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MISSING

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The Canadian Engineer

ESTABLISHED 1893

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TO OUR READERS.

If you are coming to the Canadian National Exhibition
in Toronto in September, we would be pleased to have you
call on us. Have your mail forwarded in care of our office
if you do not know where you will be staying. It will be
pleasure to look after it for you.

HYDRO-ELECTRIC POWER LINE.

It is impossible to estimate the effect the building of
the Ontario Government's Transmission Line will have on
trade and business conditions in Ontario.

The time chosen for the letting of the contract was for-
tunate. Material is cheaper, the rate of wages lower than
they have been for some years. The line will be erected at
a minimum cost.

But just as important as construction at cost will be
the stimulus given to business in certain departments.
Before completion of this one contract there will be spent
considerably beyond two millions of money. The building
of this main line will lead to the construction of several
smaller distributing lines and to the replacing of steam
plants and some water powers by the electric motor. Cheap
electric power will give an impetus to the motor trade, and
the number of small electric installations will be largely
increased.

A COMMISSIONER OF TELEPHONES FOR ONTARIO.

During the past few years the spread of the many tele-
phone systems throughout Ontario has made necessary
some central authority to direct and control, so that un-
necessary expense may not occur in the further extension
of the systems. The standard of equipment should be
unified, the rates graded and standardized, and some more
complete method of interchanging messages arranged.

This could be done by appointing a Telephone Board;
but this is not necessary. We now have a Railway and
Municipal Board, who are not particularly overworked.
This matter could well be placed under their control. They
have now something to do with the crossing of electric
railways and telephone lines, and their study of electric
transportation in Ontario has made them familiar with many
questions that will have to be faced in developing a Pro-
vincial telephone system.

Provision should be made so that the Board might
engage a telephone expert with advisory and consultative,
but not executive powers, and under his guidance the
growth, development, and unification would increase until
every settled section would have suitable telephone service.
The present scheme of a large mileage in sections un-
connected cannot long continue. A Government appointed,
legislative supported Commission is the only right solution.

CONSULTING ENGINEERS.

The one thing most required and least appreciated by
young engineers is advice, and because it is seldom appre-
ciated we do not propose to give any—at least not in this
article.

Recently we were shown a letter in which a prominent
young engineer said: "If for my part I have an engineering
work to do and were not able to do it myself, I would study
until I was able. My reputation as an engineer would be
at stake, and I would not give another firm of engineers a
chance to brag of the fact that I had to consult them."

Study is a great aid. The young engineer must be alert.
He must read carefully good technical articles. By so doing
he will come in touch with the broader minds in the same
profession. But study alone will not overcome all things.

He must have confidence. He must believe in himself, his methods, his proposition, his country and his associates. He must not fear competitors. He must know details, what is going on, how it is done, why it is done. Then he is in a position to know whether his wish is being carried out; and it is just here the inexperienced engineer is going to make his mistake. His study, his confidence, and love of detail are going to narrow him. He will lose the larger vision, will become dwarfed. The possibilities will not be secured. The general plan will be incomplete. It is in assisting to avoid these errors that the consulting engineer has found his field.

The consulting engineer, worth consulting, is in the first place too big to "brag." He recognizes the limitations and possibilities of his confrere, but does not comment. His years of experience, studying his own mistakes and the mistakes of others, his own construction and the construction of others, enable him to advise, plan and execute; for after all we only learn to do by doing. The wise consulting of experienced engineers is the quicker way to success.

EDITORIAL NOTES.

The sort of fact which tells more than columns of figures as to industrial improvement in the United States is the announcement that the Gould-Harriman railway group have practically closed contracts for the supply of 10,000 steel cars.

* * * *

It is reported that the C.P.R. are quoting prices for 1908-9 on ties six cents lower than last season. If this is correct other road will doubtless drop their prices also. Should this be the policy of the railroads very few contractors will open camp this fall, and those who do will seek markets in the United States.

* * * *

On every side we are assured that Canadian material and Canadian labor will be employed in constructing the Ontario Transmission Line, but when discussing the selection of engineers the contractor said: "I never ask a man his nationality. I want to know whether he can do his work or not." That looks like a bid for engineers from other countries. Mr. McGuigan, we would like to have heard you say: "I will first ask Canadian engineers if they can do the work."

VALUATION OF MILL PROPERTY FOR TAXES.

In a discussion of the taxable value of mill property, Mr. Chas. T. Main, engineer, of Boston, presents the following on this subject of never ending controversy:

"The Public Statutes of Massachusetts state that the assessors shall make a fair cash valuation of all the estate, real and personal, subject to taxation therein. It seems as though this definition of the cash value as the taxable value did not intend that assessors should consider the plant in the same light that a purchaser would, for the reason that the earnings cannot be included in the assessor's investigation, while they are the all important item to the purchaser.

"The average assessor knows but little about the physical qualities, to say nothing of going into the estimate of all the items which make a mill more or less profitable than other mills located elsewhere.

"It is not at all improbable that some mills, which are running at a loss, or making a slight profit, would be better off to abandon their present site and move their machinery to some more favorable location.

"It may have been that when such a ruling was made the choice of locations was not as wide as now, and that it was intended not to consider such broad questions as must be considered by a purchaser, and which to him might render a property of no value to purchase, and yet it might represent a large amount of property.

"It would seem, therefore, that in considering the taxable value of a mill, the assessors must ignore the broad questions of labor, location, transportation, etc., and confine themselves to the physical condition of the plant existing at a certain place, which place is assumed to be advantageous to the carrying on of the business. Even in this limited consideration they cannot be as severe upon the plant as a purchaser would be.

"For example, suppose that the looms in a mill are old, and so constructed as not to be able to run at anything near the speed and production of modern looms, and that the price of weaving is consequently so much higher than on modern looms as to wipe out what would otherwise be a fair profit on the goods. A purchaser taking this into consideration would say that the looms were of no value; but, unfortunately, they are in the mill, and if the company prefers to keep them, they are taxable property, and the company is unfortunate which possesses much of such property to be taxed."

ANNUAL MEETINGS.

Company.	Day.	Time.	Place
Elgin & Havelock Ry...	Sept. 2	3 p.m.	Halifax, N.S.
Rutland & Noyan Ry. . .	Sept. 2	4 p.m.	St. Thomas, Que
G.T.P. Branch Lines Ry.	Sept. 16	12 a.m.	Montreal, Que.
Ottawa & New York Ry.	Sept. 3	3 p.m.	Ottawa, Ont.
Central Ry. of Canada..	Sept. 7	2.30 p.m.	Montreal, Que.

It is stated that during the past three months the C.P.R. have had delivered to them from contractors in this section over 2,000,000 ties.

Railroad transportation in the United States was substantially seventy-five years old in 1907. There were only 32 miles of railroad in operation in 1832, and in the seventy-five years to 1907 there were constructed 228,128 miles of operated railroad.

PATENTS.

The following is a list of Canadian patents recently issued through the office of Messrs. Ridout & Maybee, Patent Solicitors, Toronto, from whom any further particulars as to the inventions may be obtained:

Reducing and treating iron ore, M. Moore and T. Heskett; wave power apparatus, A. Ravelli; water motor, G. C. Kaitting; Metal Shingle, Nathaniel Brown; electric conductors for lighting purposes, Isadore Ladoff; force feed lubricators, C. C. Wakefield; gas and oil furnaces, A. Nicholson; internal combustion engines, Thos. D. Kelly; process of chloridizing ores, C. Herner, F. Sternburg; improvements in dynamos (regulation), C. A. Vandervel and W. H. Proctor; production of artificial fuel and coke, H. S. Robertson and J. R. Graham.

☞ During the First Six Months of 1908 the subscription receipts on the Canadian Engineer in cold cash were 50% more than during the twelve months of 1907.

☞ There is only one explanation--It is this--We are giving the civil engineers and contractors of Canada the kind of information they are looking for.

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SAFE SUPERIMPOSED LOADS ON REINFORCED CONCRETE FLOOR SLABS.

Computed According to Building By-laws of the City of Toronto.

By J. Morrow Oxley, A.M., C.S., C.E.*

The following table gives the safe loads on concrete floor slabs reinforced in one direction with at least one quarter of the reinforcement continuous over the beams, and within one inch of the top of the slab over the beams. As nearly all methods of beam and slab concrete construction involve the carrying of practically all the reinforcement over the beams this condition is easily fulfilled:

These assumptions give the loads shown in the table which are the safe load per square foot of slab exclusive of the weight of the concrete itself. For a square slab reinforced both ways the loads will be twice those given in the table, plus the weight of the slab.

The method of computation is well-known and gives the economic percentage of steel.

The formula $69gh^2$

$$w = \frac{69gh^2}{l^2}$$

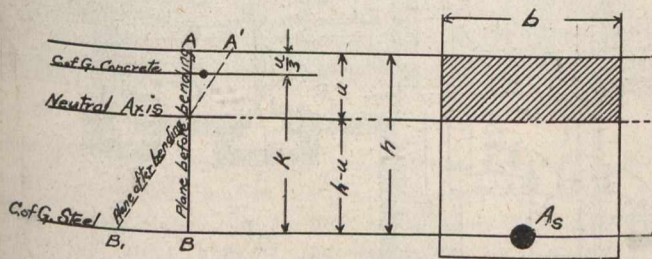
was derived from the above con-

stants and may be used to extend the table, or for any rectangular beam twelve inches wide, and by simple proportion may be used for beams of any width and even for T beams provided the depth of slab is not less than .273, the effective

SPAN IN FEET

Depth in Inches	Area of Steel in sq. ins. per ft. width.	Wt per sq. ft. of Slab.	SPAN IN FEET																
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0	9.0	10	11	12	13	14
2.5	.078	30	310	190	125	85													
3.0	.103	35	585	360	240	165	120	85	65										
3.5	.129	45	920	575	385	280	200	145	110	85									
4.0	.155	50	1340	840	570	405	300	225	170	135	105	65							
4.5	.181	55		1160	785	565	420	320	250	200	155	100	65						
5.0	.206	60			1040	750	560	430	335	270	215	140	95	60					
5.5	.232	65				970	720	555	435	350	285	195	135	90	60				
6.0	.258	70					900	695	550	440	360	250	170	120	85	60			
6.5	.284	80					1090	845	670	540	440	305	215	150	105	75	50		
7.0	.310	85						1015	805	650	535	370	265	190	140	100	70	50	
7.5	.335	90							955	780	640	445	320	230	175	125	90	65	45
8.0	.362	95								910	755	525	380	280	210	155	115	85	60

The depths given are the total depth of the slab, and the centre of gravity of reinforcing steel is considered to be one



inch from the bottom of the slab at the centre of the span.

The units and constants used are as follows:

	Symbol.
Unit stress in steel (tension), 16,000 lbs. per sq. in....	(f)
Unit stress in concrete (compression), 500 lbs. per sq. in.	(c)
Modulus of elasticity—Steel.....	Es
“ “ “ Concrete ..	Ec
Ratio.....	$\frac{Es}{Ec} = 12$ e
Effective depth of slab	h
Width of slab considered (12 inches for table)	b
Constant for moment arm of resistance	k
Height from neutral axis to top of slab	u
Area of Steel	As
Load in pounds per square foot	w
Span in feet	l

The strain in any fibre is directly proportionate to the distance of that fibre from the neutral axis.

The modulus of elasticity of the concrete remains constant with the limits of the working stresses.

The steel takes all tension, the concrete all compression.

* Of Oxley and Chadwick, Consulting Engineers, Toronto, Ont.

depth of beam, but for these cases the shearing stresses would have to be considered and provided for.

The derivation of the formula is as follows:—

Let $\lambda_c = A-A'$ = (shortening of Concrete under stress)
 $\lambda_s = B-B'$ = (lengthening of Steel under stress)

then $\frac{\lambda_c}{\lambda_s} = \frac{u}{h-u}$ (I) now $\lambda_c = \frac{c}{Ec}$ and $\lambda_s = \frac{f}{Es}$

substitute in (I). Then $\frac{\frac{c}{Ec}}{\frac{f}{Es}} = \frac{c}{Ec} \times \frac{Es}{f} = \frac{u}{h-u}$

but $\frac{Es}{Ec} = e$ $\therefore \frac{c}{f} e = \frac{u}{h-u}$ (II)

i.e. $\frac{500 \times 12}{16000} = \frac{u}{h-u} = \frac{3}{8}$

If $h = 1$, then $u = \frac{3}{11} = 0.273$ (distance from top of beam to N.A.)

$k = 1 - \frac{.273}{3} = 0.909$ (constant for length of moment arm)

Percentage of Steel

(Total compression) = (Total tension)

$b \times u \times \frac{c}{2} = As \times f$

$\therefore As = \frac{b \cdot u \cdot c}{f \cdot 2}$ (but $u = .273h$)

$= \frac{b \times .273 h \times 500}{16000 \times 2} = .00427 b h$
 say .0043 b h

To find safe uniform load on slab consider strip 12 inches wide.
 $As = .0043 \times 12 \times h = .0516 h$ sq. ins. per ft. width of slab.

Bending Moment = $\frac{w l (12 l)}{10}$

Resisting Moment = $h \cdot k \cdot 16000 \cdot As$

Resisting Moment = Bending Moment

$w = \frac{h \cdot k \cdot 16000 \cdot As \cdot 10}{12 l^2}$

$= \frac{619 h^2}{l^2}$

STEAM TURBINES AND STEAM REGENERATORS.

The accompanying drawing (Fig. 1) shows the steam turbo-alternator unit of the St. Denis turbine station of the Societe d'Electricite de Paris. These turbo-alternators are the three-phase type, are of the Parsons-Brown, Boveri type, installed by the Cie Electro Mecanique of Paris. Each unit is of 6,000 kilowatts' capacity, and operate at a speed of 750 revolutions per minute, the three-phase alternators supplying a current of a frequency of 25 cycles per second and a pressure of 10,250 volts for use on the electric light and power distribution circuits.

The station is 20 meters wide, the distance between the centre of the steam turbine units being 8 meters and the

steam turbines. The steam turbine is largely utilized at the present time with steam regenerators, thereby producing a wonderful saving in connection with the operation of rolling mill engine steam hammers and hoisting engines, this apparatus usually exhausting direct to atmosphere, and, therefore, the consumption per horse-power being very high.

By means of steam regenerators and low-pressure turbines on the Rateau system it is possible to utilize the exhaust steam on this apparatus to great advantage. The steam regenerator as utilized for this purpose is constructed both of the vertical and horizontal types. In mining and steel plants the hoisting engines and reversible rolling mill engines are not economical in the use of the steam on account of their intermittent action, and even with a super-

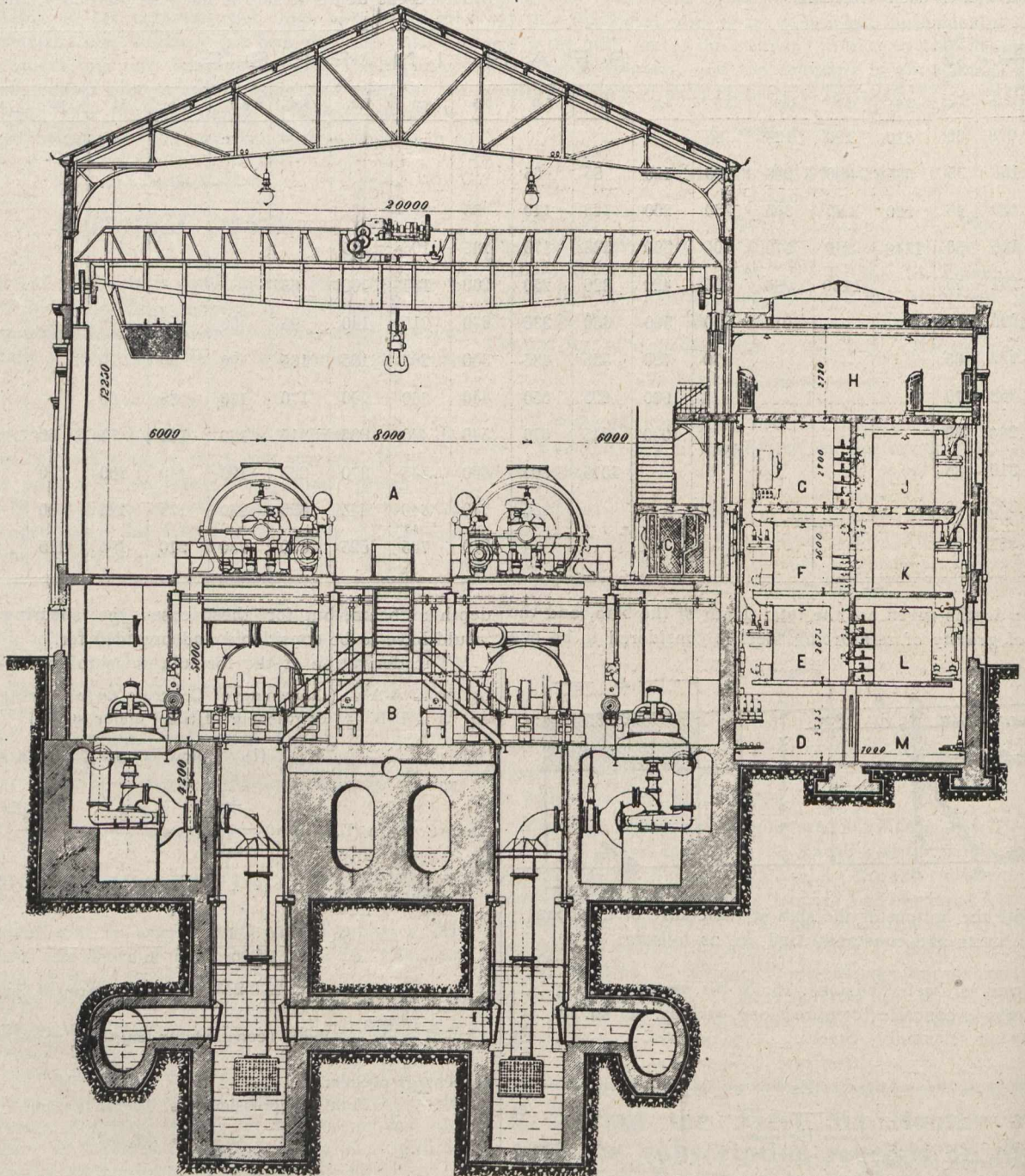


Fig. 1.

distance from the centre of the steam turbine to the walls of the power house 6 meters, while the total height from the turbine base and the floor of the station to the ceiling is 12.25 meters. The basement containing the electrically-driven pumps on the condensers is 5 meters high, while the chambers for the vertical electric centrifugal pump are 4.2 meters high, and located below this basement. This St. Denis station is one of the most complete and thoroughly up-to-date plants in France, while at Liege, Belgium, there is a unique turbine station equipped with tandem turbo-generator outfit, consisting of direct current dynamo and alternator, mounted together on the extended shafts of the

heated steam and condensing plant they cannot be worked with the same economy in steam consumption as continuous running engines. In many plants the steam consumption is as high as 80 to 100 pounds per effective horse-power hour for ore hoisted by the winding engines in large mines, while the steam consumption for cogging mill engines and engines for driving finishing trains vary from 20,000 pounds per hour to even 50,000 pounds per hour for rail mills and large plate mills.

The efficiency of low-pressure turbines is very high, and by means of the Rateau steam regenerator system it is possible to obtain a constant flow of steam with slight varia-

tions in pressure from exhaust of engines working with starts and stops without interfering with the running of the main engine.

The steam regenerator of Dr Rateau, professor in the School on Mines, Paris, is of unique construction. The apparatus is based upon the principle involving the application possessed by a saturated steam and saturated liquid when brought together. With great rapidity heat exchanges take place between the steam and the water through the medium of metallic surfaces or directly.

With certain conditions of temperature and pressure these two fluids, steam and saturated water and saturated steam, preserve a reciprocal of equilibrium, as they are composed of similar molecules. When this equilibrium is disturbed there is a transformation of one form of fluid into the other, and there is an absorption of heat or a liberation of heat, as the case may be.

In the Rateau steam regenerator there is a receiver of considerable dimensions containing water and cast-iron, and when the intermittent exhaust steam is conducted to this apparatus the heat is absorbed by the cast-iron, and upon the surface a certain quantity of steam is condensed, remaining in the state of water, which is steam saturate. There is, therefore an accumulation of heat whenever a large supply of steam is received in the accumulator, owing to this condensation, causing an elevation of temperature. There is also a slight rise in pressure, due to the steam which is not condensed, although this is adjustable, and only relative as the operation is usually at or below atmospheric pressure.

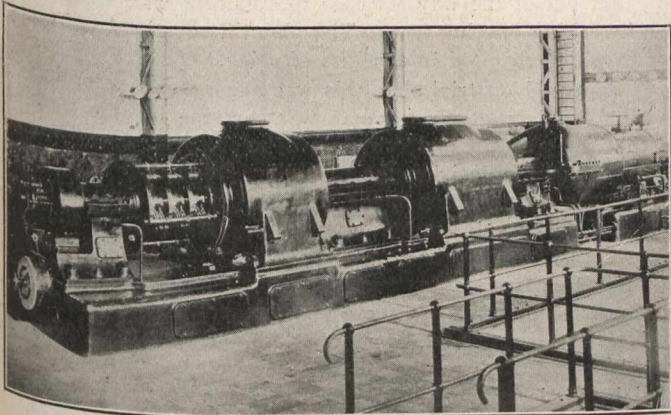


Fig. 2.

The steam turbine of the low-pressure type, as it demands more steam, lowers the pressure when the supply of exhaust steam stops, and the heat equilibrium is distributed so that the latent heat of the steam vaporizes a certain amount of water due to the heat held by the cast-iron, and, therefore, the turbine has a flow of steam supplied to it which is maintained absolutely constant, these exchanges of heat taking place almost instantaneously.

By means of this unique regenerator accumulator and a specially designed relief valve the fluctuations of temperature and pressure are exactly regulated, and correspond in a way to the flywheel of an engine, which ordinarily stores the excess energy and gives it out when required, or it may be compared to a storage battery, which absorbs electric current when there is an excess, giving it out during the peak of the load.

The Rateau system of generating power has been adopted by the Steel Company of Scotland, and it is stated that they have laid off by its use the equivalent of three steam boilers, saving the coal consumed in those boilers, as well as the wages connected with operating the same, as the power was obtained from this steam regenerator system from the waste steam, which would otherwise have gone out into the atmosphere.

The steam regenerator of the Steel Company of Scotland is 30 feet long and about 11 feet in diameter, and the weight of water is 55 tons. It takes care of absolute stoppage of the main engine for two minutes, these main engines driving the reversible mill and the three high-roll mill as well as steam hammers.

The steam turbine is of the Rateau low-pressure type of 500 horse-power capacity, and was constructed by Fraser & Chalmers, of London. One turbine is directly coupled to a Siemens alternator, supplying a current of 250 volts pressure, and is driven at a speed of 1,500 revolutions per minute. The turbine receives the steam at atmospheric pressure exhaust $27\frac{3}{4}$, and it is stated that two more sets of 1,000 kilowatts capacity are under construction, the steam regenerator having a sufficient storage capacity for this amount of power with an interruption of one minute for the main engine.

In Germany, at the Rombach Suttén Werke, there is a steam regenerator installation, with Rateau steam turbine, with a capacity of 2,500 kilowatts. At the steel works of South Chicago, Illinois, the exhaust steam from a reversible blooming mill is utilized, the steam regenerator taking care of two minutes absolute stoppage of the main engine. It is maintained that it will supply steam for full load on the two Rateau steam turbines without calling for live steam from the boilers for the above periods of time. The normal rate of capacity of these steam turbine generators is 500 kilowatts, and the speed is 1,500 revolutions per minute. The admission steam pressure at the turbines is atmospheric, and the exhaust $27\frac{1}{2}$, an Alberger barometric condenser being employed. The dynamos are direct connected to the turbines, and supply a continuous current of 250 volts pressure.

The Belgian steam turbine plant above referred to, noted in the accompanying illustration (Fig. 4) shows one of the two tandem steam turbine sets installed in the new power station of the Societe d'Electricite du pays de Liege. Another three-phase turbo-alternator of the same output is also being erected in this station.

The two units shown in the accompanying illustration (Fig. 2) are of 2,700 horse-power each, the steam turbines as well as the direct current and alternating current generators having been designed and constructed at Baden, Switzerland, by Brown, Boveri & Cie. The steam turbines are of the Parsons type of horizontal construction, operating at a speed of 1,500 revolutions per minute.

To each steam turbine are directly coupled in tandem two electrical generators, one of 1,800 kilowatts, supplying a three-phase alternating current, and the other of 850 kilowatts, generating a continuous current, the latter for railway service and the former for lighting and power distribution at Liege, Belgium.

The three-phase alternator of 1,800 kilowatts supplies a current having a frequency of 50 periods per second and a pressure of 6,300 volts to the lighting and power service line, while the direct current generators of 850 kilowatts supply a continuous current of 550 to 600 volts pressure to the railway feeders.

RAILROAD EARNINGS.

The following are the latest figures:—

	Week ending.	1907.	1908.	Change.
C. N. R.....	Aug. 7	\$ 196,700	\$ 174,400	—\$233,300
C. P. R.....	Aug. 7	1,565,000	1,470,000	— 95,000
G. T. R.....	Aug. 7	915,430	794,562	— 120,868
T. & N. O.....	Aug. 7	17,500	18,200	+ 700
Montreal St.	Aug. 8	70,530	69,864	— 666
Toronto St.	Aug. 8	67,856	67,482	— 374

A matter of concern to Canadian patentees holding British patents is the coming of the appointed day, August 28th, after which applications can be made to revoke patents that are not worked here. Abroad, there has been a good deal of needless alarm, for the Act leaves several loopholes. Revocation is in no case possible until the patent is four years old. And with a fine sense of strategy, foreign holders of patents are putting themselves into a strong position. They are advertising in English papers that patent No. So-and-So is for sale, thus showing willingness to have their monopoly worked in the United Kingdom. It may be that they have no desire to agree with a buyers' valuation of the patents' value. They are holding out their offers under advice and precautionarily.

LEGAL NOTES.

[This department will appear in the third issue of every month. Should there be any particular case you wish reported we would be pleased to give it special attention, providing it is a case that will be of special interest to engineers or contractors.—Ed.]

INFRINGEMENT OF PATENT.

Question.—A piece of machinery is patented. If I make a machine somewhat similar to it for my own use, and not for sale, and only make one such machine, am I liable to the holder of the patent?

Answer.—There are really two distinct questions included in above inquiry. Firstly, what amount of manufacture or use amounts to an infringement of the rights of the patentee? and, secondly, what degree of similarity is allowable without amounting to such an infringement?

Firstly,—Patent law is a subject of Dominion jurisdiction and as such is largely determined by the "Patent Act," R.S.C., Cap 69, and decisions recorded thereunder. Thus it will be seen the law is the same in all parts of Canada. Now, section 7 of the said act gives the patentee "the exclusive property" in the machine invented, while the form in which the Canadian patent is granted is even more full, and express granting "exclusive right, privilege and liberty of making, constructing and using and vending to others." Thus the mere making of an article for the purpose of sale or use is an infringement, although no actual sale or use has taken place. (See *Muntz v. Foster*, Web. P.C. 101.) It will be seen then that the mere making even for my own use renders me liable, as the patentee is the only person entitled to make the said machine in Canada. A state of the law which appears highly desirable in an age when the making for their own use would be quite feasible for such firms as the Canadian Pacific Railway Company or the T. Eaton Company, and would at the same time rob the patentee of a great part of all advantage which would otherwise accrue to him. We might also notice that verbal permission by the patentee would not be sufficient. The statute says you cannot make the machine without such permission being in writing.

Secondly,—The degree of similarity to which you may go in imitating the patented machine and still escape liability cannot be stated with any certainty. It is an intricate question in every case, involving questions of law as well as of fact and nothing but a judgment of the proper court on the facts of the particular case could really determine as to whether you had exceeded your bounds or otherwise.

It is, however, possible to state some of the principles which would apply in trial of such a case as suggested:

1. If there be substantial identity with the patented article—there is no doubt you are liable.

2. Infringement of patents for machines usually takes place by the substitution of "equivalent parts;" change of function or substantial difference in the result produced are evidence of a new combination and may avoid the charge of infringement.

3. Any person may accomplish a result performed by a patented device provided he employs means substantially different from those shown in the patent.

4. The patent may be for a combination, i.e., possibly the several members were all known and in use prior to the patent, but the patentee contrived a new and useful combination of them. In this case it is not an infringement if you can contrive a combination which dispenses with one of the elements in the former combination and substitutes therefor a new part that is substantially different in construction and operation, but serves the same purpose. So also you are not liable if you manage to dispense altogether with one member of the combination, e.g. if the patent is for a combination

abcd, it is not infringement to use a combination abcd or a combination abfd.

5. A patent for a water condenser is not infringed by an air condenser, the purpose is entirely different. *Downes v. Falcon Works*, R.P.C.

6. A patent for pavement lights, consisted in eights, so constructed as to throw the light in an inclined direction by using glass moulded so as to consist of a series of angles. The defendants used lights moulded to a curve. Held they were liable. *Haywood v. Pavement Light Co.*, R.P.C.

DEFECTIVE SYSTEM—LIABILITY OF CONTRACTOR.

Dagg v. McLaughlin.—McLaughlin was a contractor, and as such had undertaken the excavation work for a subway on Bank Street in the City of Ottawa. The plaintiff Dagg was employed to drive the horses in hauling down laden cars from the excavation to the dump and in bringing back empty cars to the work. He had been engaged for six days on such work when the loaded cars he was taking to the dump collided with some empty cars which were coming in the opposite direction at great speed to take the switch where they would get out of the way of those the plaintiff was bringing down by taking another track. The plaintiff sustained serious injuries which resulted in the loss of a leg.

It appeared on trial that this was the system according to which the defendant's foreman was carrying out the work and that the plaintiff had complained beforehand.

In giving his decision the presiding judge said in part: "There was no provision made for applying the brakes on the last of the cars driven by the plaintiff, and for all practical purposes, the cars might as well have been without a brake. And the defendant's foreman should not have permitted flying shunts to be made, as there was danger, from the speed at which the empties were running, of meeting the loaded cars where the track conveyed, which he well knew, from the complaint made by the plaintiff, was a dangerous point on the railway. Because of the defendant's negligent system of managing the works, he is responsible to the plaintiff for the injury sustained, and I assess the damages at \$3,000."

MacMahon, J., 23rd April, 1908.

The case illustrates the principle long established that the contractor's liability extends not only to dangerous or defective machines and works, but also to the system and manner in which the work is carried out. McLaughlin knew, or ought to have known, that the methods followed were not safe and as injury resulted he is liable. The fact that he left the management to his foreman is no defence.

DANGEROUS MACHINE—DUTY TO WARN.

Lawson v. Packard Electric Company, Limited.—The plaintiff, a boy in his fifteenth year, was engaged by the foreman of the defendant's factory to help anyone who needed assistance on a certain floor. On this floor were different machines and amongst them a varnishing machine, a drill and a stamping machine used in punching out tin plates. The power to drive the latter came by a belt which passed over the shaft and the machine was set in motion by the operator pressing his foot upon the treadle, thereupon the stamp descended and punched out the metal plate. The operator would then take his foot from the treadle; the machine would stop and he would remove the plate, usually making use of a stick for this purpose. The boy was employed assisting the man who was running the stamp machine, he had not been warned that the machine was dangerous nor forbidden to run it and when the man was called away for some minutes the boy tried to keep the machine in operation. He took hold of the press in trying to get a plate out and apparently through his in-

advertently touching the foot press the stamp came down upon him and he lost three fingers. The defendants admitted that the machine was dangerous but said the boy should not have gone beyond his assigned labor of helping the man in charge. The court pointed out that it is the duty of the employer to use reasonable care to shield his employees, and this duty involves making known to them the special risks they incur in operating dangerous machines. Further, if it was not intended that the boy should attempt to operate any of them himself he should have been expressly forbidden. Held that as the foreman was negligent in not pointing out to the boy which of the machines were dangerous and cautioning and instructing him as to them, the defendants are liable. (16, O.L.R. 1.)

RAILWAYS—LEVEL CROSSINGS.

Lamond v. Grand Trunk Railway Company.—Lamond was watchman for the defendant company at a level crossing in the City of Toronto, Ontario, and on the night of October 14th, 1907, he was killed by two cars being "kicked off" in the usual way from a train which was backing in an easterly direction for that purpose, and this action is brought by his widow. A brakeman with a lantern was on top of the more westerly of the two cars, but was not keeping a lookout and gave no warning. There was no light at the crossing, nor was anyone stationed on the cars shunted to give notice of their approach and warn people to get out of the way.

Section 276 of the Railway Act says that wherever in any city in Canada cars or tenders shall pass a level crossing without an engine in front there the company shall station a guard on the foremost of such to warn passers by of their approach.

Held, that the company is liable for negligence in not complying with the above section.

Held further, that though the deceased was an employee, and it was his own duty to warn others, nevertheless he had a right to rely on the company observing the statutes and doing nothing to cause him unnecessary danger or exposure. (16 O.L.R. 365.)

ENGINEERING SOCIETIES.

CANADIAN RAILWAY CLUB.—President, L. R. Johnson; Secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

CANADIAN STREET RAILWAY ASSOCIATION.—President, E. A. Evans, Quebec; Secretary, Acton Burrows, 157 Bay Street, Toronto.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, J. F. Demers, M.D., Levis, Que.; Secretary, F. Page Wilson, Toronto.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—413 Dorchester Street West, Montreal. President, J. Galbraith; Secretary, Prof. C. H. McLeod. Meetings will be held at Society Rooms each Thursday until May 1st, 1908.

QUEBEC BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, E. A. Hoare; Secretary, P. E. Parent, P.O. Box 115, Quebec. Meetings held twice a month at Room 40, City Hall.

TORONTO BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—96 King Street West, Toronto. Chairman, C. H. Mitchell; Secretary, T. C. Irving, Jr., Traders Bank Building.

MANITOBA BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, H. N. Ruttan; Secretary, E. Brydone Jack. Meets first and third Friday of each month, October to April, in University of Manitoba.

ENGINEERS' CLUB OF TORONTO.—96 King Street West. President, J. G. Sing; Secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter months.

CANADIAN ELECTRICAL ASSOCIATION.—President, N. W. Ryerson, Niagara Falls; Secretary, T. S. Young, Canadian Electrical News, Toronto.

CANADIAN MINING INSTITUTE.—413 Dorchester Street West, Montreal. President, W. G. Miller, Toronto; Secretary, H. Mortimer-Lamb, Montreal.

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, J. H. Winfield; Secretary, S. Fenn, Bedford Row, Halifax, N.S.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (TORONTO BRANCH).—W. G. Chace, Secretary, Confederation Life Building, Toronto.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—29 West 39th Street, New York. President, H. L. Holman; Secretary, Calvin W. Rice.

SOCIETY NOTES.

Stationary Engineers.

The Canadian Society of Stationary Engineers held their nineteenth annual convention at Windsor, Ont., August 12th and 13th. About fifty delegates were present.

The next session will be held at London, Ont., in July, 1909.

The new officers elected were as follows: President, C. Kelly, Chatham; Vice-President, William McGhie, Toronto; Secretary, William Cockett, Hamilton; Treasurer, A. M. Wickens, Toronto; Conductor, J. J. Heeg, Guelph; Door-keeper, W. Norris, London.

Stationary Engineers, Quebec.

A convention of the Stationary Engineers of Quebec was held in Montreal, August 12th, 1908. The purpose of the gathering was to discuss the possibilities of amalgamating the various societies of engineers now incorporated in Quebec.

The opinion was fully expressed that it was too easy to become an engineer in Quebec, that the methods of granting certificates was too crude and allowed many incompetent men to take charge of engines.

It was decided that incorporation was necessary, and at the close a motion in favor of applying to the Legislature at its coming session for an Act of Incorporation was unanimously carried, and it was resolved to appoint a committee to carry out the project and proceed with the necessary arrangements for the Act of Incorporation, to be presented at the forthcoming session of the Quebec Legislature.

Institute of Mechanical Engineers, Great Britain.

The Institute of Mechanical Engineers of Great Britain held their summer session during the last week of July in the University College building, Bristol.

A most interesting paper, entitled "A Method of Detecting the Bending of Columns," was read by Mr. C. A. M. Smith. In the course of the paper Mr. Smith said that in the course of certain investigations upon materials being conducted at the East London College it became necessary to determine accurately the load at which a strut of any desired ratio of length to diameter commenced to buckle. The importance of determining this critical load was considerable, as in the case of a column the whole of Euler's theory was based upon the assumption that under some critical load the strut was in equilibrium.

The general equation to the Euler formula was:

$$P = \frac{\pi^2 EI}{L^2}$$

where P=the critical load as above, E=Young's modulus of elasticity, I=moment of inertia of cross section of column, L=length of column.

There were two main points in connection with the formula which he wished to emphasize—that the value of P was dependent upon Young's modulus of elasticity, while Euler's assumed that the strut was long in proportion to its diameter and the load perfectly axial. In order to check the theory by experimental results it was necessary to be able to find for each specimen a value for E, to ensure that the load was as nearly as possible truly axial, to note the exact load at which bending of the strut commenced, a value of E, and the exact load at which bending commenced for struts of vary-

ing ratios of length to diameter. In order to do this it was found necessary to construct a new type of instrument with which these experimental results could be ascertained. The instrument known as a "sphingometer" could be quite easily used for purposes to which an ordinary extensometer was put. Arrangements were made in the experiments to secure axial loading. In the early experiments he was surprised at the wide range of value for E obtained for steel, and old records recorded the same results, notably those given by Professor Woodward. It would appear that the value of E (for tension) for good wrought iron might be taken to lie between 25,000,000 pounds and 30,000,000 pounds per square inch. The attention of engineers was drawn to the problem of the design of struts by the Quebec bridge disaster. One of the reasons suggested for the collapse was that Euler's formula only took into consideration E, and did not involve the strength of the material. It was probably the yield point of the material rather than the ultimate strength which should be taken into account, and as a matter of fact the ultimate strength of material in compression was very hard to define. With regard to the time effect on strains, the effect of continued flexure upon steel columns had not been closely observed, but it seemed certain that the molecules under the greatest stress were inclined to flow over each other to some extent, and probably the fatigue of metals was intimately associated with this phenomenon. Guest had advanced as the result of experimental work on ductile materials the somewhat startling theory of elastic strength that the condition of yielding was the existence of a shearing stress of specific amount, and belief in the truth of that statement had gradually gained ground. There was considerable diversity of opinion as to what really was the yield point, and as this was becoming an important factor in specifications too much importance could not be attached to the necessity for having some well-defined, generally-accepted yield point. It could, he thought, be best defined as the load at which the specimen continued to stretch without further increasing the load, and that continuous strain could be readily observed in the sphingometer.

American Chemical Society.

An important step in the development of engineering chemistry in this country was taken at the recent New Haven meeting of the American Chemical Society by the organization of a Division of Industrial Chemists and Chemical Engineers. Arthur D. Little, of Boston, was elected chairman of the Division and vice-president of the Society, and indicated in his address the broad field awaiting development by the new organization.

The Division will include a large proportion of the membership of the Society and especially those engineering chemists whose work is directly concerned with industrial development and progress. The Division will begin the publication at an early day of The Journal of Industrial and Engineering Chemistry, for which a strong board of editors was elected.

The Western Canada Irrigation Association.

The Western Canada Irrigation Association held their second annual convention at Vernon, B.C., August 11th. About one hundred delegates were present, the large majority coming from British Columbia, Alberta, Saskatchewan and Manitoba.

The convention adopted resolutions in favor of creation of water municipalities; that the Dominion and Provincial Governments be requested to undertake the topographical and hydrographical surveys to obtain information as to the amount of water available for irrigation of irrigable land; that the Government in its contemplated legislation provides protection for owners of water in storage in carrying it to their ditch heads.

The motion in favor of Government ownership of irrigation was lost by a vote of 26 to 20.

Mr. J. S. Dennis, of Calgary, gave an address in which he urged that all water records not being used should be snuffed out. He favored a commission of experts to examine the streams to determine what water they would provide and stop all over recording. He condemned the Provincial Water Clauses Act and said the miners' inch was useless as a water

measure. He believed in irrigation by private enterprise rather than Government ownership.

Hon. F. J. Fulton said he would not favor the Government undertaking irrigation schemes in a hurry, for if one part of the province got it all the other dry districts would want it and even to make a beginning would cost between four and five millions. He thought the Water Clauses Act required considerable amendment, as the records at present were obscure and clouded and should be cleared.

The appointment of a commission of experts on streams might be a good plan and the Government would carefully consider it. It would also consider carefully the proposal of undertaking irrigation but would not make a definite promise. He could not agree with all Mr. Dennis has said, but was grateful for the suggestions.

Price Ellison, M.P.P., urged the Government to take up these enterprises directly, as the security furnished by the land so improved was more than ample, and both residents of the locality, the province at large and the Government itself through the enlargement of taxation receipts would be immensely benefited. He knew that this was the general feeling of the farmers of the Okanagan Valley, and the expenditure of even four or five millions upon undertakings so enormously beneficial would be a mere bagatelle compared with the benefits conferred. He gave great credit to the Government for the work already done, approved of their caution in committing themselves without the fullest consideration to assuming these works and these obligations, and trusted that they would soon see their way clear to meet the strong desire of the people of the Okanagan Valley.

Mr. Robinson, of Summerland, said that property worth \$200,000 had through irrigation been advanced in value to two millions, and said his company was now considering the obtaining of money in the East to reach further sources of supply of water, which they would abandon if the Government took up this business. If, however, they carried the project through the people could depend on it that the company would make every cent out of their enterprise that they could possibly put in their pockets.

Prof. Carpenter, of Colorado, addressed the convention. He began by expressing unqualified admiration for the district and said the values in irrigated countries were entirely in the water and not in the land. The cost of irrigation was paid back a hundredfold, and one can hardly form a fair conception of what can be taken off an acre of irrigated land.

The next meeting will be held at Lethbridge.

The officers elected are: Hon. President, Governor Bul-yea; President, J. S. Dennis; First Vice-President, Hon. F. J. Fulton; Second Vice-President, P. L. Naismith, Lethbridge; Secretary-Treasurer, J. L. Fairfield, Lethbridge.

MILEAGE OF THE I.C.R.

The present total mileage of the Intercolonial Railway is 1,468.65 miles, as shown by surveys recently completed by the engineering department. Since last winter these surveys have been in progress, and every inch of railway including main lines, branches, spurs, and even little wharf branches have been tramped over and accurately measured by employees of the department. Recently these surveys were completed. It was found that from Halifax to Montreal, the main line is 836.34 miles in length, and the second greatest distance is between Truro and Sydney, which line is 215.33 miles long.

The total revenue from woods and forests of Ontario for 1907 was \$1,210,051.32, consisting of: Bonus, \$152,222.24; timber dues, \$998,863.15; ground rent, \$65,084.38; transfer fees, \$2,879.85.

The output of the mines and mineral works of Ontario for 1907 was of greater aggregate value than in any previous year, exceeding the output of 1906 by \$2,618,109. The largest item in the total of \$25,006,492 was the production of silver, of which the mines of the Cobalt camp yielded 10,028,259 ounces, valued at \$6,157,871.

A NEW FORM OF DIRECT CURRENT AMMETER AND VOLTMETER.

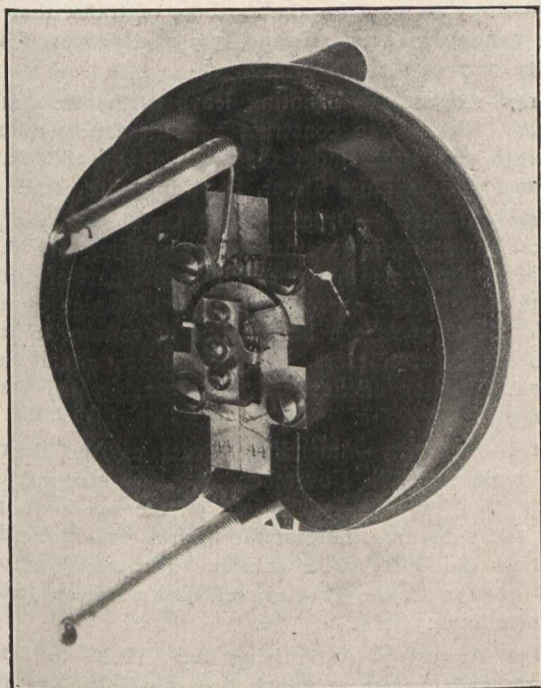
P. MacCahan.

There exists a considerable demand for a line of small size D.C. switchboard ammeters and voltmeters, of the very highest grade and accuracy, yet so constructed as to be low in price.

Heretofore all low price instruments, especially those of small size, have been built on the "moving iron" principle, the cost of the permanent magnet type construction having been considered prohibitive for this class of service.

However, it is universally conceded that for direct current service, the permanent magnet moving coil construction is highly superior to the moving iron type, being more accurate, naturally aperiodic, or "dead beat," more free from external field and temperature effects, taking less energy, and also showing polarity. The energy taken is much lower than in moving iron instruments, allowing operation of ammeters from shunts; moreover, there are none of the residual errors which are present to a certain extent, in all moving iron instruments, without exception.

Recent improvements in factory methods and in design features by the Westinghouse Electric and Manufacturing Company have rendered possible the production of a small



sized switchboard instrument of the permanent magnet type, at a price as low as that of the best moving iron instruments previously available. The result has been the instruments herein described, which possess unique features and advantages not previously obtained with any type of construction. These instruments are made as ammeters and voltmeters, and are mounted in neat black Electro-se cases, 5" in diameter, rear connected, with circular bevelled glass front-plates.

The use of a case made from insulating material instead of metal gives a degree of insulation not usually found in small instruments. Owing to the peculiar self-shielding form of the permanent magnets, an iron case is not necessary for shielding against the effects of external fields.

The meters are supported by means of brass studs projecting from the rear of the case, serving at the same time as terminals.

The voltmeters are made self-contained including resistance, in any capacity as high as 300 volts, and the ammeters are operated from external shunts, the shunts of the capacities up to and including 75 amperes being mounted directly on the meter studs.

The scale divisions are uniform, and the total length is almost the same as that found in the usual 7" diameter meters.

From a technical point of view, the most interesting feature of these instruments is the "single air gap" type of construction, which differs considerably from the original D'Arsonval Bipolar Magnet with two cylindrical air gaps in series.

The principal advantages of the single air gap construction in permanent magnet meters were described in the *Electrical World* of February 15, 1908, and briefly are as follows:

1. The possibility of removing the moving element from the magnetic structure without interfering with the magnets or removing their pole pieces.

2. The coil balancing the weight of the pointer.

3. Single air gap means that larger air gap clearances may be used without making the total magnetic reluctance of the air gap too high.

The removability of the permanent magnets is really of the greatest importance to the user who desires to do his own repair work on the premises.

Figure No. 2 shows an internal view of the meter mechanism with the case removed.

Figure No. 1 shows the process of removing the permanent magnets when repairs become necessary.

The principal applications for this class of instrument will be for small panels, such as for rectifier outfits, battery charging, small isolated plants, small marine plants, or even on regular large switchboard work where a small sized instrument is desirable.

The low price is due to the economic disposition of the material used, the light weight, and the fact that there are no hand operations used in manufacture, aside from the assembly. The parts are all machine made in large quantities, with a highly organized and accurate tool equipment, the assembler merely attaching these parts together without further fitting.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

Copies of these orders may be secured from the *Canadian Engineer* for a small fee.

5115—July 28—Directing the G.T.R. to provide, construct and maintain at its own expense such works and appliances as necessary for the safety of the public at the level highway crossing of the railway of the G.T.R. at Reid Street, Peterborough, Ont.

5116—July 30—Directing the T.H. & B. Railway and the C.P.R. to refund to the Plymouth Cordage Company the difference between 15½ and 22c. per 100 pounds on two car-loads of binder twine, for export, shipped from Welland to Montreal, and to pay interest at the rate of 5 per cent. per annum from the date of the said excess in the charges as paid, until the amount of the overcharge is refunded.

5117—July 30—Authorizing certain agents other than officials of railway companies, acting jointly for two or more companies to act for the several companies by power of attorney, for the filing of certain tariffs of freight or passenger tolls.

5118—July 31—Authorizing the Department of Public Works, Province of Saskatchewan, to construct a highway cross the right of way of the Souris Branch of the C.P.R. on the extension, southerly, of Main Street, Oxbow, Sask.

5119—March 12—Dismissing the application of Frank A. Cutting, Boston, Mass., in connection with alleged discrimination in favor of Quebec and Ontario, against the Province of New Brunswick by the C.P.R. in refusing to carry tan bark from its stations in New Brunswick destined to New England points, at the same rates as it charges for lumber, and allowing the same rates on tan bark from points in Ontario and Quebec as are charged on lumber.

5120—August 1—Authorizing the James Bay Railway Company to place its line of tracks across the line or tracks of the C.P.R. near Wahnapiatae, Ont.

5121—July 31—Authorizing the Norfolk Gas Co., Limited, to lay gas pipe or main and an outer or larger pipe

encasing the same under the tracks of the G.T.R. between Nelson and Chapman Streets, Port Dover, Ont.

5122—July 16—Authorizing the Brantford and Hamilton Electric Railway to open for the carriage of traffic that portion of its line of railway between the village of Ancaster, Ont., and the city of Brantford, Ont.

5123—July 31—Authorizing the C.P.R. to construct, maintain and operate a branch line of railway or spur, commencing from a point on the C.P.R. about 400 feet east of the easterly limit of Duncan Street running in a southerly and westerly direction and reconnecting with the right of way about 150 feet west of the westerly limit of Vickers Street, Fort William, Ont.

5124—August 5—Granting leave to the Manitoba Government Telephones to erect, place and maintain its wires across the track of the C.P.R. at a point 200 yards south of Headingly, on Portage Avenue, Manitoba.

5125—August 5—Authorizing the C.P.R. to open for the carriage of traffic the second track of three portions of its line of railway in the Province of Ontario.

5126—August 5—Approving by-law of the Esquimalt and Nanaimo Railway Co. authorizing the Assistant Freight Traffic Manager to prepare and issue tariff of tolls to be charged as provided by the Railway Act.

5127—August 6—Authorizing the Bell Telephone Co. to erect, place, and maintain its aerial wires across the tracks of the C.P.R. at public crossing 250 yards south of Parry Sound Station, Ont.

5128—August 5—Authorizing the Bell Telephone Co. to erect, place and maintain its aerial wires across the tracks of the G.T.R. at public crossing $1\frac{1}{4}$ miles north of Hyde Park Station, Ont.

5129—August 5—Granting leave to the Farmers' Telephone Co. to erect, place and maintain its wires across the tracks of the C.P.R. at Fifth Avenue, Hartland, N.B.

5130—August 5—Granting leave to the Chatham Gas Co. to lay gas pipes or mains and outer or larger pipes encasing same under the tracks of the G.T.R. where the same crosses George Street and Lacroix Street, Chatham, Ont.

5131—August 5—Amending Order of the Board No. 2016, dated the 1st of May, 1907, authorizing the C.P.R. to close one public crossing and open a new one in lieu thereof at Lot Cadastral No. 340, on the west side of the Petite Riviere du Loup, near Louisville, county of Maskinonge, in the parish of St. Antoine de la Riviere du Loup.

5132—March 27—Authorizing the G.T.R. to construct, maintain, and operate two branch lines of railway, or spurs, from a point on its line of railway on Bethune Street, in the city of Peterboro', Ont.: (1) Crossing Bethune Street to Lot No. 9, north of Dalhousie Street North; (2) crossing Bethune Street to Lot No. 9, north of Wolfe Street.

5133—July 31—Authorizing the Brockville Water Commissioners to lay at their own expense water main under the tracks of the G.T.R. where the same crosses St. Bartholomew Street, Brockville, Ont.

5134—August 5—Granting leave to the G.T.P.R. to operate its trains on its line or track where the same crosses the Regina branch of the C.N.R.

5135—August 5—Authorizing the C.P.R. to construct, maintain and operate two branch lines of railway, or spurs, at Cardigan, N.B.

5136—August 5—Authorizing the C.P.R. to operate its trains over the track of the Qu'Appelle, Long Lake and Saskatchewan Railway and Steamboat Co. without being brought to a stop.

5137—August 6—Authorizing the C.P.R. Co. to construct, maintain and operate branch line of railway, or spur, in Grand Forks, B.C., to and into the premises of the Kettle Valley Lumber Co.

5138—August 6—Approving location of the Toronto and Niagara Power Co. transmission line on the Beach Road, township of Nelson, County of Halton, Province of Ontario.

5139—August 6—Permitting the corporation of the city of Toronto to lay certain water pipes under Royce Avenue, Toronto, under the track of the Northern Division of the G.T.R. Co.

5140—August 5—Order amending items 15 and 23, pages 23 and 52 of the Canadian Classification re Classification of Printers' Cabinets, Frames, etc.

5141—August 7—Authorizing the G.T.P.R. to open for the carriage of traffic that portion of its line of railway from Portage la Prairie, Man., mileage 54, to Battle River, in the Province of Saskatchewan, mileage 675.

5142—August 7—Granting leave to the G.T.P.R. to operate that portion of its line of railway from Earl, Sask., to Scott, Sask, for the purpose of moving a party of settlers between the said points.

5143—August 7—Approving deviation of the C.N.Q.R. Co.'s location between station 1417—49E to 1473—39.7, between mileage 36 and 38 west from Quebec bridge, parish of Cap Sante, county of Portneuf, Province of Quebec.

5144—August 7—Authorizing the C.P.R. Co. to construct, maintain, and operate a branch line of railway, or spur, to and into the premises of the Pacific Cartage Co., Calgary, Alta.

5145—August 5—Granting leave to the C.P.R. to construct highway in the line and of the width of Fourth Street, in the town of Tillsonburg, across the railway of the G.T.R. and across railway and land jointly occupied by the M.C.R. and the C.P.R.

5146—August 6—Authorizing the Walkerton and Lucknow Railway to open for the carriage of traffic that portion of its railway between mileage 27.5 at Hanover, Ont., and mileage 37.7 at Walkerton, Ont.

5147—August 11—Granting leave to the St. Catharines Gas Co., Limited, to construct and thereafter maintain a three-inch gas main under the track of the G.T.R. where the same crosses Page Street, St. Catharines, Ont.

5148—August 7—Ordering that Order No. 5027, dated the 30th June, 1908, be amended by striking out the word "northeast" in the 18th line of the recital part of Order and the 7th line of the operative part, said Order authorizing the C.P.R. to operate a branch line of railway to and into the premises of Messrs. Riley & Julian, situate on the northeast quarter of Section 21, Township 12, Range 9, Province of Manitoba.

5149—August 7—Amending Order of the Board No. 4018, dated the 16th November, 1907, by striking out the figures "216" in the fourth line of the operative part of Order and substitute therefor the figures "261." Said Order authorizes the G.T.P.R. to construct its railway across certain highways in the Province of Saskatchewan from mile 0.00 to mile 34.541.

5150—August 7—Authorizing the C.P.R. to construct, maintain and operate a branch line of railway, or spur, in Range 1, Township of Campbell, County of Labelle, Province of Quebec.

5151—August 7—Approving by-law of the B. and H. Electric Railway Co, authorizing Geo. E. Waller, G.F. and P.A., to prepare and issue tolls to be charged for all traffic carried by the company.

**MAIN SEWERAGE
AND
SEWAGE DISPOSAL
BY
T. AIRD MURRAY, C.E.
Consulting Engineer, Toronto**

Brings the whole question of town drainage and the purification of Sewage in a terse and concrete manner before those authorities, engineers and others to whom the subject is a new one.

Price 25 Cents

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TORONTO**

CONSTRUCTION NEWS SECTION

Readers will confer a great favor by sending in news items from time to time. We are particularly eager to get notes regarding engineering work in hand and projected, contracts awarded, changes in staffs, etc.

Printed forms for the purpose will be furnished upon application.

TENDERS.

Quebec.

MONTREAL.—Tenders for concrete walls and widening of the Lachine Canal will be received at this office until 16 o'clock on Monday, the 31st August, 1908. Plans and specifications can be seen at the office of the superintending engineer of the Quebec Canals, No. 2 Place d'Armes, Montreal. L. K. Jones, secretary. Department of Railways and Canals.

Ontario.

PETROLEA.—Tenders for pavement will be received by the undersigned up to 6 p.m., Monday, August 31st, 1908, for about 6,000 square yards of vitrified brick pavement, with cement curb, on Main Street, Petrolea. J. McHattie, town clerk; C. A. Jones, town engineer, Petrolea, Ont.

PORT ARTHUR.—Sealed tenders will be received by the city clerk until Saturday, August 29th, 1908, for the construction of a concrete dam at Onion Lake, on Current River. Following are approximate quantities of the various classes of material which will enter into the work: Earth excavation, 100 cubic yards; rock excavation, 450 cubic yards; concrete, 1:3:5, 2,000 cubic yards; concrete, 1:2:4, 100 cubic yards; reinforcing steel, 3,000 pounds; cast-iron in place, 1,500 pounds. Plans and specifications, instructions to bidders and form of contract can be seen at the city engineer's office, Port Arthur, and at the office of Messrs Smith, Kerry & Chase, Toronto. J. McTeigue, city clerk, Port Arthur.

TORONTO.—Tenders for magazine, Toronto, will be received at this office until 4 p.m. on Monday, August 24, 1908, for the construction of a magazine at Toronto. Plans and specifications can be seen and forms of tender obtained on application at this Department, and at the office of Mr. Thomas Hastings, Clerk of Works, Toronto. R. C. Desrochers, Assistant Secretary. Department of Public Works. (Advertised in the "Canadian Engineer.")

WELLAND.—Tenders for construction of dock near Welland will be received at this office until 16 o'clock on Monday, the 24th August, 1908. Plans and specifications can be seen at the office of the superintending engineer, Welland Canal, St. Catharines, Ont., at which place forms of tender may be obtained. By order. L. K. Jones, secretary. Department of Railways and Canals. (Advertised in the "Canadian Engineer.")

Manitoba.

VIRDEN.—Tenders for telephone lines will be received up to noon on Monday, the 31st day of August, 1908, for the building of such telephone lines and the installation of such telephones as will be required in the telephone system in the rural municipality of Pipestone. Plans and specifications may be seen at the office of the chief engineer of telephones and telegrams, Winnipeg. A. P. Power, secretary-treasurer. Virden, Man.

WINNIPEG.—The city of Winnipeg will receive tenders until August 31st, for the supply of 50,000 carbons for arc lamps. Magnus Peterson, Secretary Board of Control.

WINNIPEG.—Tenders will be received until September 15th, 1908, for electric lighting plant and carbons. For fuller information apply F. A. Cambridge, city electrician, or M. Peterson, secretary Board of Control, Winnipeg. (Advertised in The Canadian Engineer.)

WINNIPEG.—Tenders for lock gates, St. Andrew's Rapids, Man., will be received at this office until 4 p.m.

on Monday, September 14, 1908, for the construction of lock gates at St. Andrew's Rapids, Red River, Province of Manitoba. Plans and specifications can be seen at this Department; at the offices of Mr. A. R. Dufresne, resident engineer of the Department at Winnipeg; Mr. J. G. Sing, resident engineer, Confederation Life Building, Toronto. R. C. Desrochers, Assistant Secretary. Department of Public Works.

Saskatchewan.

REGINA.—Tenders for Lumsden-Saskatoon Telephone Line, and tenders for Regina, Arcola and Antler Telephone Line will be received at this office until noon on Tuesday, August 25, 1908. S. P. Porter, Deputy Commissioner. Department of Railways and Telephones.

REGINA.—Tenders for construction of grade across Reed Lake, south of Morse, east of Section 4, Township 17, and east of Section 33, Township 16, all Range 8, west of the third meridian, will be received up to 4.30 p.m., Monday, August 31, 1908, for the construction of grade at the above named location. About 20,000 cubic yards of earth fill will be required to be made. F. J. Robinson, Deputy Commissioner. Department of Public Works.

CONTRACTS AWARDED.

New Brunswick.

MONCTON.—Tenders for water mains on High and Cameron Streets were opened as follows: Louis Devenen, \$548.70; Dan Gotro, \$632.16; Dosity LeBlanc, \$481.76; Amos S. Govang, \$568.10. The length of pipe is 890 feet on High Street and 450 feet on Cameron. These tenders are for the excavations, filling, and laying pipe. Dosity T. LeBlanc's tender was accepted. Tenders for pipe were opened as follows: Canada Foundry Company, per ton, \$34.80; Summer Company, \$34.40. Summer Company's tender was accepted.

Quebec.

GRANBY.—The Birmingham Iron Works were awarded the contract for machinery to equip the first unit of the new rubber mills which Mr. S. H. C. Miner is building. The order amounts to about \$50,000 and the machinery is to be delivered as fast as the buildings are ready to receive it. Mr. Miner is now treating with experts for the installation of the electrical equipment for the new works.

Ontario.

TORONTO.—The contract for building the Hydro-Electric Commission's transmission line was awarded to Mr. F. H. McGuigan. The contract calls for some 293 miles, costing \$1,270,000. The Commission having the option to withdraw 58 miles of this work or add another 293 miles, providing this is arranged before Feb. 1909. The cost per mile is figured in four ways: (1) Double circuit towers, double line, \$5,240; (2) single circuit towers, double line, \$4,830; (3) double circuit towers, single line, \$4,080; (4) single circuit towers, single line, \$3,570. The aluminum—not only the cable, but the pig—will be manufactured by the Northern Aluminum Company of America at Shawinigan Falls, Que. The steel towers will be manufactured by the Canada Bridge Company, of Walkerville, and by the Ontario Iron and Steel Company, of Welland. The line is to be completed within fifteen months from date.

WALKERVILLE.—The contract for the construction of 1,200 feet of vitrified pipe sewer was awarded to John Conn, of Windsor, at \$900. Thos. Clink, of Windsor, tendered at \$1,100.

Alberta.

CALGARY.—The contract for street paving was awarded to the Kettle River Quarry Company. The tenders were as follows: The Bitulithic Company tendered at \$127,485, and submitted terms for extra work; \$2.98 per square yard was the price for street paving; single track lineal foot, \$6; double, \$12; excavation, per square yard, 60 cents; combined curb and gutter, per lineal foot, \$1. For creosoted block pavement, the Kettle River Quarry Co. submitted a price of \$135,000. Extra work: street or side paving, per square yard, \$3.48; double track, including paving, \$12.50 per lineal foot; single track, \$6.25; excavation, per cubic yard, 60 cents; combined curb and gutter, per lineal foot, 75 cents. J. C. McNeill's new price for California asphalt was \$115,000. Extra concrete, per cubic yard, \$7; asphalt concrete, per square yard, \$3; excavation, per cubic yard, 75c.; railway cedar ties, 70c. For Worswick asphalt the price of \$110,000 was submitted. Extra work: concrete, per cubic yard, \$7; asphalt concrete, per yard, \$3; excavation, 75c.; railway cedar ties, 70c. John Gunn & Sons tendered for carbolineum paving blocks, guaranteed 10 years, at \$146,500.

EDMONTON.—The contracts for grading from Ninth Street to the river have been let to J. L. Eagle at 22 cents per cubic yard; for erecting poles to Oscar Barnstead, for \$4,450; for electric generators to the Westinghouse Company; for motor generators, to the Canadian General Electric Company; for rails, copper wire, bolts, plates, etc., to Gorman, Clancey & Grindley, of Edmonton.

British Columbia.

VICTORIA.—Tenders were opened by the City Council for wire insulators and locus pins. The following were the prices: Hutchison Bros. & Co., Limited, wire, 19¼ cents per pound; insulators, \$950 per hundred, and pins, \$3.50 per hundred. Hinton Electric Company, wire, \$1,145; insulators, \$21, and pins, \$7.50. Hawkins & Hayward, wire, 19¼ cents per pound; insulators, \$9.25 per hundred, and pins, \$3.50 per hundred. Referred to the city electrician and the purchasing agent for report to the electric light committee. The following tenders for steel work for the concrete high level tank were opened: Marine Iron Works, tank, ladder, staircase, bolts, etc., \$3,800; Victoria Machinery Depot, \$3,400; Robertson Iron Works, \$2,650; B. C. Marine Railway Co., \$4,550. John Inglis & Co., through their agent, F. B. Ward, of Vancouver, also put in a tender, which, however, was not totalled up. These were referred to the water commissioner, the purchasing agent and the city engineer for report.

Foreign.

CATTLESLOE CENTRAL, WEST AUSTRALIA.—The D. P. Battery Co., Limited, have received an order for the renewal with their W. L. 9 type of the above battery for the station here.

CHIPPING NORTON, ENG.—The D. P. Battery Company, Limited, have secured the contract for the supply of a battery of their L. 15 type cells for the above central station.

LACONIA, N.H.—The Laconia Car Company has closed a contract with the Aberthaw Construction Company of Boston for the erection of cabinet shop and storage building. It is proposed to build the cabinet shop with concrete walls and mill construction floors. The storage building is to be fire-proof. The work involves the removal of two of the existing wooden buildings to make room for the new construction. The work is to be pushed rapidly in order to give the increased output necessary for the car company's business.

SEATTLE.—Bids for the construction of a new fireboat for the city of Seattle, Wash., were opened by the board of public works on July 18th. There were but two bidders for the boat complete, the Moran Co., of Seattle, whose bid was \$165,000, and the Willamette Iron & Steel Works, of Portland, Ore., whose bid was \$122,475. No award was made.

RAILWAYS—STEAM AND ELECTRIC.**Ontario.**

BRANTFORD.—John S. Clark, first president and promoter of the Grand Valley Railway, has entered action

on behalf of himself and other bondholders and shareholders against the Grand Valley Railway Co. and a number of individuals for an injunction restraining the sale of the railway to M. A. Verner, a Pittsburg financier.

BRUCE MINES.—Business men and others with faith in the future of Bruce Mines and of the country along the North Channel are continuing the agitation begun some time ago for the construction of a Government railroad from "The Bruce" northland to some point on the Transcontinental.

NORTH BAY.—The rails are laid now on the Temiskaming and Northern Railway to within about twenty-five miles of the junction with the National Transcontinental Railway. It is expected, if the weather holds good, to have the steel laid so trains could run to the junction by the 15th of October.

OTTAWA.—Hon. S. N. Parent, chairman of the Transcontinental Railway Commission, and Hon. Jacques Bureau, Solicitor-General, left for Lataque, Quebec, August 13th, in connection with the selection of the site and the plans for the Grand Trunk Pacific yards, station, etc., at that divisional point on the new line. Lataque will be one of the most important points on the Quebec division of the road.

ST. THOMAS.—The M.C.R. has a large number of men on the work train engaged in improving the roadbed. The material used is crushed stone, which is much more satisfactory than gravel, which has been used heretofore. All the known supply of any account has been exhausted, and crushed stone is the only substitute to bear the strain of heavy travel.

ST. MARY'S.—John E. Webb, railroad contractor, states that his business will pay all debts in full. He has issued a writ against the St. Mary's and Western Ontario Railway Co. to recover unstated damages for the cancellation of his contract. This action, he says, compelled him to assign for the benefit of his creditors to his brother, George F. Webb, of Hamilton. Mr. Webb says that there is \$35,000 due him by the railway, and that this will cover his entire indebtedness.

STRATFORD.—One hundred men have been working out of Bright on the Buffalo-Goderich line of the G.T.R., putting in new track rails and taking away the old. The work will continue through Stratford as far as Holmesville, a few miles south-east of Goderich. The rails that are being replaced are of Barrow steel, and to a great extent are the 56-pound rail. The new steel is an 80-pound rail, and is more suitable for heavy traffic.

WELLAND.—The work of connecting the Niagara, St. Catharines and Toronto line with the T., H. and B. Railway will be gone on with as soon as the Government approves of the plan for the bridge, which it now has in its possession. The cost will be about \$25,000.

Alberta.

EDMONTON.—A force of about 3,550 men is at present employed by Foley, Welch & Stewart on the G.T.P. grade west of Edmonton, a large proportion of these being between the city and the Pembina River.

LIGHT, HEAT, AND POWER.**Ontario.**

BRANTFORD.—Mr. J. H. Fryer, Galt, president of the Municipalities Power Union, has notified Brantford that it must reach a decision regarding Niagara power within ten days if it is to enter the Union. The local committee thinks that a definite answer will be forthcoming by that time. The Western Counties Company, now operating here, has made the city a very favorable offer for the renewal of the street lighting franchise, which expires next month.

GALT.—Mayor Patterson, supported by three aldermen, still refuses to sign the Hydro-Electric power contract, as embodied in the by-law which has received its third

reading. He objects to the transaction on the grounds that the agreement does not accord with the proposition voted on by the people, and that the price per horse-power to be charged is only an estimate. A writ of mandamus will be issued against the three aldermen.

MERRITTON.—The council is still wrestling with the electric light question. A special meeting was held recently, when the electrical expert, Mr. K. L. Aitkin, was present, and went over a number of important points with the reeve and councillors. As yet the council has received no quotation for power from the Hydro-Electric Commission.

TORONTO.—The Hydro-Electric Power Commission will call for tenders for transforming stations shortly. The specifications are nearly ready. The F. H. McGuigan Construction Co. will not tender for this work, as it is largely a matter of electrical equipment. The stations will be twelve in number, and will be built at the following points: Niagara Falls, Dundas (combined transformer and inter-switching), Toronto, Brantford, Woodstock, London, Guelph, Preston (supplying Galt and Hespeler), Berlin (supplying Waterloo and New Hamburg), Stratford, St. Mary's, and St. Thomas. Stratford and St. Mary's will, of course, be cut out if the Stratford by-law fails to carry.

TORONTO.—The Interurban Electric Co., Limited, with a capital of \$400,000, has been incorporated. The incorporators are: E. S. Edminson, gentleman, Oshawa; Fred Grundy, broker; A. N. Morine and C. H. Porter, barristers; M. McDonald, student-at-law; G. D. Lewis, gentleman; Margaret D. Gray and Ethel Greenway, all of Toronto; and G. T. Turnbull, trader, of Seaforth. The objects of the company are set forth in part in the "Ontario Gazette" as follows: To carry on in the municipalities of the city of West Toronto, Township of York, city of Toronto, Township of Etobicoke, and the Township of Toronto, the following operations: To acquire, construct, maintain, complete, and operate works for the production of steam and water power, and for the production, sale, and distribution of electricity. To acquire the plant, works, property, rights and powers, undertaking, franchises, and all other assets of the Stark T., L. and P. System, Limited, at such price, consideration, terms, and conditions as may be agreed upon. To acquire and hold the stock of any company having objects similar to those of the company for which incorporation is hereby sought, and to again sell and dispose of same. The head office is to be at Toronto.

WHITBY.—As a result of the unanimous action by the town council, Mayor Jackson is corresponding with towns east from Whitby, proposing a conference at once in regard to their inclusion in the Hydro-Electric Commission's Niagara power service.

Alberta.

CALGARY.—A new schedule of rates for electric lighting has been adopted: House Lighting—K.W., 12; discount, 20 per cent., nett, \$9.40. Electric Signs and Hotels—K.W., 11; discount, 20 per cent., nett, \$8.80, up to 500 K.W.; K.W., 11; discount, 25 per cent.; \$8.25, or over 500 K.W. Churches, Public Hospitals and Charitable Institutions—K.W., 10; discount, 25 per cent.; nett, \$7.50. Commercial Rating—New rating: 13 cents per K.W. hour. Up to 150 K.W., 15 per cent.; nett rate, \$11.25; 150 to 300 K.W., 20 per cent.; nett rate, \$10.40; 300 to 600 K.W., 30 per cent.; nett rate, \$9.10; 600 or over, 40 per cent.; nett rate, \$7.80. Power Rating—Up to 250 K.W., 7 cents per K.W. hour; discount, 15 per cent.; nett, \$5.95; 250 to 500, 7 cents per K.W. hour; discount, 20 per cent.; nett, \$5.60; 500 to 1,000, 7 cents per K.W. hour; discount, 25 per cent.; nett, \$5.25; 1,000 to 2,000, 7 cents per K.W. hour; discount, 30 per cent.; nett, \$4.90. Flat Rates—Flat rates for one light, \$1; flat rates for two to four, 75 cents, payable in advance; hall lighting in blocks, apartment houses, etc., first ten lights, \$1 per light; each additional light, 75 cents; 25 per cent. discount for prompt payment. Minimum Rates—Minimum rate for lighting shall be \$1 per month, whether current is used or not. Minimum for power will be \$1 per horse-power per month.

SEWERAGE AND WATERWORKS.

Ontario.

HAMILTON.—The Smart-Turner Machine Company, Limited, Hamilton, are supplying the Corporation of Hamilton, with a duplex pump for the sewage disposal works.

TORONTO.—The Board of Control instructed the Assessment Commissioner to purchase the Leslie nursery property, in Riverdale, for the purposes of the sewage disposal plant. The property is about 42 acres, and the city will pay \$135,000 for it.

TELEPHONY.

Ontario.

NORTH AUGUSTA.—Of the one hundred and sixty shareholders of the Leeds and Grenville Independent Telephone Co. only three or four were absent from the organization meeting held here August 14th. The following were elected directors: President, Reeve, J. H. Dawson; vice-president, A. P. Bissell; managing director, Chas. J. Johns; treasurer, Geo. W. Chapman. The remaining directors are Messrs. Simpson, Connell, Arthur Bissell Landon and R. E. Griggs, manager of the Metropolitan Bank at North Augusta, was employed as permanent secretary. The provisional directors, Messrs. T. W. Ralph, R. E. Griggs and George A. Love, reported that the line was nearly completed throughout the Township of Augusta, and there was a large demand that it be extended into the Township of Edwardsburg. The rate fixed for all users was \$10 per year. When the work is completed in Augusta the application of residents from Edwardsburg to have the line installed in that township will be considered. In two weeks it is expected that connections will be made with the Bell Company here.

Manitoba.

SELKIRK.—Telephone communication between this town and Gimli was established on August 8th.

Alberta.

EDMONTON.—S. Edwards, who for the past two years has been superintending the Government telephone lines in Alberta, is in Calgary, having just returned from the coast, where he has been for his health, which is much improved. Mr. Edwards has resigned his position with the Government and will return to Winnipeg and assume the managing directorship of a company there, in which he is a large shareholder.

RECENT FIRES.

Quebec.

MONTREAL.—Damage estimated at \$40,000 was done to Stanley Hall and the garage of the Automobile Import Co., Limited, 90 to 96 Stanley Street, Montreal, Que.

Ontario.

BRANTFORD.—Lightning struck the chimney of the city waterworks plant, cracking the outer shell from top to bottom.

ST. CATHARINES.—Lightning struck the transformer house of the Fall Power Co. and did damage to the extent of about two thousand dollars.

MISCELLANEOUS.

Ontario.

BRANTFORD.—This city will undertake the construction of \$150,000 worth of street pavements in addition to the work already in progress.

GUELPH.—Two surveyors are at present working in this district in the interest of the Militia Department. They are Messrs. E. H. MacColl and W. L. Cassels, of Ottawa, both students at McGill. For the past three months they have been engaged in Western Ontario, taking land elevations. The object of the survey is to give a complete map

of the civilized parts and some of the uncivilized parts of Canada, showing the elevation of every sections.

ST. CATHARINES.—Drillers Weaver and Furry, of Humberstone, have just completed a good gas well on John Mains' farm in Wainfleet for the United Gas Companies of St. Catharines. It is the best struck in that vicinity this summer.

OTTAWA.—In an interview Mr. N. J. Ker, city engineer expressed himself in reference to roadway pavements. Mr. Ker said: "I have not initiated any tar macadam pavements for about two years, and what has been laid meanwhile is on account of petition. It should now be stopped on principle. At the very outside the life of a tar macadam pavement is five years. Asphalt pavements will last ten, fifteen or twenty years, and the difference in cost is only about 25 per cent. As we now have an asphalt plant of our own, I shall recommend stopping all further tar macadam construction. With one exception it has only been used on residential streets. On some it is in fair condition, and on others a lot of patching is required."

Manitoba.

WINNIPEG.—The Algoma Bridge Co., with branch office in Winnipeg, Man., are just completing three steel highway bridges at Shellmouth, Man. Two of them are 80-foot spans and one 160 feet. The company are also at work on an 87-foot span bridge at Virden, Man., to be completed by September 15, while another 75-foot span highway bridge is being constructed by them at Manitou, Man., to be in readiness by October 1st.

British Columbia.

NEW WESTMINSTER.—The Government is just finishing the building of a new road up the steep hill coming from Port Moody to this city, and the grade is made much easier, the heaviest portion being five per cent.

PERSONAL.

MR. C. H. RUST, City Engineer, Toronto, is making a special study of sewerage systems of American cities.

MR. T. P. WHITE has been appointed car service agent of the Grand Trunk Pacific with headquarters at Winnipeg.

MR. F. B. DeW. LAVENDER, C.E., of Toronto, has been appointed superintendent of the Bowmanville electric light plant.

MR. C. H. NORTON, of the C.P.R. engineering staff, Muskoka, has been transferred to a location party on C.P.R. work at Peterboro'.

MR. A. W. ELLSON FAWKES, of Montreal, Que., is stationed at Campbellford, Ont., where he has control of the erection of the new power house.

MR. G. REID MUNRO, B.A. Sc., Peterboro', Ont., has joined the staff of surveyors engaged by the Government on the survey of the Hudson Bay Railway.

MR. J. B. TYRRELL, mining engineer, of Toronto, has left for Port Arthur and Edmonton, and will be absent from Toronto till the end of the month.

MR. K. L. AITKEN, consulting engineer, Toronto, has been selected by the Board of Control as electrical engineer for Toronto at a salary of \$3,600 a year.

Mr. Thomas Deer, formerly of St. Thomas, has been appointed mechanical superintendent of the Grand Trunk Pacific on all its lines west of Winnipeg.

MR. T. H. HOGG, B.A. Sc., of Niagara Falls, Ont., has been appointed Demonstrator in Applied Mechanics in Faculty of Applied Science, Toronto University.

MESSRS. H. E. VAUTELET, C.E., of Montreal; Maurice FitzMaurice, M.I.C.L., of London, England, and Ralph Modjeska, of Chicago, have been appointed a Board of Experts to re-design and construct the Quebec Bridge. Mr. Vautelet, who will be chairman, is recognized as one of the leading civil engineers of Canada, having been connected with the bridge construction work of the Canadian Pacific Railway for many years. Mr. FitzMaurice is at present chief engineer for the London County Council. He was asso-

ciated with Sir Benjamin Baker in the erection of the great Forth Bridge, and was also one of the engineers entrusted with the carrying out of the Assouan dam across the Nile. Mr. Modjeska has had valuable experience in the building of railway bridges in the Western United States. He is a son of Countess Modjeska, the eminent actress. Both Messrs. Vautelet and Modjeska are graduates of the Polytechnic School of Paris.

OBITUARY.

Mr. A. J. Bailey, formerly superintendent of bridge and building department of G.T.R., died here on August 14th. He had been ill for about a month, and a stroke of paralysis hastened the end. He retired about 12 years ago and previous to that time was 43 years in the G.T.R. employ, first in the Portland Division, and, since 1862, when he came to Stratford, in the middle division. From his position he was well-known over the Grand Trunk System, and was a man of sterling integrity. He was 74 years of age. Mrs. Bailey and two sons and two daughters survive.

It is with regret that we record the death of Mr. T. Edward Lamb of the firm of Laurie & Lamb, consulting and contracting engineers, Montreal. Mr. Lamb passed away at Caledonia Springs on the 13th inst., after a very brief illness. His death was quite unexpected, as on leaving Montreal a couple of days before he expressed his intention of returning to the office within a few days. Mr. Lamb was only 44 years of age, and was an engineer of exceptional ability. He was well-known among mechanical engineers from one end of Canada to the other, as he was for many years superintendent and chief engineer of the original Laurie Engine Company, Montreal, and many of those who are now holding important positions in mechanical engineering circles passed under his control as apprentices, or engineers. The loss is a severe one to his partner, Major W. H. Laurie, with whom Mr. Lamb has worked continuously since leaving school at the age of seventeen, when he entered Mr. Laurie's service as apprentice draftsman, rising subsequently to the position of chief draftsman, shop foreman, superintendent, chief engineer, and for the last three years has been a partner with Mr. Laurie as consulting engineers. Such a life-long business connection is unusual in this country of quick and continual changes. Mr. Lamb was a prominent member of the Episcopal Church, being a churchwarden of St. Luke's Church, Montreal. He was a member of the Masonic order, and also a member of the Canadian Society of Civil Engineers. He leaves a wife and one daughter.

LOCOMOTIVE BUILDING.

The American Locomotive Company, Brooks' Plant, Dunkirk, N.Y., have received an order from the Central Northern Railway of Argentine for ten 10-wheel locomotives and twenty Pacific type locomotives. Herewith is given the principal dimensions, weights, etc., to these two types:

4-6-0 Type Freight.

Gauge	1 meter
Weight on drivers	66,000 lbs.
Total weight	82,000 lbs.
Cylinder, diameter	15 in.
Piston stroke	22 in.
Drivers, diameter	43 in.
Boiler type	Belpaire straight top
Working pressure	170 lbs.
Heating surface tubes	958.7 sq. ft.
Heating surface fire-box	100 sq. ft.
Tubes, number	155-2 in.
Tubes, length	11 ft. 11-9/16 in.
Grate area	15.89 sq. ft.
Water, capacity, tender	2,650 gallons
Fuel, capacity, tender	10 metric tons
Air brakes	Westinghouse American Combined
Axles	Siemens Martin steel