producer machinery, and will be gone ahead with on the arrival of the manufacturers' expert, who is expected here.

The dry kiln is waiting for the doors which will be placed this week, finishing that building.

The foundations are almost completed for the transfer table between the passenger car shops.—Moncton Times.

The Co-Partnership System.

How Profit Sharing Pays in Some Industries.

By Sir George Livesey.*

The mutual relations of capital and labor of employers and employed, are in a most unsatisfactory condition, and have been so for many years, and there is no indication that unless a radical change in their relationship can be effected any improvement can be expected. The great industrial army is divided into two separate and distinct bodies, each with its own independent organization, aggressive on the side of labor and defensive on that of capital, both, however, ready for war at any time, making the position at best only an armed peace, which often breaks into actual war, damaging both sides, inflicting much suffering on innocent people, and injuries in many ways to the nation. Great efforts have been made by the parties interested—by public bodies, by Government departments and others—to find a remedy. Conciliation Boards and Arbitration Courts are the usual form, but although often successful in staving off an open conflict, they do not go to the root of the evil. At best they are only palliative, not preventive. They do not touch the evil at its source by removing the cause of dispute. They do not unite the two wings of the industrial army into one compact body or make the interests of employers and employed identical, and until this is done there will never again be real and abiding peace.

The wages or hiring system of payment has had its day, and no longer satisfies. It must, therefore, be altered or supplemented in such a way as to identify the interests of employers and employed and make them one, not only in regard to wage-earners, but to all employees. The essence

*Abstract of Paper read before the Great Western Railway Lecture and Debating Society.

of joint stock enterprise is partnership, and the ideal is to imbue everyone interested in a joint stock company with its spirit, and that all should have a material stake in the concern. There is a difference of degree or position between the salaried staff and the wage-earners, but to both the same principle applies. Moreover, each is in many ways concerned with the other. They obtain their livelihood from the same source, and come in contact with each other at many points; then a happy, contented, willing body of wage-earners tends to make the task of those in a higher position easy and pleasant, while the contrary is anything but pleasant.

Partnership.

To the joint stock limited liability system, which is the greatest practical application of partnership the world has seen, do we owe the enormous development of industrial activity in the nineteenth century. It has been almost entirely the work of the middle class, and to it is mainly due their present great position of wealth and power, influence and numbers. But in this great inheritance the working classes generally, and many others, have neither part nor lot. To this fact is very largely due their present unrest and discontent, the growth of Socialism, and the attack on property, or what they call capitalism. The only remedy is to bring them into the partnership. Why should not the twentieth century do for the working classes what the nineteenth did for the middle classes? The day, however, for asking questions and for talk is passed. The enemy is at the gate, and action, too long neglected, has become a very pressing necessity. There have been faults and shortcomings on the sides both of employers and employed. Capital has not done its part, and labor has not taken advantage of its opportunities. The former can give the help and encouragement needed by the latter, and by co-operating in a spirit of mutual confidence and goodwill the position can be saved.

The present system of payment by salary or wages, based on the law of demand and supply, is not partnership, and does not create that close interest in the business necessary for the most successful and pleasant working, and the question is: How are the great majority of employees to become partners? They find it very difficult to save, and the few who overcome the difficulty can only save small amounts, which they are very unlikely to invest in the business. Therefore, the co-operation of the employer becomes necessary. The employer, however, may say, "I pay my workpeople the current rate; why should I do more?" One answer is: "Your workpeople receive the current rate of pay it is true: but, on the other hand, they, as a rule, only give you in return the current rate of work." On both sides there is much of the "pound of flesh" theory.

Profit Sharing.

Some years ago I was introduced to the head of a great manufacturing concern, whose first question on profit-sharing was: "How can you share profits if you make none?" I replied by another question: "Is not an interested willing worker worth 5 per cent. more than the ordinary worker of the present day?" His prompt reply was: "Five per cent.; say twenty." It is in the nature of things that the man who takes a real interest in his work and his employer's prosperity, which is more than is understood to be included in the contract, is worth something beyond the current rate of pay, and the actual experience of the South Metropolitan and other gas companies and other firms who have adopted co-partnership is proof that this is sound reasoning. Therefore, while the current or market rate of pay must be the standard, it is necessary, if the best service is to be obtained, to do something more, and thus profit-sharing was introduced. It is right in theory, but often fails in practice; the general complaint being that it soon loses its efficacy, and does little or no permanent good to employers or employed. The chief reason for its failure is the payment of the annual bonus in cash, whereas, if invested in the business, simple profit-sharing becomes co-partnership, and it is in this way, and for the great majority of employees in this way only that the money for investment in the business as shareholders or partners can be found.

Does co-partnership pay? Is it worth the trouble? Does it pay financially? The answer of all the gas companies is an emphatic affirmative. They employ a great variety of labor, perhaps not so great as railway companies, but not far behind, and a very large proportion of their men of many grades are working in the streets where effective supervision is impossible. Whether this or that class of men earn their bonus in addition to their salaries or wages cannot, in most cases, be proved by figures, but with one class—the stokers and men working in the retort-houses—there is positive proof, which I gave in a paper read last November at a meeting of gas managers, that the bonus, which has ranged from 3 up to 9¼ per cent. on wages, has always been earned and more than earned. The same willingness to do good work is shown by the officials and the men generally, and there is not a man in a responsible position who has any doubt that the men under him earn the bonus. Of course, there are some careless and indifferent men, but their number has been constantly diminishing.

Co-partners work under agreements or contracts of service which are not renewed with careless or indifferent men until they improve. The stoppage of an agreement means a stoppage of the bonus. It is absolutely necessary that discrimination as to the renewal of agreements should be strictly and carefully exercised, for, if not, if good, bad, and indifferent workmen are all treated alike, and receive the same bonus, the good will be discouraged and the standard of conduct so lowered that the bonus will not be earned, and the scheme will fail. This discrimination must be just, and to ensure justice we allow no subordinate or foreman the power to refuse renewal—he reports to the chief of the department, on whom rests that responsibility.

The greatest benefit of co-partnership is the improvement it works in the employees. By making them owners of property their present position is improved, and their hitherto hopeless future is rendered hopeful; there is a growing sense of responsibility—one of the grandest of educators—and self-respect is developed. They thus become better men and better citizens, which also re-acts for the benefit of their employers, and makes them better servants. Again co-partnership, if generally adopted, would, by enabling workmen to become owners of property, with a stake in the country, be the best antidote to Socialism.

The disease in the industrial world is palpable and universally admitted, and no remedy has been found, or will be found, but co-partnership. It has been successfully applied in various trades, and especially by certain gas companies—the South Metropolitan since 1889, in which the employees have over £350,000 invested in ordinary stock and on deposit at interest; the South Suburban since 1893, and the Commercial since 1901, with quite equal proportionate amounts; and the Chester and the Newport Gas Companies have had the system in successful operation since 1900. It has often been said that, though successful in gas companies, the system is not applicable to other industries. In some trades there are no doubt great difficulties, but the joint stock limited liability system seems made for co-partnership, and there are many undertakings where the difficulty of its application is not the reason for its non-adoption. It is, I fear, want of conviction of its necessity, and want of faith in its effectiveness. If these obstacles can be overcome, the difficulties in the way will not be found insuperable.

Advantages of Co-Partnership.

If I were an ordinary railway stockholder, I would gladly give up for a time, or even permanently, a fraction of dividend, if thereby the capital and labor difficulty could be solved. It would certainly improve the market value of the stock, but co-partnership would do something more and better for the ordinary stock. The co-partnership bonus of the gas companies is invested in their ordinary stock, for the simple and sufficient reason that only the ordinary stock-holders are real partners in the concern. Debenture holders are mortgagees, running no risks, with their property fully secured, and are anything but partners. Preference and guaranteed stock-holders are very little better, whose risk is slight and their interest in the business remote. The ordinary stockholders, however, have a vital interest in its prosperity, and it is one of the chief objects of co-partnership to create in its employees a similar interest, and thus make their interest identical with that of responsible shareholders, the owners of the ordinary stock. At present there is in the public mind a feeling of indifference in regard to the ordinary stock, but suppose the half-million railway employees were holders of that stock, what a difference it would make in its public estimation and security. Therefore, I contend that even if the adoption of co-partnership should slightly diminish the dividend, it would be a very gainfull loss. Were I a railway chairman, I should not only have no hesitation, but be really glad to put such a proposal before the shareholders. I can say that in my experience anything for the real benefit of their employees has always been received with warm sympathy and approval by gas shareholders, who are much the same men as railway shareholders. They gave an overwhelming vote in favor of the election of workmen or employee-directors, which is the top-stone of co-partnership; and I may say, after ten years' experience of two workmen and one clerk

on the Board of the South Metropolitan Gas Company, of all the good things pertaining to co-partnership this last and final step has been perhaps the best, and has worked most satisfactorily to shareholders, directors, and officers and employees of all ranks.

There remains the problem of the practical application of co-partnership to railways. It is not necessary here to go into details, but a basis outline may be suggested. The object is to unify the interests of capital and labor by making employers and employed partners, and of equal importance; to help the employed to permanently improve their position in life. If there is failure in the latter, the former will share the same fate soon or late. The gas companies have been able to unite the three interests of capital, labor, and custom, thus making theirs a tri-partnership. It is done by making the bonus dependent upon the price of gas. A certain percentage—10s. or 15s. per cent. —on salaries and wages is given for every penny per 1,000 feet reduction in the price of gas below a standard price. The lowest rate at which any gas company has started co-partnership is 3 per cent. on salaries and wages. It is simply an extension to the employees of the system known as the sliding scale, which governs the dividend by Act of Parliament in the same way.

The Co-Partnership Bonus.

Railway companies, however, must be content with co-partnership, uniting the interests of shareholders and employees only. The obvious method is to regulate the bonus by the ordinary stock dividend. It should, if possible, start with a bonus of not less than 3 per cent. It is well to begin with a low percentage, for the prospect of an advance has a very beneficial effect. But even 3 per cent. on a total of millions paid in salaries and wages by a great railway would amount to a large sum. I think it will not be far wrong to say that 1 per cent. on salaries and wages is about equal to 2s. or 2s. 6d. per cent. on the ordinary stock, say 1 per cent. bonus equals one-eighth per cent. dividend, 3 per cent bonus equals three-tenths or three-eighths per cent. dividend. But experience shows that a good part at least would be earned from the start, and the whole in time. A company paying, say, 6 per cent. might begin with a 3 per cent. bonus, with the promise of an increase of 1 per cent. annually until it reaches the amount of the dividend, and thereafter to rise and fall with it, subject to the condition that the system is a success; if, in fact, the bonus is not earned to the satisfaction of the company, it cannot be continued. With a company paying a low dividend, say, about 3 per cent., I should put it rather differently. In submitting a co-partnership scheme to the employees, I should say to them: "The company pays you the current rate of wages, which is a first charge on its funds. Justice demands that before anything extra goes to you, capital should have its wages at the lowest reasonable rate, which I should put at 3 per cent., and when that rate is paid any further profits shall go to you until your bonus amounts to 3 per cent." Then shareholders and employees shall share alike. The dividend on the ordinary stock, and the bonus on salaries and wages shall be at the same rate if the system works satisfactorily.

It is essential that one common bond of fellowship should unite all the employees from the highest to the lowest. A general manager remarked to me that he could not be included, but while respecting his motive, I must say it would not be for the general good. It has also been said there are large classes of men who could do nothing in the way of saving for the company. I am sure this is a mistake. To shut out any would detract greatly from the value of the scheme and its advantage to the company. By co-partnership alone in industrial life can the highest principles that should govern the relation of man to man be applied. Co-partnership fully developed means more even than sharing in profit and loss and responsibility, important as they are. It means honesty, faithfulness, loyalty, comradeship and brotherhood. If men in authority as employers could but be led to believe this, they would not hesitate as they are now doing, and if the employed could but realize what is their true interest, they would become eager advocates of co-partnership.

Needless Foundry Wastes.

Address by Harrington Emerson before the American Foundrymen's Association at Toronto.

If in the operation of a foundry any dollars are spent needlessly, the loss is a foundry waste. Wastes of this kind are very common and easily overlooked. In the discussion of the molding machine before this Association yesterday, one of the members spoke of the desirability of equipping the foundry in such a way that operations could be carried out more conveniently, therefore less expensively. Another speaker, with some feeling, remarked that a policy of this kind would put sixty per cent. of the foundries of the country out of business.

There are, however, many wastes occurring in foundry operations which it would cost next to nothing to eliminate or at least lessen, unless one puts a price on a little thought and observation. If a founder for a few days could forget all about iron and molding, as well as sales, and go through his own foundry with the same keen, alert, and awakened critical attention that the stranger who is not a founder sometimes displays, he could add unexpectedly to his profits and to his pleasure in the business.

In neither a technical nor scientific way, I shall simply give you a few examples of the preventible losses and wastes I have noticed in visiting various foundries throughout the country from the coast of Maine to the coast of California.

1. Losses due to bad cost accounting. In one foundry making part of its product for the trade and the balance for its own machine shop, all the costs during the month were added up, divided by the total weight of castings delivered, and the conclusion arrived at that the cost of castings per 100 pounds was about $2.50. On the basis of this system of cost determination, contracts were entered into to supply certain firms with castings at $2.75 per 100 pounds. An actual subdivision of costs in this foundry showed that some castings cost as low $1.50, and others as high as $10.00 per 100 pounds. The customers with flat rate contracts ordered their cheap castings elsewhere, actually felt aggrieved, and properly so, that this firm should presume to charge $2.75 for what other foundries supplied at $1.75. They, however, rushed in all their small and intricate work which cost from $3.00 to $10.00 per 100 pounds, and paid only the contract price of $2.75.

2. Losses due to bad design. A rail road foundry without any cost system charged for big cylinder bushings $4.00 per 100 pounds. These bushings were made very thick, nearly two inches, so that the rough casting weighed about 1,700 pounds. Machining brought the weight down to 375 pounds, which took about a week of an expensive man's and expensive machine's time. The cost of the finished material and labor was about $75.00.

Another firm offered to supply the finished bushing at $50.00. This firm made the rough casting weigh 600 pounds, machined it in a day at a total cost for material and labor of $30.00. There was between the two operations an actual waste of $45.00, and it makes no difference who paid it, it was there.

3. Unnecessary work. Another combined foundry and machine shop had over 300 patterns for box covers. Had they been of standard design, 20 would have answered. Instead, therefore, of working up a small quantity of stock from 20 patterns, the foundry was more or less busy in getting out odd orders for box covers, and many were made for stock which were never used.

4. Hard Iron. A foundry never analyzed either its iron or coke. The purchasing agent

bought what was cheapest. On one occasion he invested in a ballast cargo of inferior Scotch pig, high in sulphur, and when analysed, the coke supplied was found to run 3 per cent. in sulphur. A change to better pig iron and to coke with less than 1 per cent. in sulphur reduced machine shop expenses over $18,000 in a year. If it had been necessary the better coke would have been cheap at $20 a ton, but actually the better coke cost $0.10 a ton less than the poorer article. In this case $15 a month invested with a testing laboratory returned a dividend of $1,500 a month.

5. Badly directed labor. Within the period of two weeks we had occasion to compare two foundries, both in the Middle West, both ranking very high in their respective fields. One foundry turned out its finished castings for less than $1.40 per 100 pounds, all material, labor, and overhead charges included, except depreciation and interest on the investment. At the other foundry the total cost of finished work was over $3.00. The work was so different in character that these figures have little comparative value, but as to entirely comparable operations the labor costs were only one third as much in one foundry as in the other. This was not because the men did not work hard, in fact were to the limit of human endurance in the less efficient shop, but they worked hard to no purpose. On both charging floors the charges came up in trucks. In one case trucks, tracks, cupola doors, as to height and location were so adjusted that one man easily charged direct from truck to cupola, while in the other case the same combination was so awkwardly adjusted that it took three men to do the same work, passing the pig and scrap from one to another. All labor efficiency in these two foundries ran on about this same comparative basis, work costing three times as much in one as in the other.

6. Curtailment of output and increase of expense owing to vicious system of paying for work. In a foundry men were paid by the piece. The management imagined that in this way they had attained a fixed cost. A checking of all the conditions showed this not to be so. Nearly all the molders had set themselves fixed outputs. They felt that if they earned more than a fixed amount, their rates would be cut. By limiting themselves some worked very fast for awhile and then dawdled, smoking, talking, visiting neighboring saloons. Others worked with a fatigueing deliberateness. Others found it easier to average their operations by molding many pieces carelessly with many rejections on inspection, rather than to mold fewer pieces perfectly.

As a consequence not only was the output generally curtailed, but there was a very large amount of remelt, which added to the amount of sulphur, made more pig and less scrap necessary for proper mixtures. These various forms of losses added about $0.10 a 100 lbs. to the cost of good castings. As the foundry turned out over forty tons a day, the added cost amounted to $80.00 daily.

7. Disagreements between employer and employee. This is perhaps the greatest waste of all. This ought not to be at all. Clear thinking and clear statements would in many cases pave the way for reasonable concessions on both sides. Three out of the four elements that make into labor disputes, are generally so jumbled together that it is like the fighting of two knights in the old fable, each looking at the same shield from the opposite sides. One said it was gold. The other maintained it was silver. And so they attempted to settle the job by cutting each other's throats. The shield actually was gold on one side and silver on the other. The three elements that enter into a labor controversy, and that ought to be kept entirely separate are

(a) Rate of pay per day.
(b) Standard cost of output.
(c) Varying efficiency of the workers.

Every worker naturally wants and ought to have the highest rate of pay which circumstances or combination will permit him to exact. These rates of pay cannot be immutable. They will fluctuate up and down and may not be adjusted without more or less friction and controversy.

Both parties are equally interested in low cost of output. The lower the cost, the greater the market, the more work there is the higher the wages can be. If finally standard costs of output can be so arranged that as labor efficiency reduces cost, labor is paid a higher rate, then both employers and employees can rejoice as higher efficiency receives higher pay. On a very large scale this solution of labor compensation has been tried out and with entire success. The men receive in any case a standard day rate of pay. If there was shortage of work, the hours were shortened, days were omitted or men laid off. A standard of fair cost was put on every item of output, this output being what a good man working faithfully but without undue exertion, under perfect conditions, ought to deliver. If this output were reached as to the average work of a month, the worker was rated at 100 per cent. standard, and received a premium above his day rate. This was virtually a stipend paid him for acting as his own foreman. If the worker did better than 100 per cent. standard all the gain in time was his own. If he did less he was still certain of his day's pay.

It is nonsense to pretend that in any plant the good men are not generally differentiated from the poor ones. Since this is the case it is absurd not to recognize the fact scientifically and fairly. Efficiency of the worker has nothing to do with the agreed upon rate of wages. The reward of efficiency merely gives to the individual worker the whole of that part of the reduced cost to which he is entitled. He leaves to the employer the gain due to lessened equipment charges, lessened overhead charges, increased output.

With a system of this kind, the net profits of a plant have increased several hundred per cent., the net ability of the worker to save above living expenses has also increased several hundred per cent., and both realized that the lower the manufacturing cost, the higher the individual worker's earnings.

An old fashioned foundry which eliminates useless wastes will often find itself able to compete successfully with the large modern foundries. We all know that a good racing pony can run 100 yards faster than a race horse. 100 per cent. efficiency in the small plant, however elementary its facilities, will produce cheaper work than 60 per cent. efficiency in a large fully equipped plant. It costs very little to eliminate most of the wastes that occur.

New Industry for Peterborough.

PETERBOROUGH LUBRICATOR COMPANY STARTS THERE.

The Peterborough Lubricator Co., whose incorporation was mentioned in the last issue of THE CANADIAN MANUFACTURER, have secured a factory in that city says the Peterborough Review.

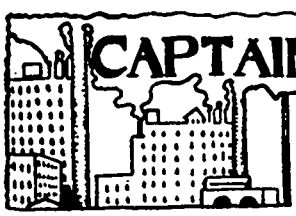
The lot upon which the factory is built is 198x42 feet. The factory itself is thoroughly suited for the purpose of the new company; has been very strongly and carefully constructed with a view to being utilized for heavy machinery, and has a solid and most substantial foundation. There will, therefore, be no difficulty in installing the necessary plant for completing the Grease Cup, and the factory is expected to be in operation within the next few weeks as soon as the machinery can be brought from Philadelphia, the parent company having had special machines designed for the economical manufacture of their product. It is satisfactory to learn that the stock of the company is being taken up by some of the most prominent citizens of Peterborough, and it is confidently anticipated that within a short time all necessary capital will be subscribed. It has been decided that the company will not go into actual operation until a certain amount is provided for working capital, so that the shoals upon which some companies have been wrecked, will be avoided.

An application is about to be made to the City Council for a small bonus and fixed assessment which will probably be granted on the usual terms.

It may be added that there is no preference stock in the company, all shareholders thus being on exactly the same footing. The temporary offices of the company are at 387 Water Street, where the books can be inspected, and any information given which may be desired.

It should be important to intending investors to know that the company have already received orders enough to keep the plant busy for the next five months. This is phenomenal in itself, when it is known that all these orders have come into the company without any solicitation, showing at once to the practical and wide awake business man that the company have an article that is appreciated by the manufacturing plants throughout the Dominion of Canada, who have been alive enough to see that by applying the compressed air Grease Cup they are able to secure a saving in lubrication alone of at least 50 per cent. The demand for the cup is unlimited.

Intending investors should not lose this opportunity of a safe security, as well as aiding a new industry.



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 concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

The Hamilton Brick Co., Toronto, have been incorporated with a capital of $40,000, to manufacture brick, tiles, pipes, stone, terra cotta, lime, cement, lumber, etc. The provisional directors include S. Thompson, G. E. Bevan, Hamilton, and C. W. Evans, Toronto.

The town council, Aylmer, Ont., purpose sinking another eight inch well as with the present flow they are not able to supply new industries.

Dunbar & Sullivan's dynamite manufactory at Dynamite Island, Amherstburg, Ont., has been completed and work of making "powder" has commenced. Seventeen hundred pounds are made daily.

The Universal Signal Co., Toronto, have been incorporated wth a capital of $1,000,000, to manufacture trucks, cars, air compressors, electrical machines, etc. The provisional directors include T. R. Meredith, J. A. Street, and G. E. Foster, Toronto.

M. Ferguson, Kingston, Ont., has been appointed City Engineer in Stratford, Ont.

The Peterboro Furniture Factory, Peterboro, Ont., are considering the erection of a factory in Ashburnham, Ont.

The Hagen Shirt & Collar Co., Berlin, Ont., will erect a new factory, 100x64 feet, in that town.

The town council, Cobourg, Ont., are preparing to erect a number of concrete bridges to replace the wooden bridges within the town.

The Lake of the Woods Yacht Club, will erect a club house, docks and pavilion at Kenora, Ont.

The new agricultural building, Meaford, Ont., will be improved at a cost of about $2,500.

The congregation of the Yonge Street Methodist Church, North Toronto,, will erect a new church at the corner of Summerville Avenue and Yonge Street.

The Dominion Pressed Steel Co., Port Elgin, Ont., have assigned to E. R. C. Clarkson, Toronto.

A new consumptives' home is being considered for Ottawa, Ont.

The congregation of the Presbyterian Church, Stratton, near Rainy River, Ont., will erect a new edifice.

The Canadian Order of Foresters have purchased a site on College Street, Toronto, and will erect a new hall at a cost of about $60,000.

James E. McGuffin and Samuel B. Gorwill have bought the stock, etc., of the London Pant, Overall, & Shirt Mfg. Co., London, Ont.

The Canadian Fairbanks Co., Limited, have secured judgment for $1,353 from The Seth C. Nutter Brewery Limited, Cornwall, Ont.

It is now stated that the junction of the Grand Trunk Pacific and the Temiskaming & Northern Ontario Railways will be eight miles west of Abitibi Crossing.

A despatch from St. Catharines states that a deposit of silica has been found on Charles Reeb's farm, Wainfleet Township, near that city. J. H. Smith and T. I. White are at work developing it, having purchased an option on the property. A force of men have been at work testing the vein, which is said to be quite heavy. A number of outside capitalists have examined the property.

An addition will be erected to the Library Building of the University, Toronto.

Robt. Cameron, Almonte, Ont., has been awarded the contract for the erection of the new public building at Magog, Que., at a cost of about $20,000.

The congregation of St. Matthews Evangelical Lutheran Church, Brantford, Ont., will erect a new church building at a cost of about $6,000.

The Canadian Shipbuilding Co., Bridgeburg, Ont., have nearly completed plans for a large dry dock to be built near this town. Tenders will be called for shortly.

A sewerage system will be installed in the Industrial School, Mimico, Ont.

The Baptist Church, Paris, Ont., will be considerably enlarged and improved.

The Town of Merritton, Ont., is going to reconstruct the electric light plant. K. L. Aitken, E.E., of Toronto has been appointed consulting engineer.

Plans have been completed for the rebuilding of the canal bank at Cornwall, Ont.

The directors of Ridley College, St. Catharines, Ont., are considering the erection of a third building on the college grounds, across the old Welland Canal.

The county council, Wallaceburg, Ont., will construct a bridge across the Thames at or near Prairie Siding. The cost will be about $40,000.

The Canadian Westinghouse Co., Hamilton, Ont., have been awarded the contract for supplying the new pump for the waterworks, Niagara Falls, Ont., at a cost of about $6,250.

The Lambton Pressed Brick Co., London, Ont., have been incorporated with a capital of $50,000, to manufacture brick, tiles, pipes, terra cotta, etc. The provisional directors include B. V. Hole, J. D. Scott and C. B. Keenleyside, London, Ont.

The Joliet Match Factory, Joliet, Ill., will establish a plant for the manufacture of wood splints near Fort Frances, Ont.

The Bell's Lake Portland Cement Co., Markdale, Ont., capitalized at $450,000, will erect a cement mill at Walter's Creek, Ont., to have an initial capacity of 1,000 barrels per day.

The congregation of the Bloor Street Presbyterian Church, Toronto, will erect a new Sunday School building at a cost of about $25,000.

The Canadian Fire Engine Co., London, Ont., have been incorporated with a capital of $40,000, to manufacture fire engines, appliances, etc. The provisional directors include D. H. Gillies, R. Angus and A. J. Cartwright, London, Ont.

The Ottawa Electric Railway Co., Ottawa will erect an additional car barn.

John Carew, Lindsay, Ont., will erect a planing mill to replace the one recently destroyed by fire.

M. McIntyre, Peterboro, Ont., has been awarded the contract for the erection of the new cardboard factory for M. A. Turner at that place.

The Imperial Copper-Nickel 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 T. Reid, S. C. Wood and J. H. Whitehead, Toronto.

M. J. O'Brien will erect a new hotel and possibly an opera house at Renfrew, Ont.

A new schoolhouse is being considered for Bradford, Ont.

Many new hydrants and water mains are being installed in Queen's Park, London, Ont.

The Central Mining Co., Ottawa, have been incorporated with a capital of $1,250,000, to carry on a mining, milling and reduction business, The provisional directors include J. L. Lavoie, C. T. Moffat and E. E. Rogers, Ottawa.

The Canadian Silk Co., Toronto, will erect a new factory at a cost of about $10,000.

The Grand Trunk Railway purpose erecting car shops and repairing plant at Barrie, Ont.

The stone cutting plant of the Martin & Stanworth Co., Port Arthur, Ont., is being enlarged.

The Canadian Weber Gas Engine Co., Toronto, have been incorporated with a capital of $300,000, to manufacture gas producers, gas and gasoline engines, hoisting machinery, pumping machinery, etc. The provisional directors include R. G. Weber, Kansas City, R. J. Goudy and H. Macdonald, Toronto.

The Canadian Independent Telephone Co., Toronto, shipped an automatic telephone equipment to Lyons, France.

The Lennox Furnace Co., Marshalltown, Iowa, are considering the establishment of a factory in Canada, either at Winnipeg, Man., or Fort William, Ont.

The Reynolds Co., Toronto, have been incorporated with a capital of $25,000, to carry on the business of construction engineers, etc. The provisional directors include G. B. Reynolds, J. P. Crawford, and F. E. Brown, Toronto.

Eugene DeKleitz, Buffalo, N.Y., is looking over Berlin and Guelph, Ont., preparatory to building a Canadian branch piano-making factory.

The Algoma Central Railway are building a five mile spur to the Superior Mine.

The Dominion Government have voted $100,000 to survey and locate the Hudson's Bay Railway.

The Ontario & Manitoba Flour Mills, Ottawa, have been incorporated with a capital of $750,000, to carry on a general

milling business. The provisional directors include N. J. Ker, J. Gibson and A. G. Mather, Ottawa.

A new school will be erected at Port Arthur, Ont.

The new Y.M.C.A. building at Woodstock, Ont., is nearing completion.

A new Zion Evangelical Lutheran Church building will be erected in Stratford, Ont., at a cost of about $18,000,

The Seymour Power & Electric Co., Campbellford, Ont., have been incorporated with a capital of $1,000,000, to produce electricity, etc. The provisional directors include A. G. Ross. J. F. H. McCarthy and W. S. Edwards, Toronto.

A new post office will be erected at Glencoe, Ont., at a cost of about $12,000.

The Thistle Rink, Hamilton, Ont., will be improved at a cost of about $9,000.

New sewers are being constructed in Perth, Ont.

The Ontario Railway Signal Co., Toronto, have been incorporated with a capital of $40,000, to manufacture air compressors, electrical machines, trucks, cars, etc. The provisional directors include N. R. P. Parker, G. Russell, and J. A. McEvoy, Toronto.

A sewerage system is being considered for Kincardine, Ont.

Breckels & Matthews, manufacturers of church pipes and organs, 491 King Street West, Toronto, have assigned to E. R. C. Clarkson.

The Hyland Silver Mining Co., Ottawa, have been incorporated with a capital of $500,000, to carry on a mining, milling and reduction business. The provisional directors include R. Hyland, J. E. McCuaig and E. B. Robinson, Ottawa.

The premises of the John King Co., and several adjoining buildings, Fort William, Ont., were destroyed by fire July 21. Loss about $160,000.

The premises of the Crown Hat Co., Galt. Ont., were damaged by fire July 17, to the extent of about $7,000.

The W. A. Moore Co., Meaford, Ont., have been incorporated with a capital of $40,000, to manufacture mantels, woodwork, etc. The provisional directors include W. A. Moore, W. J. Johnston and L. H. Wood, Meaford, Ont.

The sawmill of Beckler & Co., Sombra, Ont., was destroyed by fire July 12. Loss about $6,000.

The power house of the Silver Queen Mine, Cobalt, Ont., was destroyed by fire July 11.

The Knight Bros. Co., Burk's Falls, Ont., have awarded the contract for two reinforced concrete dry kilns to the Central Engineering & Construction Co., Toronto.

John S. Moore has been appointed inspector of the Manp Brass Mfg. Co., manufacturers plumbers' brass goods, London, Ont.

The Toronto General Trusts Corporation have been appointed interim liquidators of the Wilson Automobile Co., Limited, Ottawa.

Morris & Ballantyne, brick manufacturers, Ottawa, have suffered loss by fire.

The Petrolia Wagon Co., Limited, Petrolia, Ont., report having had a busy season, they have shipped since 1st of January one hundred and twenty-five carloads of wagons, including a number of lorries, principally to the North-West. Their capacity has been increased by the erection of two large storage buildings.

The Martin Electric Supply & Construction Co., St. Catharines, Ont., have received the contract for the electric wiring of the large Kenora Mills, Kenora, Ont.

The Grand Trunk Railway Co. are erecting a new station at Walkerton, Ont., to replace the one recently destroyed by fire. The Canadian Pacific Railway are also erecting a station in that town.

The Farmer's Binder Twine Co., Brantford, Ont., have again commenced operations, after having been closed down for sometime.

Peer & Wideman have commenced operations in their factory at Guelph, Ont., for the manufacture of the Peerless gas generator.

The Canadian Northern Ontario Railway propose commencing construction of their line to Orillia, Ont., right away, so that cars will be running into that town before winter.

A new school will be erected at Port Stanley, B.C., at a cost of about $10,000.

The Dominion Government has put through the $3,000,000 subsidy for the construction of the Grand Trunk Pacific westward from Fort William, Ont., to a connection with the National Transcontinental.

A new post-office will be erected at Waterloo, Ont., at a cost of about $8,000.

Stewart & McTaggart, Engineers and Contractors, Federal Life Building, Hamilton, have been awarded the contract for a 75 foot steel highway bridge, by the Township of Wilmot. Bowman & Connor, Toronto, are Engineers for the structure.

Cote Bros. & Burritt, Montreal, were awarded the contract for elevators in the City Hall, having the lowest tender, and also giving a guarantee for 24 months, as against 12 months' guarantee offered by other tenderers.

J. W. Williamson, Montreal, has installed a No. 2 laminated leather belt 6 inches wide and 52 feet long for the Canada Flax Fibre Co., Lachine, Que.

The factory of the Canada Flax Fibre Co. at Lachine, Que., was damaged by fire July 25. The installation of machinery is almost complete, and the plant will commence operation in about a month.

The J. H. Hanson-Tilley Co., Montreal, have been incorporated with a capital of $145,000, to manufacture refrigerators, screen doors, windows, files, milling tools, wire rope, etc. The charter members include J. H. Hanson, Westmount, Que., A. Tilley and J. W. Blair, Montreal.

R. & T. Ritchie, Aylmer, Que., have been incorporated with a capital of $100,000, to manufacture lumber, timber, etc. The charter members include R. Ritchie, T. Ritchie and S. Ritchie, Aylmer, Que.

The Canada Car Co., Montreal, are turning out twenty new freight cars per day for use on the Grand Trunk Pacific.

S. H. C. Miners has awarded the contract to Kent & Cox for a large modern rubber factory at Granby, Que.

Military buildings will be erected at St. Johns, Que., at a cost of about $17,500.

The Customs House, Montreal, will be improved at a cost of about $5,000.

A new school will be erected at Bury, Que., to replace the one recently destroyed by fire.

The Otis-Fensom Elevator Co., Toronto, have been awarded the contract for placing two new elevators in the City Hall, Montreal.

The foundry of J. R. Heaule, Cartier Street, Montreal, was damaged by fire recently.

A new school house will be erected at Beebe Plain, Que., at a cost of about $4,000.

The Moncton and Butouche Railway are erecting a new bridge over the Butouche River, N.B.

C. McKenzie will erect a Burns Memorial hall at St. John, N. B.

The Yarmouth Street Railway Co., Yarmouth, N.S., are preparing for the construction of a large dam at Nine Partners' Falls.

The Dominion Government have voted $400,000, for improvements, repairs and dredging to the harbor, St. John, N.B.

The L.O.C. hall at Sydney Mines, N.S., will be remodelled.

The New Brunswick Tourist & Hotel Co. have purchased the old Baptist Seminary at St. Martins, N.B., to which they will make extensive alterations and improvements.

The Dominion Bridge Co., Montreal, have been awarded the contract for the erection of all the structural steel on the Fort Garry depot, Winnipeg, Man.

C. Unicume, Brandon, Man., will erect a new warehouse on 9th Street at a cost of about $8,500.

The Portage Exhibition Association, Portage la Prairie, Man., will erect a new racing stable, 150 x 50 feet, with 58 box stalls, paddocks and grand stand, at a cost of nearly $10,000.

The Grand Trunk Pacific will erect a large hotel at Rivers, Man.

Tenders will shortly be called for the erection of the new library at Selkirk, Man., to cost about $12,000.

The Deaf & Dumb Institute, Winnipeg, Man., will build a separate workshop next to the main building, at a cost of about $1,800.

Jas. Stuart of the Stuart Electric Co., Winnipeg, Man., is considering the erection of a factory for the manufacture of water meters.

The Argyle Land Co., Winnipeg, Man., will erect a four story business block on Notre Dame Avenue, at a cost of about $41,000.

The Icelandic Lutherans, Winnipeg, Man., will erect an academy there at a cost of about $20,000.

A sanitarium will be erected at Brokenhead River, thirty-five miles east of Winnipeg, Man., on the National Transcontinental Railway.

No. 2 fire station, Winnipeg, Man., will be repaired and altered.

The Reliance Concrete Machinery Co., Winnipeg, Man., have been incorporated with a capital of $100,000, to manufacture machinery, tools, cement, concrete, asphalt, etc. The provisional directors include H. Gutteridge, G. Murray, and D. N. Finnie, Winnipeg.

A water supply system will be established in Melita, Man., at a cost of about $3,000.

The Canadian Pacific Railway are building a bridge across Highwood River at Menton, Man.

The Grand Trunk Pacific line from Winnipeg to Battle River, 675 miles, is completed and ready for traffic.

Messrs. Wall & Creelman, who have the contract for the building of the Canadian Pacific Railway bridge across the Winnipeg River, Winnipeg, Man., in connection with the double-tracking operations, have just succeeded after nearly two years' work and endless difficulty, in finishing the third and last pier across the east branch of the river.

The plant of the Wheat Milling Co., Brandon, Man., has been purchased by the Maple Leaf Milling Co., Kenora, Ont. The company will extend the plant and resume operations on a much larger scale.

Winnipeg, Man., invite tenders up to September 15, for electric lighting plant and carbons.

W. H. Blow, Calgary, Alta., will erect a new warehouse at a cost of about $23,000.

The Canadian Club will erect a two story structure at Camrose, Alta., at a cost of about $4,000.

The recently organized Wauchope People's Telephone Co., Wauchope, Sask., expect to commence work on the construction of their system at once.

F. A. & G. A. Mann have been awarded the contract for the erection of the new fire hall at Saskatoon, Sask., for the sum of $14,100.

The Lumber & Grain Co., Nanton, Alta., are considering the erection of an elevator at Cayley, Alta.

W. H. Simpson, Lindsay, Ont., and J. Memberby, Toronto, are opening a coal mine at Clover Bar, near Edmonton, Alta.

The Merchants Bank of Canada will erect a branch at Medicine Hat, Alta.

The municipal lighting plant, Calgary, Alta., is being enlarged,

The new Prague Flour Mills, Moose Jaw, Sask., will be enlarged from a 300 to a 1,000 barrel mill. The company will also erect a new elevator and oatmeal mill.

Herbert Finger, Port Arthur, Ont., will erect a new mill at The Pas, on the North Saskatchewan River, Sask.

G. A. Lerew, Vonda, Sask., and C. O. Kankel, Terrebone, Minn., will erect a flour mill in Vonda.

The government will erect an immigrant hall at Wilkie, Sask.

The city council, Regina, Sask., have recommended the expenditure of $150,000 for a trunk sewer.

Wm. Newman & Co., Winnipeg, Man., have commenced work on a reinforced concrete abutment over Moose Jaw Creek for the Saskatchewan Government, the work to be completed this season.

A Roman Catholic Convent will be erected in Calgary, Alta..

Wendt & Hancock will erect a building for a pump manufactory, 100 x 60 feet, at Daysland, Alta.

Another large elevator will be erected at Milestone, Sask.

The Canadian Pacific Railway will build a new line from Calgary to Lethbridge, Alta.

A Methodist Church is being erected at Lumsden, Sask.

The ratepayers of Lethbridge, Alta., will vote on a by-law to raise $73,749, to buy over the electric light plant.

The waterworks system, Red Deer, Alta., will be extended at a cost of about $4,500.

A High School is being considered for Everett, B.C.

Tenders have been closed for the erection and completion of the Normal School, Victoria, B.C.

H. Stead, New Westminster, B.C., is negotiating for a site on which to erect a plant for the manufacture of launches.

Dinsdale & Malcolm, Victoria, B.C., have been awarded the contract for the erection of the addition to the post office in that city, at a cost of about $15,000.

Brooks, Scanlon & Co., Minneapolis, Minn., are considering the erection of a lumber mill near Vancouver, B.C., at a cost of about $300,000.

E. J. Young, Madison, Wis., and F. N. Norton, Medford, Wis., will erect a sawmill on the Indian River, B.C.

J. Studebaker has been awarded the contract for the erection of the addition to the Chesterfield Avenue School, Vancouver, B.C., at a cost of about $3,800.

McDonald, Nilson & Snider have been awarded the contract for the extension to the General Hospital, Vancouver, B.C., at a cost of about $95,000.

A Sisters' Hospital and Catholic School will be erected at Grand Forks, B.C.

New school buildings will be erected at Collingwood Heights and Cedar Cottage, and a four-roomed addition will be erected to the Mountain View School, South Vancouver, B.C.

The Carbolinium Paving Co., Vancouver, B.C., are removing their plant to New Westminster, B.C.

A new Catholic Church will be erected at Vernon, B.C., at a cost of about $10,000.

The Central and Union Hotels and several adjoining buildings, Wardner, B.C., were destroyed by fire July 13. Loss about $100,000.

The Eastern British Columbia Lumber Co., Fernie, B.C., are erecting an addition to their mill.

The Cooke Lumber Co., will erect a sawmill at Nelson, B.C.

The Sumas Dyking Co., New Westminster, B.C., will improve their plant at a cost of about $1,000,000.

The municipality of Nelson, B.C., will install a 15 h.p. motor to run their rock crusher.

The city council, North Vancouver, B.C., are considering a by-law to borrow $30,000 for the Lynn Valley waterworks district.

The General Engineering and Constructing Co., Vancouver, B.C., will erect an addition to the Glencoe Lodge in that city, at a cost of about $50,000.

"QURIDE": AN INTERESTING PRODUCT.

An interesting and valuable product with a wide range of uses has been developed by the Pichrome Hide Co., of Syracuse, N.Y., and is being placed on the Canadian market by John Millen & Son, Limited, Montreal.

"Quride," as the new product is called, is made from animal hides by a chemical process by which the fibrous and gelatinous matter is changed and made insoluble and extremely dense and tough. By slight modification in the process any degree of hardness or flexibility may be secured.

On account of its hardness and tensile strength, only very light shrouding is necessary for the support of the edges of the teeth when "Quride" is used for gears. Its insolubility in any of the common insolvents, such as oil, grease, petroleum, alcohol, turpentine, or naptha, and the fact that it is unaffected by any temperatures in which gears are used, makes it especially valuable for gear work.

Great claims are also made for the soft "Quride" as a material for valves in air and circulating pumps, being lighter in weight, less expensive, and more durable than leather or rubber. Its other possible uses are almost unlimited, as for example in washers, cold water pump valves, packing, dust guards, oil box covers, carriage axle boxes, car seat covers, truck wheel shoes silent ratchet wheels, oilless bearings, trunks, suit cases, etc. It is also commended for all kinds of plumbing joints, because, owing to the density and toughness of the material, there is no tendency to squeeze out under pressure.

Mr. Geo. B. Oldham, vice-president of the Dayton Pitless Scole Co., Dayton, Ohio., recently visited a number of the leading manufacturing centres of Ontario in an endeavor to find the most suitable location for the establishment of a Canadian branch factory. It is now practically settled that the new factory will be established either in Brantford or Hamilton.

K. L. Aitken, E.E., of Toronto, has been appointed by the City of Chatham, Ont., to run the official tests on the municipal producer gas equipment.

PUBLICATIONS

A Review of Books, Catalogues, Bulletins and other Publications of interest to readers of this paper. All such publications should be sent to The Editor, Canadian Manufacturer, Toronto.

FUSE TALKS.—A 16-page booklet describing Noark fuses made by H. D. Johns-Manville Co., and handled in Canada by the Canada General Electric Co., Toronto.

EXPERIMENTAL RESEARCH AND DEVELOPMENT.—A sixteen page brochure presenting an address delivered before the American Academy of Arts and Sciences on the occasion of the presentation of the Rumford medal to the author, Mr. Edward G. Acheson, for his electric furnace products—The International Graphite Co., Niagara Falls, Ont.

My Conversion to Gas Power.

By J. C. Miller in Power.

I had never taken much stock in gas engines. My previous experience in that line had been with engines of 20 to 30 h.p., and my memory was good enough to span the lapse of years and bring again to mind the troubles that I had survived.

In those days what joy we had starting a cold gasoline engine. All the operating force took turns in riding the flywheel, and one morning, when Pat, the engineer, was thrown violently against a partition, he even rejoiced in his sorrow to know that "she ran." When something did go wrong it was hard to locate the trouble. We had a regular schedule of the points for investigation, and sometimes one thing, sometimes another, caused our woes; never the same thing twice in succession.

In the use of steam as a motive power we could always get some action. Our engineers were not bothered by efficiency tests, and the engine might be using 20 or 100 pounds of steam for all we knew. It was sufficient to know that the engine would run at every demand. Right there is where steam is strong and has made its reputation as a source of power. If there is steam in the boiler the engine will usually run. Economy is a second consideration.

I was destined to have more experience, however, with gas power and it came about this way: The company with which I was connected bought out several Canadian manufacturing plants and in one of them a suction producer and engine of English make furnished the power. Interesting stories came to me from time to time of the economy of this plant and of its reliability, ease of operation and simplicity, so that I was tuned up to look for great things. In the course of time I was called upon to make frequent visits to this factory, preparatory to enlarging it, and the power plant was always a point of special interest and study. The engineer was a Frenchman and knew little of the theory or principles of gas-plant operation. He was a past master, however, of the art of keeping things in operation as well as of cutting out overtime labor. He came late and left early and his heart was heavy when anything required his attention outside of regular hours. Nothing seemed to surprise him, and even when he looked into the scrubber manhole with a lighted candle in hand, he treated the consequent explosion as something that was bound to occur.

I made it a practice to reach the plant early in the morning to see the starting operations, and I was surprised at their simplicity. The engineer would arrive at 6.40, along with his boy, who manipulated the hand blower. The fire of the day before was poked and the ashes were taken out. Then the doors of the producer were closed, water was turned into the vaporizer, the purge pipe was opened and the boy was set to work on the hand-power fan. The coal hopper had been filled, and we waited for gas. While the fire was being blown up, which took eight or ten minutes, the engineer would attend to his oil cups and was ready to start as soon as gas was coming of the right grade. The gas was tested at repeated intervals from several test cocks by applying a candle thereto, and as soon as a flame could be maintained the engineer would make for the engine. (I had always had some fear as to the safety of a gas plant, but the promiscuous mixing of candles, pipes, gas and engineer soon freed my mind of this.) Compressed air was used for starting. When the engine had partial speed, gas was turned on and the engine would fire. The boy at the fan would be called off and the thing was in operation.

Process of Starting a Revelation.

The whole process of starting was a revelation to me, both from its rapidity and positiveness. There seemed to be no question as to whether he was going to make it go or not. It always went, and then the economy of the plant after it was started was amazing. As the engine was of 50 h.p. and used little more than a pound of coal per horse power-hour, all the attention that was needed was the dumping of two hods of coal into the feed hopper per hour. The "conveyer" was an ordinary coal scuttle combined with the engineer, and he had ample time between conveyings to oversee every operation that took place within seeing distance of the engine. He was not allowed to wander from his post of duty, however, or to do other work.

At shutting-down time the performance was simpler still. The gas supply was shut off, oil cups attended to, purge pipe opened to the air, and the water supply shut off. As the engine used water for cooling from elevated tanks it required no attention in temperate weather. At the end of five minutes the engineer would leave the plant for home.

Learning that other producer plants of English and German make were in operation in the city, I made it a point to study them and see if their performance was as creditable as our own. Such proved to be the case, for all engines were operating satisfactorily and with corresponding economy. Designs differed in detail, but the principles of all were the same, of course, and as a result of this inspection and the record of our own engine I became a convert to producer gas as a source of power.

English builders seem to have about come to a standard in their single-cylinder engine design. There is plenty of weight in their castings; the centre line is placed well down toward the foundation, special attention is paid to cooling and lubrication, and there is an absence of small trappy springs and fittings, which sooner or later cause trouble.

It may be added that as a result of our experience with this small engine, a much larger one was ordered and installed as more power was needed.

In conclusion I would urge all power users to forget their early experiences with gas engines, if they have had any, and get next to an up-to-date plant using producer gas. Study it and note the conditions necessary to reliability and economy, and I am confident there will be other converts to gas power.

Textile Mechanism.

From the American Wool and Cotton Reporter.

The chimney is a portion of the mill plant which requires considerable care in design that it may be suited to the demands of each particular case. Aside from the usual drop or pressure considerations, the height of a chimney is largely influenced by surroundings. Where hills, tall trees or buildings are near by, the stack must often be carried to a height otherwise unnecessary. The introduction of economisers or other heat saving devices tends to still further increase the height of a chimney where natural draft is used. Then there is the mill with no chimney at all. A short iron stack, in connection with a mechanical draft system, is used by these mills and between these two extremes of the exceedingly high chimney with natural draft, and the small short stack through which draft is made by mechanical means, lie many variations and combinations of the two systems. It is only a few years ago that mechanical draft was held quite generally to be the proper system for practically all requirements. The tall costly chimney was declared to be doomed. Such a result, however, does not seem to be forthcoming. Many of the latest mills built, in fact, most of them, have a chimney of correct design to furnish natural draft for the boilers. Where mills are located in a city chimneys of fair height are a necessity that all soot and smoke may be carried away from the other buildings. The tendency to-day, however, is not to build these excessively high, but to meet all draft requirements by furnishing a large area. Most are below 200 feet. It is estimated that a pound of coal requires 12 pounds of air for complete combustion. With an air current moving at the rate of 3,720 feet per minute, or about 21 yards per second, theoretically, an area of not above .15 square inches per pound of coal consumed per hour would be necessary. As a matter of fact, the resistance imposed by the boiler passages and uptakes, as well as the grates and fuel, makes ten times this area, or 1.5 square inches per pound of coal, a more general figure in practical work. When more boilers or when heat absorbing apparatus is added to a plant the height or area of the chimney may be found insufficient.

Tall and Short Stacks.

One solution of this problem is to assist the draft by installing fans; another is to increase the chimney area or height. This latter course is often resorted to. In order to increase the area, however, it is obvious

that an entirely new construction is required, and for this reason care is usually taken to have an ample area when originally built. Practically all of these tall chimneys have walls diminishing in thickness all the way up. This reduction may be constant and gradual, or it may be accomplished by a series of steps. In the concrete chimney the walls are generally of uniform thickness up to a single offset or shoulder almost midway of its length. From this shoulder to the top there is a taper. This same construction is employed quite frequently in brick stacks as well. In connection with a mechanical draft system and where a short stack is in use, a spark arrester is a very useful contrivance. Where shavings, chips or such matter are burned it is almost a necessity. This device may be incorporated in the chimney base, but more often occupies a separate chamber. Just before entering the chimney the products of combustion enter at the periphery of the arrester and under the action of the fan are given a whirling motion. Finally they pass down into an inverted conical catch-basin or pit, where most solid matters are deposited. From here the gases pass up the chimney. As a general thing chimney walls are built with a slant or batter, and a batter of one in twenty is a very fair average for the ordinary brick stack. In concrete stacks sometimes very little batter is used; the reinforcement is depended upon to tie the walls securely. A capstone of fire brick, terra-cotta or concrete is generally placed on a chimney. Sometimes a cast iron cap is used, and this helps to bind the upper portion together. It has been shown that the shape of this cap has considerable influence upon the chimney draft when a high wind is blowing. Thus with a cap having a rounded or convex upper surface the wind is directed downward into the chimney mouth, baffling the upcoming gas and warm air. With a concave curve on the outer surface of the cap the air impinging against the chimney top is deflected upward, increasing rather than retarding the draft. This theory usually works fairly well in practice, yet it is safe to say that there are more convex surfaced caps than of the other kind. The outward flare of the chimney walls themselves just before reaching the cap does not aid the draft in any degree.

Belt Compounds.

Though many of the belt compounds now on the market are meritorious, for ordinary work there is no better dressing than neat's foot oil. For the most part belt dressings merely give a temporary improvement to the belt action. This improvement very soon disappears, and another application of the dressing is necessary. These preparations which merely stick to the outside surface are of no advantage in the long run. What is needed is something which will enter the pores of the leather and render it soft and pliable. Too much oil or oil of certain kinds will make the leather too soft and flabby, so that it will stretch and tear easily. It is the smooth soft surface of the leather adhering well to the pulley which gives the best and longest pulling power. Any residue left on the leather tends to present a foreign surface to the pulley, rapidly decreasing its pulling value. This foreign matter should be removed from time to time, and the corner of a stick or even your belt scraper if carefully used will do this speedily, while the belt is running. A limited amount of beef tallow applied to a belt is recommended in place of neat's foot oil, and this will furnish all the dressing required. A leather belt is valuable because leather is an excellent transmission medium, and the best a belt preparation can do is to preserve the natural characteristics of the leather.

Boiler Setting.

It is now getting to be quite a common practice to suspend boilers from overhead trusses by means of lugs at each end. Where furnace walls are required to support the boilers as well as form the combustion chamber, it is recognized that some compromise must be made in order to fulfill both functions. When supporting piers are in the way, repair work or remodeling operations are handicapped. The design of the furnace, too, can be much improved where it is not built to uphold the weight of the boiler as well as to heat its water. By screwing up the nuts on the iron rods which pass through the beams, the boilers may at any time be raised from their setting that this may be repaired or rearranged. Where boilers are hung in this manner it is easy to fix pans of sheet or boiler iron on the arches for the heating of feed water.

Effects of Superheat.

Superheated steam is in its way very like a high tension current, in which everything must be kept in good condition to prevent failures. The engineer must be ever alert to detect the weak places in all apparatus or they may be very forcibly thrust upon his notice. The effects of superheated steam upon cast iron are shown in a valve recently tested by the makers after it had done service for something over four years. A standard 14-inch gate valve was taken from a line carrying steam superheated to about 590 degrees Fahrenheit, and at a pressure ordinarily of 200 pounds. According to the records of this company the body of this valve as completed was composed of iron having a tensile strength of 22,400 pounds. This was shown from test bars of the iron from which the valve body was made. Tests made of iron bars cut from the valve body after it was removed at the end of four years showed an average tensile strength of 11,740 pounds, a loss of 49 per cent. While the valve body showed only about half its original strength, the flanges of the valve showed a depreciation in strength of only 33 per cent. This was, it is thought, due to the flanges being exposed to a much lower temperature. A valve with a steel body was installed in place of the cast iron one.

A Record of Equipment.

Once in a while a machine by especially bad behaviour may direct attention to itself and its operating record. Perhaps on occasion a machine with an especially good record may also be remarked. It is something like our system of jurisprudence, in which the careers of criminals are preserved carefully, and the public take some notice of the most eminent men, while the doings of the great majority are for the most part ignored except in the small circle in which they move. However well this plan may work in social and state affairs, it is not suited to the mill. The record of each employee is carefully kept. In something the same way the performance and output of the individual machines should be taken account of. In this way all the data concerning the various machines is brought together for comparison and the obtaining of much information which would not otherwise be available. Without such a system this data is unsystematic and widely scattered. No one perhaps outside of the loom fixer knows which loom has required the most repairs. The master mechanic may know which one takes on an average the most power, and if he had the loom fixer's information as well, he could work more intelligently. This is really the master mechanic's province, and he should have such information at hand. But a part of a single clerk's time will be required in keeping such a record, and in many instances it will be well worth the trouble.

The jail, New Westminster, B.C., will be improved.

Keep your name before the men whom you must convince to get orders — by advertising in the paper they constantly read.

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