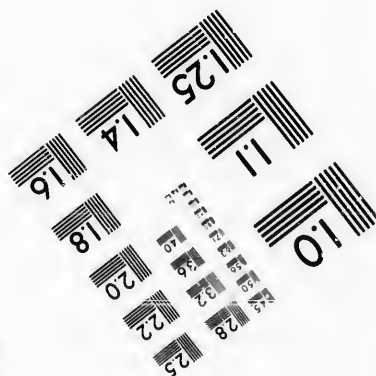
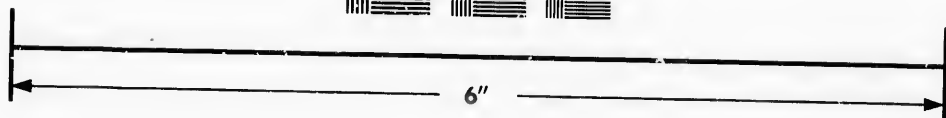
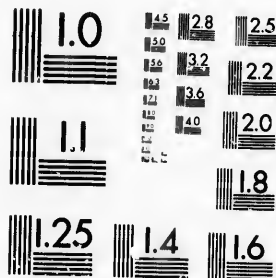


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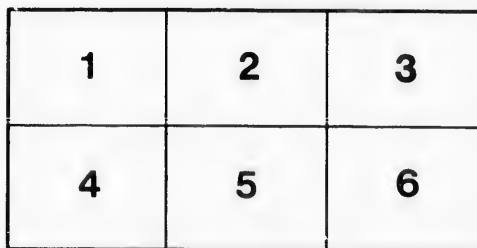
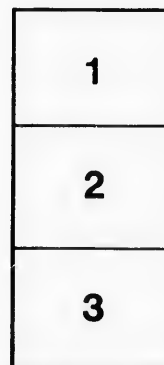
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CATALOGUE FOR

1887-1888.

ENGINES & BOILERS



E. LEONARD & SONS

LONDON, CANADA.

ESTABLISHED 1834.



A growing appreciation of our goods because of their unequalled qualities.

FOUNDED, 1834.

REORGANIZED, 1875.

REBUILT, 1881.

CATALOGUE, 1887-88.

To the Steam Using Public:

THE object of issuing a Catalogue with each succeeding year is, that by devoting its pages to designs, cuts and description of our goods, we may thereby enable intending purchasers (whom we will be pleased to furnish with this pamphlet at any time) to judge as to the excellence of our goods, and assist them in determining what they require for their business. It also proves most useful to our customers in remote parts of the Dominion, as they can, by looking its pages up, get information that would necessitate a lengthy letter.

We refer to the constantly increasing growth of our business in all parts of Canada, and feel that we are only doing justice to ourselves in attributing it to the unbounded satisfaction our Engines and Boilers give our patrons. But this proof of the efficiency of our goods does not influence us to cease endeavouring to improve, knowing that the steam user will be sure to appreciate our efforts; and this being our aim, we do not bind ourselves to furnish good exactly as shown in cuts as improvements sometime materially altering the design.

We shall be pleased, as in the past, to furnish intending purchasers with references to parties using our Engines not far from their own locality, it sometimes being desired to see our goods at actual work.

We ask for a continuance of your liberal patronage.

We remain,

Yours respectfully,

E. LEONARD & SONS.

WAREHOUSES AND AGENTS

— AT —

Montreal, Que.

St. John, N. B.

Toronto, Ont.

Halifax, N. S.

Chatham, Ont.

NOTICE.—When writing us please refer to the page on which the style and size of Engine and Boiler best suited for your business is shown, you shall have an immediate answer from us or our nearest Agent who will have full authority to quote our best figures.

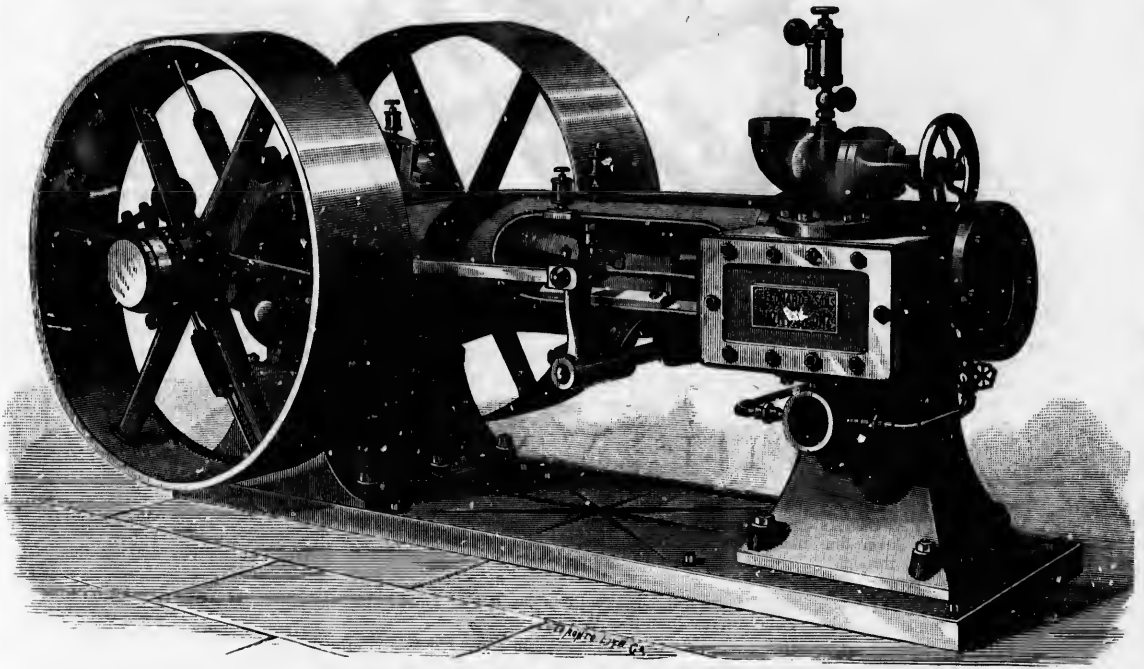
SPECIAL NOTICE.—We do not hold ourselves responsible for delay in delivering of goods in case of destruction of works by fire or strikes or stoppage through any accident over which we have no control.

1881.

THE LEONARD-BALL AUTOMATIC · ENGINE.

Question.—What is the principal peculiarity of the above Engine?

Answer.—The Leonard-Ball Engine has a Governor altering the cut-off when the load changes, independent of any alteration in the speed. Thus it does not *have to go fast in order to go slow*. This Governor is in a pulley on the main shaft, its weights being held against centrifugal motion by springs and varies the point of cut-off with the steam pressure as in other engines. But should changes of load occur, as the force which drives the load is passed through (small springs peculiar to this Governor and which connect the main shaft to the driving pulley) the eccentric position is changed, and cut-off altered to correspond with the variations in the load.



FROM 8 HORSE-POWER AND UPWARDS.

The Leonard-Ball Automatic Cut-off Engine with Balanced Valve.

1,600 ENGINES NOW IN OPERATION!

THE GOVERNOR WEIGHS THE LOAD.

ECONOMY OF STEAM ENGINE REGULATION.

IN MANY INDUSTRIES a carefully determined speed of machinery cannot be exceeded without material, sometimes very serious loss, while if the speed is lower the production is correspondingly decreased and frequently the product is inferior in quality. If the speed cannot be controlled then the normal speed must, as a matter of course, be slower than at which the best results will obtain in order that the maximum speed may not exceed the limit. When the regulation is close, the normal speed may be almost exactly the maximum instead of several per cent. slower. In one case, the machinery is kept in motion at a speed representing its greatest productive capacity, instead of as in the other, several per cent. below this.

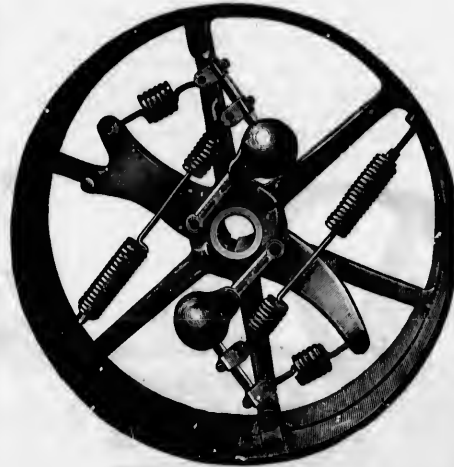
A closely regulated Engine may increase the capacity of machinery from 5 to 10 per cent., as compared with one in which the regulation is only moderately good, a matter of no small importance in large manufacturing interests.

THE GOVERNOR.

THE THEORY OF THIS GOVERNOR is based on the logical principle, that if a varying load requires a change of steam supply, this change should be the direct result of the load and should exactly correspond with it. In other words, the Governor of a Steam Engine should not depend upon the very variations of speed, which it is intended to obviate, for its motive power to act, but should recognize the variations of load, thereby becoming a weighing machine, the result of this weighing being a corresponding change in the steam supply, thus making it possible to maintain absolutely uniform speed. Comparing the two systems, we see that with the old system the supply of steam is in proportion to the speed, but with the new system the supply is in proportion to the load, and the speed is constant.

Suppose the Engine to be started without any load. As the speed approaches the desired point the weights of the Governor acquire centrifugal force sufficient to overcome the springs and they move outward, cutting off the steam and restraining the Engine within the prescribed limits of speed. Now if work be put upon the Engine, the usual process is for the momentum of the Engine to be overcome, reducing its speed until the loss of centrifugal force on the weights allows the springs to draw them into a position that will admit the necessary amount of steam to meet the load, and if still more load be added the speed is reduced still further, etc. In the case of our Governor the addition of load does not overcome the momentum of Engine but acts directly on the weights, drawing them into a position that admits the necessary steam. When load is thrown off

Nearly every point in the Governor is acted upon by a spring which takes up the lost motion, should any appear. Those points not so arranged have large wearing surfaces of steel and ought not to show wear in a lifetime with the slight motion they have.



the weights are immediately released just in proportion to the change of load. In this way the conditions of load are communicated directly to the steam valve without going through the Engine and the change of load on the belt is met by a corresponding change of steam in the Cylinder, the two being simultaneous. The successful application of this new force, producing as it does, a result so long sought and never before obtained, is a matter of no small importance in the development of the Steam Engine, and particularly so, since the demand in this particular has of late been so exacting.

All parts of the Governor, although revolving with the shaft, are practically motionless in regard to each other. They only move in relation to each other when some change of load or pressure requires a different steam supply, and therefore as there is practically no motion there is necessarily little or no wear.

THE VALVE.

(OPPOSITE PAGE.)

ANOTHER FEATURE is the opportunity to inspect the Valve when in operation under Boiler pressure by removing the Steam Chest Cover, thus enabling us to detect any leakage and scrape the surfaces until absolutely tight. As the Valve admits steam through it, exhaust steam only escapes when Steam Chest Cover is removed, thereby making this operation easy.

FIG. 1 is a Vertical Longitudinal Section through centre of Steam Chest and Valve, and shows the Valve in position to admit steam to one end of Cylinder and exhaust from the other.

FIG. 2 is a Horizontal Section through centre of Cylinder and Steam Chest, and also shows Valve in the same position as Fig. 1. It will be seen that steam is admitted to the inside of Valve through the middle port of Steam Chest. The Valve consists of two flat valves placed with their backs toward each other, and having on their backs circular sleeves nicely fitted to each other, the inside sleeve being provided with suitable packing rings to maintain a steam tight joint. The telescopic motion of these sleeves allows each valve to adjust itself to its seat.

FIG. 3 shows the Valve in position and also shows the arrangements of ports in Steam Chest. The two faces of Steam Chest correspond to the two Valves and are each provided with Steam Ports. As indicated by arrows, (see Fig. 1) steam is being admitted simultaneously to these Ports, and at the same time exhausted from both Ports at the other end. The Steam Chest is therefore filled with exhaust steam which passes down through exhaust pipe at lower side of Steam Chest.

We think any mechanic who understands the subject cannot deny that this Valve is much better suited to the requirements of this class of Engines than anything else made.

As there are nearly 2,000 Engines now in use with this Valve, running through a period of ten years, we think we have a right to speak from experience, and we know whereof we speak when we say that this Valve, in our opinion, has no equal.



Side view of Valve as it appears in the engine without nut.



Side view of Valve with telescopic sleeve drawn apart.



View of Valve resting on its side showing its upper face and interior.

S. P. M. 9. 3. 83.

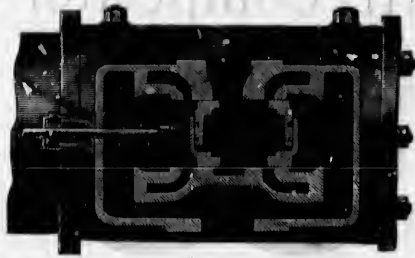


FIG. 1.
Vertical Section through Steam Chest and Valve, Taking Steam and Exhausting.

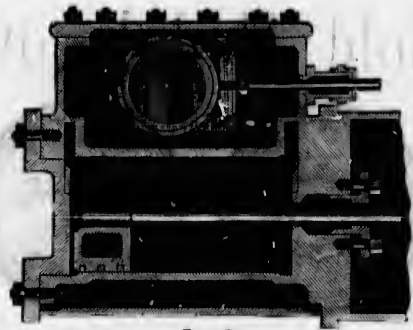


FIG. 2.
Horizontal Section through Steam Chest-Valve and Cylinder.

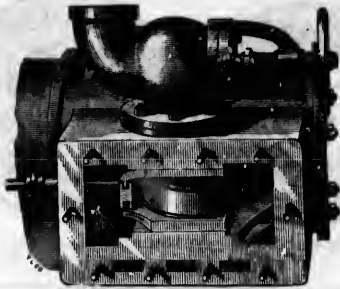


FIG. 3.
View of Steam Chest with Cover removed, showing VALVE IN POSITION.

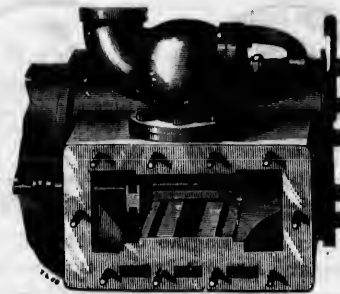
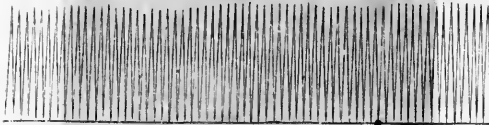


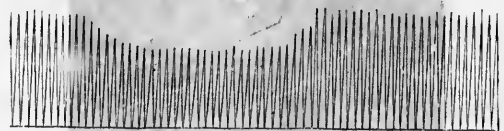
FIG. 4.
View of Steam Chest with Cover and VALVE REMOVED, showing lower Valve Seat and Port.

SPEED AND REGULATION DIAGRAMS.



SPEED DIAGRAM FROM A BALL GOVERNOR.

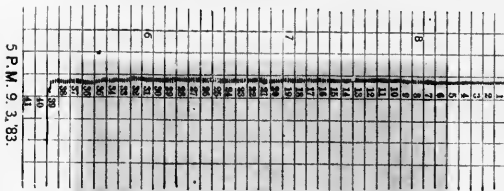
LOAD THROWN ON AND OFF.



SPEED DIAGRAM FROM A COMMON GOVERNOR.

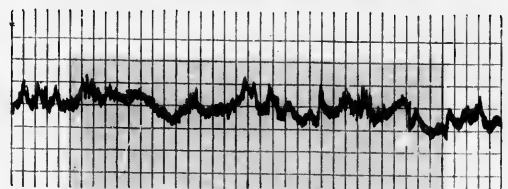
LOAD THROWN ON AND OFF.

Taken from the same Engine, under the same conditions and changes of load.



Showing a continuous Record of Speed for several hours.

Diagram made from 9 x 12 Engine at the Boston Fair of 1883, making electric lights from four dynamos, which were thrown on or off at pleasure. The record began at 5.10 p.m., and is shown until nearly 9 o'clock. Not for one instant, or for one revolution, did the speed vary more than a small fraction of one per cent.



A SAMPLE OF NOT UNCOMMON REGULATION.

Diagram taken from a Two Hundred Horse-Power Automatic Cut-off Engine driving a paper mill, and is by no means an extreme case of bad governing.

Gold Medals over all Competitors.



Gold Medal, Western Fair, 1883.



Gold Medal, World's Fair, New Orleans.
Ball Automatic Engine, 1884.



Award to Ball Engine Company, Erie, Pa.,
Automatic Cut-off Engine, Boston, 1884.



Leonard-Ball Automatic Engine,
Gold Medal, 1885.

INDICATOR DIAGRAMS.



DIAGRAM NO. 1.

THE action of the Automatic Cut-off is beautifully illustrated by Diagram No. 1 which represents four diagrams traced on the same card with different conditions of load. Scale of diagram 60; Engine, 10x12; initial pressure, 90 lbs.; No. 1, indicated horse-power, 99.39; No. 2, do., 89.11; No. 3, do., 68.56; No. 4, do., 35.64.



DIAGRAM No. 2.

SCALE of diagram, 60; Engine, 10x12; initial pressure, 86 lbs.; mean effective pressure, 46.1 lbs.; indicated horse-power, 65.83; theoretic water consumption, 22.21 lbs. per horse-power per hour.

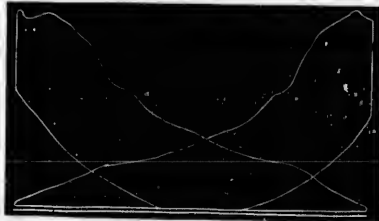


DIAGRAM NO. 3.

SCALE of diagram, 60; Engine, 10x12; initial pressure, 82 lbs.; mean effective pressure, 29.4 lbs.; indicated horse-power, 41.98; theoretic water consumption, 22.13 lbs. per horse-power per hour.



DIAGRAM NO. 4.

SCALE of diagram, 60; Engine, 10 x 12; initial pressure, 79 lbs.; mean effective pressure, 36.76 lbs.; indicated horse-power, 52.49; theoretic water consumption, 22.20 lbs. per horse-power per hour.

ORS.

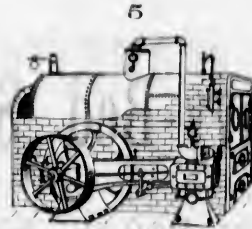
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References



in Canada

OF USERS OF

LEONARD-BALL CUT-OFF ENGINE.

J. Elliott & Sons, Agricultural Implements, London, Ont.
McClary Mfg Co., Stoves, Etc., " "
Hunt Bros., Grist Mills and Electric Light, " "
Essex & Bailey, Brass Works, " "
T. Prefontaine, Planing Mills, Montreal, Que.
N. Rheume & Bro., Picture Frame Works, " "

A. MacFie & Co., Cotton Bating Factory, Chatham, Ont.
J. L. Grant & Co., Pork Packers, Ingersoll, "
W. Abercrombie, Planing Mills, Parkdale, "
Trenton Electric Co., Electric Light, Trenton, "
H. G. Merkley & Son, Planing Mills, Morrisburg, Ont.
W. G. Scott, Planing Mills, Dunnville, Que.

NOTES

The LEONARD-BALL will save from 15 to 50 per cent. in fuel over any form of Engine using the common or fly-ball governor, operated by belt from shaft.

Perfect Regulation under all changes of load.

Most perfect in design.

Is self contained and cannot get out of line.

Every part made to duplicate. Adjustable at every wearing part.

Grade of workmanship of the finest quality. Simplicity and durability.

Cylinder, Starting Valve and Chest scraped to surface plates. No Rubber Packing used.

Lubricator and Oil Cups are automatic and adjustable sight feed. Can be regulated by hand when in operation. No occasion to stop Engine at any time.

The Valve takes up its own wear.

This class of Engine saves expensive foundations, floor space, belts, counter shafts, repairs and Engineer. Only ordinary care to attend.

Tested by steam and indicated to their horse-power capacities before shipment.

Proved by 1,600 Engines in operation.

Letter from Frank H. Ball, of Ball Engine Co., Erie, Pa.

E. LEONARD & SONS :

Erie, December 4th, 1886.

Gents,—We are receiving more orders than we can fill for our Ball Automatic Cut-off Engine using the Balanced Valve. In November we refused as many orders as we accepted because we could not furnish the Engines. Shipping out about 120 Engines this year, and should have sold another 100, we think, if we could have built them. We are adding new tools and shall endeavour to built 200 next year, if business continues as good as it now is. Shall soon be settled in our new shops. We have examined some of the Balanced Valves used with our Cut-off Engines, using my patent Governor, which have been sold in the last four years, and find them in excellent condition. The wear being imperceptible and they seem as tight as when new. Have had but very slight repairs on any Automatics of this class sold in the last 4 years. We used this balanced valve ten years and put them into **1,600 ENGINES**, and never had the slightest trouble and consider it the best Valve in the market.

F. H. BALL, Treasurer Ball Engine Company.

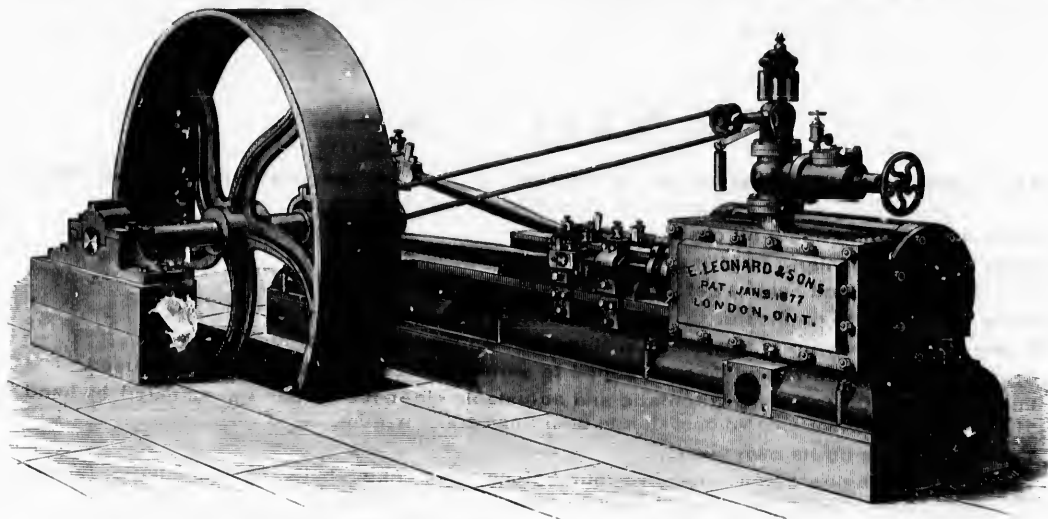
LARGE

Stationary Heavy-Bed Steam Engines

WHICH WE SUPPLY WITH OUR

STANDARD STEEL BOILERS FOR BRICKWORK.

THE ACCOMPANYING CUT represents our large sized Engines, adapted for a heavy class of work, of which we make a large quantity. These Engines are supplied with extra heavy frames, planed full length, on which are bolted Pillow Block, Guides and Cylinder. The latter sets well down in the frame, bringing the line of work as near the frame as possible. The Cylinders are made of extra hard cast iron, and lagged. We attach to these Engines our Improved Patent Short Port Steam-Saving Valve. The Eccentric and Valve-Rod motion and connection are got up in the very best manner, which, with the two bearing surfaces and parallel motion, gives a straight motion to the Valve-Rod, and does away with any leaky stuffing boxes, or chance of admitting steam to the Cylinder at the wrong time. The main bearings have brass quarter-boxes. The Piston-Rod and Crank-Pin and the Shaft are of steel. The Connecting-Rod has extra brass-wearing surfaces.



25, 30, 35, 40, 50 AND 60 HORSE-POWER.

WE SUPPLY WITH THESE ENGINES A HEAVY BALANCE-WHEEL PULLEY, as shown in wood cut, also our New Adjustable Boiler Feed Pump, (see page 17) which can be set to feed the Boiler continuously. The heater has four lengths of pipe running its full inside length. Fast Speed Governor, Starting Valve, Lubricator, Oil Cups, Oil Can and Wrenches.

Any of the above fixtures not required by a purchaser will be discounted from the price. This style of Engine is splendidly adapted for Saw Mill work, and the most substantial offered for sale in Canada, having the best proportions, are prepared for the most changeable work. All wearing parts are of steel and the Engine is got up in the best workmanlike manner.

REFERENCES.

Martin McGillis, Esq.,	Cornwall, Ont.	J. Lawrence & Sons,	Watford, Ont.
Christie Bros., & Co.,	Amherst, N. S.	C. Gagnon,	L'Avenir, Que.
L. & C. Garnett,	Bethany, Ont.	Elgin Manuf'g. Co.,	Elgin, N. B.
A. McNair,	Nashe's Creek, N. B.	A. McIntyre,	Wallacetown, Ont.
Thos. Nightingale,	Toronto, Ont.	W. & E. Chappel,	Tidnish River, N. S.
Rhodes, Currie & Co.,	Amherst, N. S.	H. E. Villette, Esq.,	St. Narcisse, Que.
	D. Ethier, Esq.,	St. Eustache, Que.	

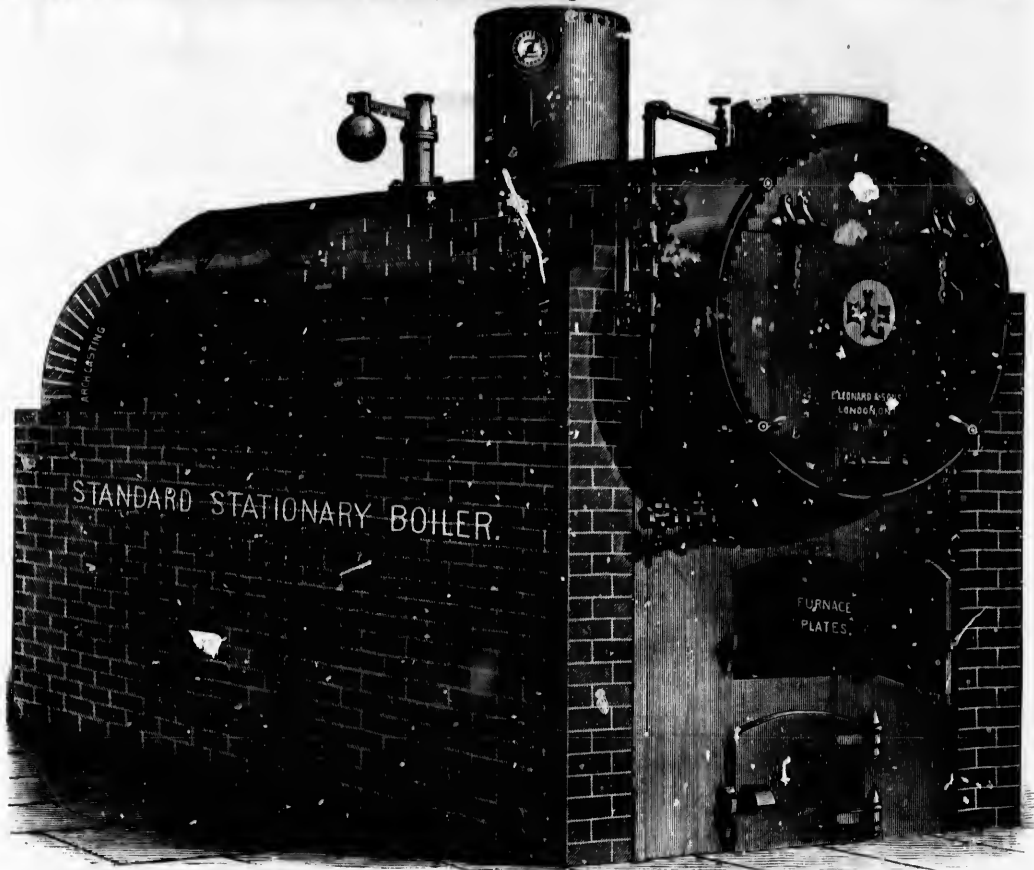
STANDARD STATIONARY STEEL BOILERS

WITH HALF ARCH BOILER FRONTS.

4, 6, 8, 10, 12, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 75, 90, 90 & 100 H.-P.

WE HAVE GREATLY IMPROVED THE EFFICIENCY OF THIS STYLE OF BOILER by adding our new kind of **Furnace Front** with plates, which are so arranged as to prevent any loss of heat. The **Flush Front** is always cool, and retains its shape.

The **Combination**, comprising **Glass Water Gauge** and **Gauge Cocks**, is placed in front of brickwork alongside of **Smoke Box**. The pipe goes through **Smoke Box** and into the head, enabling us to put a **Brass Cock and Plug** inside, and, by turning the **Cock** and unscrewing the **Plug**, the scale and deposit can be removed, thereby obviating the liability of showing **water in the Glass Gauge** when the **water is low in the Boiler**, which, with a **heavy fire and imperfect Safety-Valve**, would result in a **dangerous explosion**. The **Angle Valve**, at its steam connection, may be turned off and repairs attended to while steam is in the **Boiler**. The **Blow-off Cock** is of brass and placed in **Smoke Box** opposite the **Combination Pipe**. The **Feed-Pipe** is under the **Combination Pipe**, and is complete with its **Check Valve**, **Brass Stop Cock** and **Drip Cock** to prevent pipe from freezing.



Damper in the **Smoke Box Collar**. **Double Fire Doors** supplied for the **40 Horse-Power** and all sizes above. The **Brass Fittings** are of the best quality.

All Boilers tested by water pressure before shipped.

We furnish, when preferred, **Flush Fronts**, for all the larger sizes of these Boilers.

We forward with every Boiler a drawing of the brickwork, in both "end and side elevation," whereby parties may depend on getting them set up correctly. (See next page.)

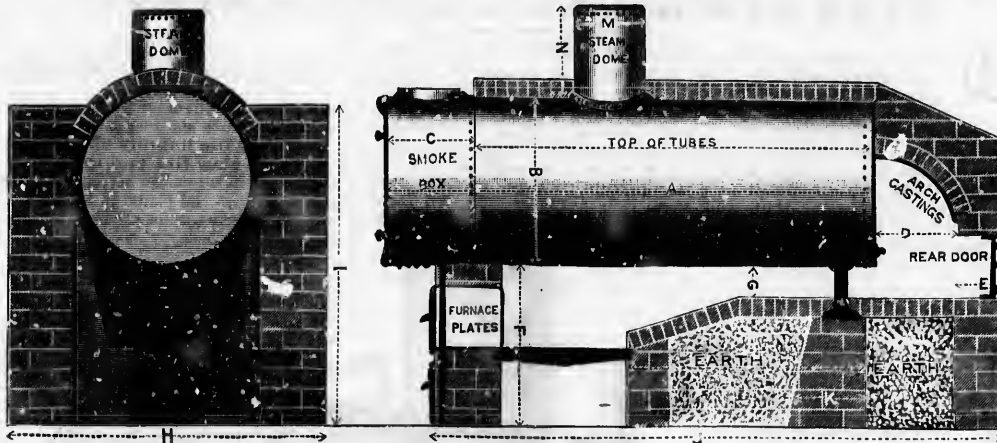
The **Smoke Box** of all these Boilers is a part of the shell, which takes the weight of the **Smoke Stack**.

The doors are made of cast iron, are ornamented, and present a very fine appearance. **Rear door**, for cleaning at the back. **Grates** for burning shavings, wood or coal. Note well our **Arch Castings**, to prevent brickwork from falling.

Parties ordering must say which side of **Smoke Box** the **Combination** is wanted, and the class of fuel to be used.

Will be pleased to quote for special Boilers of any size required, as we have the best facilities in machinery for the production of this class of goods.

MEASUREMENT FOR SETTING Standard Stationary Boilers with Half Arch Boiler Fronts.



HORSE POWER.	TUBES.			REFERENCE LETTERS ON BOILER PLAN.														WEIGHT.		STACK	BRICK.		FIRE	
	Number.	Dia.	Length.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	With Fixtures.	Without Fixtures.	DIA.	Com.	Fire.	DOORS.	
4																								
6																								
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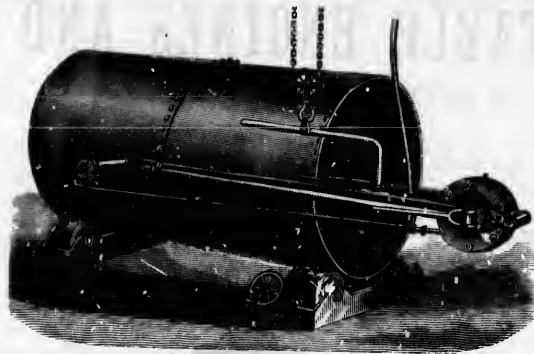
TO THE "BRICKLAYER."

MAKE the length of furnace as long as the grate bars received and as wide as they are when all placed together. The Boiler front must touch the smoke box of Boiler in the inside of projecting rivet so as to keep the front plate from coming forward. Please be sure that the dimensions of letter **L** are not forgotten which will give two-thirds of the shell of Boiler as heating surface.

NOTE.—That it is not always possible to manufacture Boilers to exact dimensions for the reason of the number of courses in Boiler. The 25 Horse-Power Boiler with 3 Inch tubes and all sizes smaller can be put in box cars.

9

RIVETING MACHINE.

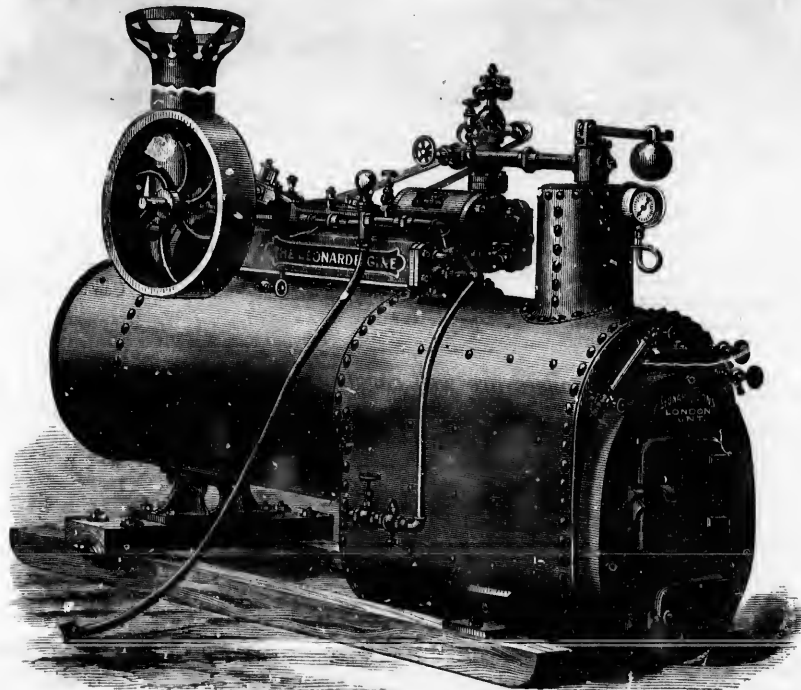


WE USE THE BEST MACHINE RIVETER known, and invariably employ it where practicable. This machine makes work that is far superior to the best hand-riveting; but as to this we note from a work entitled "*The Use and Abuse of the Steam Boiler*," by the distinguished author, STEPHEN ROPER, none being admitted greater authority. He says:

"The advantage of machine-riveting is that the machine upsets the rivet and closes up the hole better than hand-riveting, as the dead heavy pressure is exerted through the whole mass of the rivet, and the effect is not concentrated upon the point, as it must be with a succession of light, sharp blows from a hammer. Then, again, as the piston of the machine is not limited in its movements, it will follow the rivet home, drawing the plates well together, filling the holes, making the work equally good, whether the rivet is half an inch too long or half an inch too short, thus accomplishing what no workman could possibly do."

SEMI-PORTABLE ENGINES WITH LOCOMOTIVE BOILERS ON SKIDS.

WE MANUFACTURE THE LOCOMOTIVE BOILER attached to Skids, and are termed semi-portable, for the reason that they can be moved about. We mount Engines upon them, which makes a very compact and handy rig for moving short distances. The convenience of having a rig so compact is the principal reason for there being so much call for this style, more especially as its only being a common waggon load, it can easily be handled in this form, which is not the case, however, with large sizes, which, moreover, are called upon to perform more arduous work; hence the desirability of getting them on the ground.




6 AND 8 H.-P. HAVE CAST FRONTS; 10 AND 12 H.-P. HAVE WATER FRONTS.

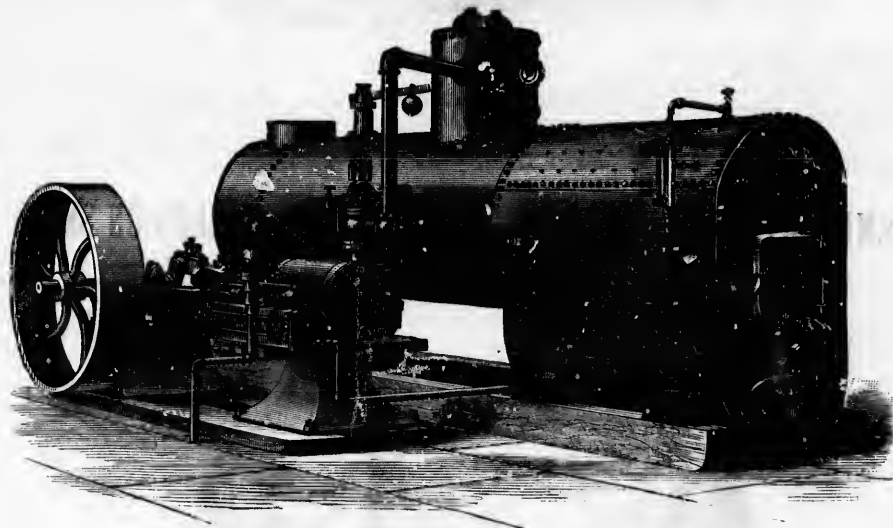
This style of Engine and Boiler is sold complete with all fixtures required, and which are included in the prices given, viz., Heater, Governor, Force Pump, Lubricator, Oil Cups, Starting Valve, Steam Gauge, Glass Water Gauge, Gauge Cocks, Safety-Valve, Blow-off Cock, Grate Bars, Oil Can, Monkey Wrench, Tube Cleaner, Damper and Suction Pipe.

10

INDEPENDENT SEMI-PORTABLE ENGINES AND BOILERS

WITH WATER FRONTS.


HIS CUT represents our Locomotive Boiler with Engine alongside, as we build and set them up in 16, 20, 25 and 30 Horse-Powers. These styles have come into general use for Portable Saw-Mill purposes, for which they are so well adapted. It becomes patent at first glance to all parties, whether millmen or not, that they are the best ever designed for the business. In the Province of Nova Scotia, New Branswick and Quebec they have met with extensive sale, and even in parts of Ontario, where lumber is extra large, the use of the heavier sizes are found to be, by old millmen, one of the cheapest methods of making logs into lumber, as you can get closer to the timber, besides which the risk of loss is far less, as it is not customary or requisite to put up any expensive buildings.



STANDARD SIZES: 16, 20, 25 AND 30 HORSE-POWER.

The Engine being a Double Crank, with bearings on both sides of the-frame for main shaft, it is always in line, and can be taken up and set down on mud sills, without disturbing any part that may require mechanical readjustment, in a short space of time. Parties preferring **Injectors or Inspirators** will be supplied with them same price. Can furnish **6, 8, 10 and 12 Horse-Power** in this style when required. 6 and 8 have cast fronts.

Our Locomotive Boilers are well constructed for the reason that

<p><i>The 6 Horse-Power Fire Box contains 80 screwed and rivetted stays.</i></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 10%;">" 8</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">85</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> </tr> <tr> <td>" 10</td> <td>"</td> <td>"</td> <td>"</td> <td>155</td> <td>"</td> <td>"</td> <td>"</td> </tr> <tr> <td>" 12</td> <td>"</td> <td>"</td> <td>"</td> <td>193</td> <td>"</td> <td>"</td> <td>"</td> </tr> </table>	" 8	"	"	"	85	"	"	"	" 10	"	"	"	155	"	"	"	" 12	"	"	"	193	"	"	"	<p><i>The 16 Horse-Power Fire Box contains 208 screwed and rivetted stays.</i></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 10%;">" 20</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">230</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> <td style="width: 10%;">"</td> </tr> <tr> <td>" 25</td> <td>"</td> <td>"</td> <td>"</td> <td>230</td> <td>"</td> <td>"</td> <td>"</td> </tr> <tr> <td>" 30</td> <td>"</td> <td>"</td> <td>"</td> <td>278</td> <td>"</td> <td>"</td> <td>"</td> </tr> </table>	" 20	"	"	"	230	"	"	"	" 25	"	"	"	230	"	"	"	" 30	"	"	"	278	"	"	"
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All are tested to 150 lbs Cold Water pressure before shipment.

These Boilers have arrow Indicators to show the height at which the water must be carried.

REFERENCES.

R. McNaughton, Elmsdale, N. S.	McGowan, Hamilton & Ewing, Laurel, Ont.
Taylor & Irwin, St. Andrews, "	S. Wood, Digby, N. S.
W. S. Doyle, Amherst, "	R. H. Cross, Ulverton, Que.
A. King, Centreville, "	J. & E. Hosford, Trout Brook, N. B.
F. J. Cross,	Melbourne, Que.

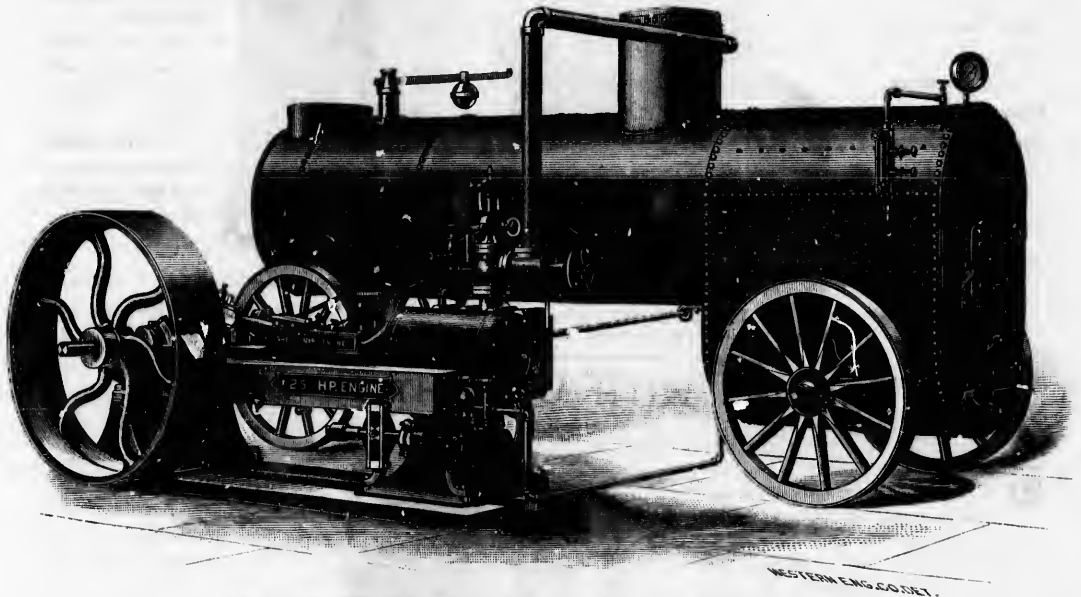
PORTABLE BOILERS ON WHEELS

WITH WATER FRONTS

AND ENGINES ON SKIDS. ✦

ARRANGED TO DIVIDE THE WEIGHT IN TWO DISTINCT LOADS.

OUT BELOW SHOWS THESE STYLES ON WHEELS, ready for the road at any time, as sometimes preferred by parties who require to move very frequently, and want everything in as convenient shape as possible for that purpose. Being on wheels does not mitigate its efficiency, while the Engine on which the work comes direct has the best possible foundation—the earth.



25 HORSE-POWER ENGINE AND 30 HORSE-POWER BOILER.

POINTS.—In reference to **Boilers** of this style, and also to those on preceeding page, are **Large Steam Space and Heating Surface, Extra Large Fire Boxes** for burning inferior fuel, **Large Steam Dome, Fire Sheets and outer Shell** well stayed the whole circumference of the **Furnace**; **Hand Holes** for cleaning at every requisite part; **Large Fire Doors**, well fitted; **Axles and Brackets** attached by stud bolts and nuts, **Axles** extending wholly under bottom of Boiler, and taking its weight like a truss; **Crow Foot and Angle Iron Stays** holding head sheets to shell; **Blow and Check Valves of Brass**; **Combination with Water Glass, Guage Cocks, and Drip and Cleansing Cocks** to prevent clogging of pipes by dirty water.

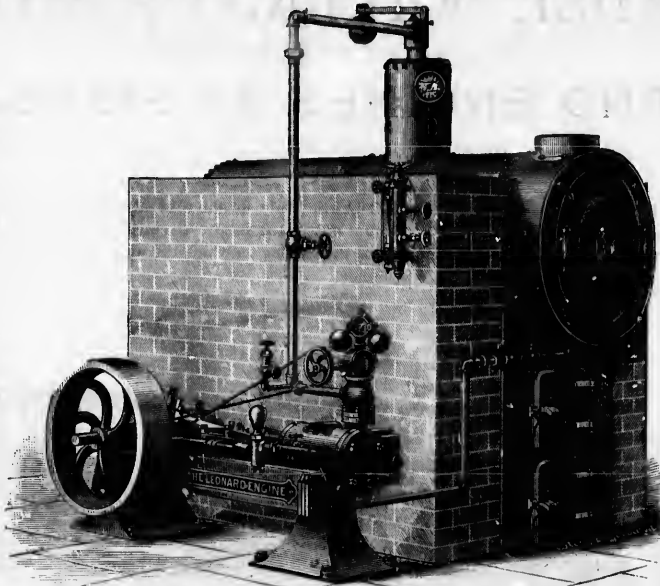
These Engines have **Double Cranks** and work within themselves, having no outside bearings; the **Strain, or Line of Work**, is through their iron frame, not above it; and do not require the assistance of skilled mechanics to set them in operation. The **Governors** are of a new and improved design; **Crosshead** is fitted with extra hard babbit and brass; **Heater** is independent of the Engine frame; the **Piston Rods and Valve Rods** are made of **steel**; the **Connecting Rod and Eccentric Rods** are fitted with the best hardened brass, and with gibs and keys for taking up the wear. **These Engines** are all tested and run at our works before shipment.

REFERENCES.

A. Audet,	St. Ephrem de Tring, Que.	T. & J. Williams,	Andover, N. B.
Z. Perrault,	Deschambault, "	Jos. Gagnon,	Grand-Digue, "
Starrack & Atkinson,	Weldford, N. B.	Levi F. Judd,	Richmond, Que.
Joseph L. Black,	Sackville, "	J. W. Brown,	Grand Pré, N. S.
	Robt. McGregor,	Rankin, Ont.	

SMALL CLASS STATIONARY ENGINES AND BOILERS.

NOW manufactured, (like Engine, page 6 and 7) and set and arranged together, as per cut below, in all orders sent us by customers, unless they specially order otherwise, leaving, say, two feet between Engine and Boiler. **Steam, Water and Exhaust Pipes** are included in price, of a reasonable length, when they are ordered at the same time.



Parties ordering must answer the following questions:

(1st.) Which side of Boiler the Engine is to set on?

(2nd.) What space between brickwork and Engine?

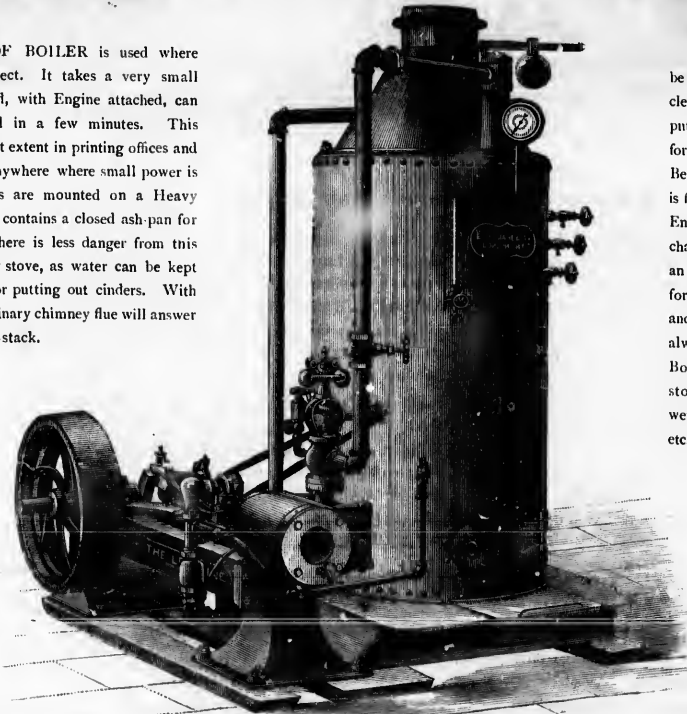
(3rd.) Will Engine set on a level with bottom of Boiler Front?

(4th.) Also whether front end of Engine and Boiler will be in line?

ENGINES OF 3 TO 30 H.-P., LIKE PAGES 6 AND 7. BOILERS OF STEEL, 4 TO 100 H.-P., LIKE PAGE 7.

ENGINES WITH UPRIGHT BOILERS.

THIS STYLE OF BOILER is used where room is an object. It takes a very small floor space, and, with Engine attached, can be set up and started in a few minutes. This pattern is used to a great extent in printing offices and butter factories, and anywhere where small power is required. The Boilers are mounted on a Heavy Cast-Iron Base, which contains a closed ash-pan for extinguished coals. There is less danger from this Boiler than an ordinary stove, as water can be kept in bottom of ash-pan for putting out cinders. With the smaller sizes an ordinary chimney flue will answer in the place of a smoke-stack.



The Smoke-Bonnet can be swung to one side for cleaning out the tubes. We put hand holes on all sides for cleaning and washing out. Before shipment, the Boiler is fired up, steamed, and the Engine run, so that the purchaser can rely upon getting an Engine and Boiler ready for work the moment water and fuel are applied. We always keep this style of Boilers and Engines in stock. Write to us for weight, floor space, prices, etc., etc.

WE MANUFACTURE 3, 6, 8, AND 10 H.-P. OF THIS STYLE. LARGER SIZES TO ORDER.

We are now manufacturing (March, 1887)

THE LEONARD AUTOMATIC FARM ENGINE

And as we go to press the work has not far enough advanced to show a cut.

WHAT WE CLAIM IS

MORE POWER with less weight.

LESS CONSUMPTION of wood and water than any form of Steam Engine using the common or fly-ball governor.

THE ENGINE THAT WILL TAKE THE LEAD FAR AHEAD ANY OTHER CLASS. It is the principle of our Automatic Engine.

There are **LESS THAN HALF** as many parts.

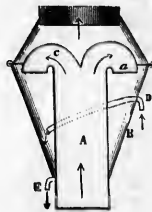
STEEL CONNECTING ROD. STEEL CRANK AND VALVE RODS.

CROSSHEAD, adjustable above and below. **NO BRASS BOXES** (for Crank and Crosshead) to be replaced.

Repairs to a minimum.

THRESHERS and those who contemplate purchasing should **LOOK WELL TO THESE MERITS** and write for full particulars before ordering any article of the **OLD STYLE** which will, in a few years, be an expensive article on their hands.

The Leonard Farm Engine with McKenzie Superior Spark-Arrester.



THE LEONARD FARM ENGINE WITH MCKENZIE SUPERIOR SPARK-ARRESTER continues to be the favorite among many Threshers, for the reason that it still maintains its first class qualities far beyond any in the market. There are many who, to-day, would prefer it over our other departure advertised as the Leonard Automatic, and for this reason we still shall manufacture to supply these wants. The changes brought about, by advice and experience, tend towards keeping a stock on hand. The cast front is now substituted by one containing water. The feed water enters the side instead of bottom. The Piston Rings are now similar to the Leonard Automatic, doing away with the bolts and springs to maintain a tight joint. This reduces the repair cost to a minimum. The Piston Valve and Pump Rods are of steel, and the Arrester is supplied with water, and a separate Valve furnishes steam to increase the draft. Have done away with Hand Force Pump on side of Boiler as shown.

We have to admit, at the same time, that our other departure and improvement is very far ahead of this style, we hope yet to increase our sales by making a quantity of the Leonard Farm Engine.

Injectors will be attached instead of Pumps, so in writing, please notify us which is required.

LANE'S PATENT LEVER-SET



✧ CIRCULAR SAW * MILLS. ✧

AWARDED FIRST PREMIUMS WHEREVER EXHIBITED.

DIPLOMA at New England Fair, Concord, N.H., 1865; SILVER MEDALS at New England Fair, Portland, Me., 1869; New Hampshire State Fair, Manchester, 1869; and New England Fair, Manchester, N.H., 1870; HIGHEST AWARD at Vermont State Fair, St. Johnsbury, 1871;

GOLD MEDAL at New England Fair, Boston, Mass., 1873; BRONZE MEDAL at New York State Fair,

Albany, N.Y., 1873; SILVER MEDAL of the American Institute, New York City, 1873;

GOLD MEDAL of the Massachusetts Charitable Mechanic Association, 1874.

More than Three Thousand in Successful Operation!

More than Three Thousand in Successful Operation!



Important and Valuable Improvements added without Change of Prices.

These Mills have been before the public for several years, and from their first introduction have met with a steadily and rapidly increasing sale. No effort is spared to maintain their high character for efficiency, convenience, accuracy, durability, and special adaptation to all classes of sawing.



AMONG THE PARTICULAR POINTS OF EXCELLENCE TO WHICH THE ATTENTION OF LUMBERMEN IS DESIRED ARE THE FOLLOWING, VIZ:

The Log is set by the Sawyer IN ONE-FOURTH THE TIME REQUIRED WITH SCREW HEAD-BLOCK.

The set is accurate and reliable.

The last board is as perfect as the rest.

No change is required when sawing logs of different lengths.

The last board dogs cannot hit the saw.

The saw guide is adjustable when the Mill is running.

No calculation IS REQUIRED AFTER LOG IS TURNED to leave the last board one inch thick.

Live sawing is done without danger of injury to Mill or Sawyer.

The Frost Dogs are sure to hold frozen logs securely.

The Feed and Dig-rack works are the most perfect in use.

THE FOOT-RIG not only moves the set-beam back TO TAKE ON A FRESH LOG, OR TURN DOWN A CANT, but is extremely useful and convenient for moving the log forward IN SLABBING OR WHEN SAWING TIMBER, PLANK AND SCANTLING.

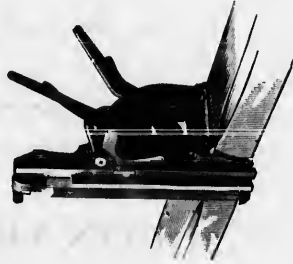
THE SET WORKS CAN BE instantly and easily adjusted to take on a new log.

The upright roll IS THE BEST OF THE KIND MADE. Prevents springing of the cant, and is a convenient gauge to set against by hand or power.

The saw arbor is provided with an improved arrangement to secure the saw collars from heating.

The Mills are thoroughly and substantially made.

CAPACITY.—They are built in two sizes, medium and large; the former (No. 1) having, with sufficient power, a capacity of from 8,000 to 12,000 feet per day, and the latter (No. 2) from 12,000 to 20,000 feet. But these figures are not by any means maximum, instances being on record where they were much exceeded, even cutting upwards of 15,000 to 30,000 feet respectively; in fact where circumstances are favorable it is hard to define their limit.



For PORTABLE purposes the driving pulley is arranged to go outside mill frame. When ordering, specify if for Portable or Stationary use.

The standard sizes for driving pulleys are: for No. 1 Mill, 24 inches diameter; No. 2 Mill, 28 inches diameter. Larger or smaller driving pulleys will be furnished to order.

Make all orders explicit as to "hand," number, length and size of saw.

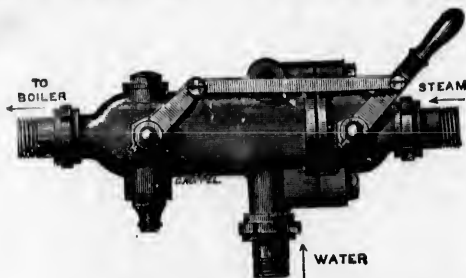
LANES LEVER SETS are easily attached to any Circular Saw-mill Carriage, and are offered at very reasonable prices.



Sold by E. LEONARD & SONS, London, Canada.

KORTING INJECTOR.

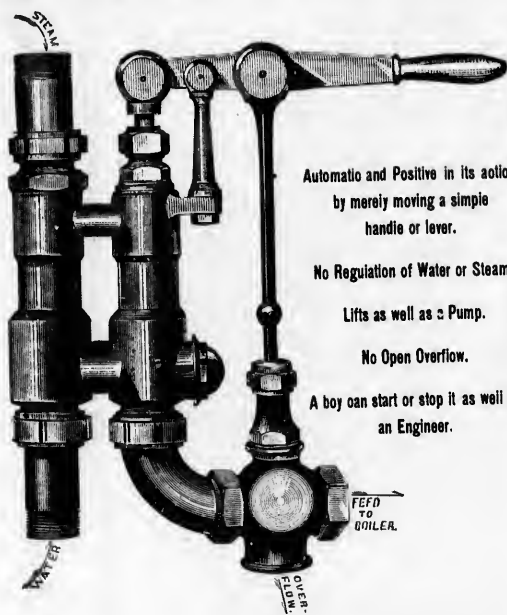
TO START,
OPEN WITH HANDLE.



TO STOP,
SHUT WITH HANDLE.

High or Low Pressure Steam—Hot or Cold Water—Water under Pressure or Suction without any adjustment—No Overflow—No Waste of Water.

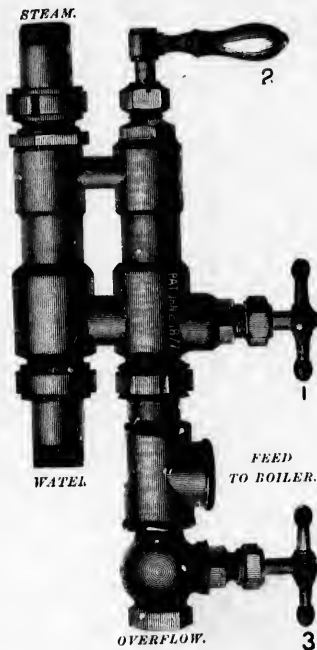
McAvity Improved Boiler Feeder.



Automatic and Positive in its action
by merely moving a simple
handle or lever.
No Regulation of Water or Steam.
Lifts as well as a Pump.
No Open Overflow.
A boy can start or stop it as well as
an Engineer.

Suitable for all Kinds of Boilers.

THE HANCOCK INSPIRATOR.



STATIONARY OR LOCOMOTIVE BOILERS.

No Adjustment Required for Varying Steam Pressures.

All of the above kept in stock and supplied instead of Engine Pumps when desired.

WRITE FOR LISTS AND DISCOUNTS.

FOR SALE BY

E. LEONARD & SONS, London, Canada.

CROSBY'S POP SAFETY-VALVES

ARRANGED FOR

Stationary, Locomotive and Portable Boilers.



PORTABLE VALVE.

PORTABLE SIZES.

1	inch	for Boilers below	to H.-P.
1 1/2	"	" " " from	10 to 20 "
1 1/2	"	" " " "	20 to 30 "
2	"	" " " "	30 to 40 "

STATIONARY & LOCOMOTIVE SIZES.

1 1/4	inch	for Boilers below	15 H.-P.
1 1/2	"	" " " from	15 to 25 "
2	"	" " " "	25 to 40 "
2 1/2	"	" " " "	40 to 75 "
3	"	" " " "	75 to 100 "
3 1/2	"	" " " "	100 to 125 "

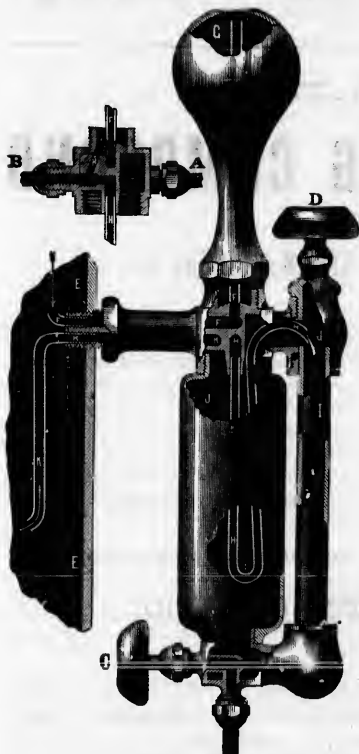


STATIONARY AND LOCOMOTIVE VALVE.

DIRECTIONS FOR LARGE VALVE.

THE SAFETY-VALVE should be connected by a separate nozzle directly to the Boiler, without pipe or elbow. In making screwjoints, use as little red lead as possible, and see that none is left inside the Valve. When steam is first gotten up under the Valve, it is well to hold it open for a few minutes, when steam is nearly at the opening pressure, to blow out any scale or sediment, on which the Valve might close with injury to the seats. We do not recommend the use of a waste steam pipe. If it must be used, pipe every Valve separately to the open air. If the waste-pipe runs horizontally, give it "dip" enough to discharge all the water at the outer end. Keep the drip-hole open. Try the Valve each day by the lever.

The American Lubricator.



DESCRIPTION.

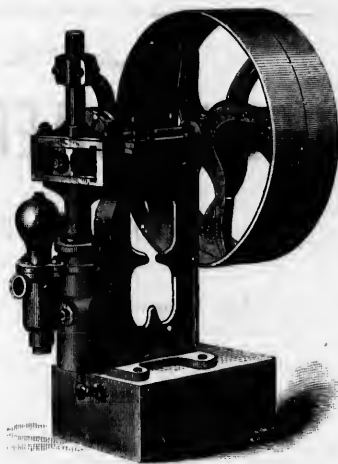
- A—Oil valve for admitting oil to steam pipe of engine. See Figs. 1 and 2.
- B—Water or feed regulator valve—opposite A.
- C—Valve for discharging water and sediment from oil chamber J J J when same is empty.
- D is a soft-seated plug to be unscrewed when the Lubricator is to be filled with oil.
- E E represents a portion of steam pipe of engine above the throttle-valve, to which the Lubricator is attached by one connection only.

PRINCIPLE OF OPERATION.

Steam from boiler enters passage F F F discharging into condenser G which thus becomes filled with distilled water, which passes down passage H H H by opening valve B and discharges into oil in glass tube I at its upper end and descends in visible drops through the oil therein. The drops of water, by accumulating at the bottom of the oil, causes it to rise, because of its lesser gravity. It then enters through valve A into passage K K K discharging in diffusion into the current of steam in the steam-pipe. The steam being thus infused with oil, lubricates the interior of the engine by passing through it.

*Patented in Canada Nov. 2, 1880.
Patented in England Nov. 12, 1880.
Patented in Germany Nov. 23, 1880.
Patented in the United States Nov. 14, 1876.
Re-issued in United States Sept. 20, 1881.
Patent applied for in France 1881.*

Adjustable Force Pump.



THIS PUMP, which we furnish with Engines, per page 6, is of a neat and most substantial pattern. The plunger is worked by a crank which is variable, and can be adjusted to suit quantity of water required. It is fitted with square brass boxes, in which it revolves. It has a guide for top end of cross-head, and a neat air chamber and brass valves, and a good wide babitted bearing for journals. It is very effective in operation, and we make three sizes, for 1, 1 1/4 and 1 1/2 inch pipe.

FOR SALE BY E. LEONARD & SONS, LONDON, ONT.

OLE.

any

OR.

No Adjustment Required for Varying Steam Pressures.

l.

da.

Tiffany's "Centennial" Tile and Brick Machine

HAS RECEIVED THE HIGHEST HONORS OF ANY MACHINE IN AMERICA.



Was awarded 1st prize for Tile, and 2nd for Brick, at the Western Fair at London, 1884.
It makes Tile from 2 inch to 12 inch Diameter without any change of machine, except Front Plate, Die and Cutting Table.
The Bricks from this Machine are put directly in the hack. The "Centennial" will work a greater variety of clay than any other machine. It is also a perfect grinder of clay.

Complete for Brick \$
Complete for Tile making with 2, 3, 4, 5, 6 and 8 inch, with "Centennial"
Cutting Table and Copper Troughs \$



MANUFACTURED BY

❧ E. LEONARD & SONS, ❧

For the Patentee. Send for Circular.

SAVE YOUR BOILERS!

LORD'S BOILER CLEANSING COMPOUND

FOR THE

❧ REMOVAL AND PREVENTION OF SCALE IN STEAM BOILERS. ❧

It has been demonstrated that a scale 1-16 of an inch thick requires the extra expenditure of 15 per cent. more fuel, and as the scale thickens the ratio increases; thus when it is $\frac{1}{4}$ of an inch, 60 per cent. more fuel is required; at $\frac{1}{2}$ inch thick, 150 per cent. and so on.

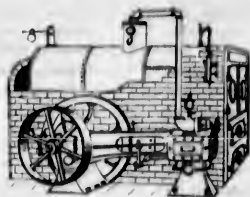
To raise steam to a working pressure of 90 pounds, the water must be heated to 320 degrees F. This may be done through $\frac{1}{4}$ inch iron by heating the external surface to about 325 degrees; if a $\frac{1}{2}$ inch intervenes the boiler must be heated to 700 degrees, almost a red heat. On an average, a boiler will accumulate, in four months, scale to the extent of a 1-16 of an inch, and after one month's use the boiler will require $3\frac{3}{4}$ per cent. more fuel than at first; after two month's $7\frac{1}{2}$ per cent., and so making an average for the year of over 20 per cent. more fuel than would have been necessary in a clean boiler. This Compound will at once prevent the formation of scale.

Send your order for the Compound and save wear and tear, burnt plates and leaky tubes.

E. LEONARD & SONS, LONDON, ONTARIO.

We do not place much value in testimonials, but we have published a few on the next page, relative to the merits of our Engines and Boilers. Parties who will notify us as to their particular business engaged in or about to enter and the probable size and style required, we shall be pleased to give information and refer them to those near by having these Engines and Boilers in operation.

TESTIMONIALS OF LEONARD-BALL AUTOMATIC ENGINES.



Leonard-Ball Out-off Engine and Stationary Boiler.

Chatham, January, 1887.

MESSRS. E. LEONARD & SONS, London :

Gentlemen.—The Ball Automatic Cut-off Engine, 15 H.-P., we have had from you worked to our entire satisfaction and has been much admired for its neat appearance and smooth, perfect motion.

The nature of our machinery needed a strong head of steam often, and the little Engine took it always good naturedly, never kicking in any way from first to last.

We cannot say too much for the Boiler either, 20 H.-P. Both suited us first class.

A. MACFIE & CO.,
Batting Factory.

The "Leonard-Ball" as an Electric Light Engine, has no superior. Great economy in fuel.

Clarke's Electrical Instrument Works, }
Trenton, February 21st, 1887. }

E. LEONARD & SONS, London, Ont. :

Gentlemen.—Having recently purchased one of your 10x12 (sixty horse-power) Leonard-Ball Automatic Cut-off Engines, I beg to state that it is giving me the best of satisfaction in every way. I am using it for driving a Brush dynamo electric machine, having a capacity of sixty lights of two thousand candle power each. My circuit is not far from six miles in length and I run the Engine at a speed of two hundred and eighty which gives the dynamo a speed of eight hundred and forty, the wheel on the Engine being fifty-four inches and the pulley on dynamo eighteen inches. The regulation of the Engine is so perfect, that, a few days ago when the circuit was opened accidentally for not more than half a second, the governor acted so quickly that the exhaust was almost stopped. I run from dusk until midnight with fifty-two lamps on a cord and a half of light edgings which cost me seventy-five cents per cord delivered. I can cheerfully state that your Engine is the best in the market for electric lighting purposes.

Yours respectfully,

W. J. CLARKE,
Agent Brush Electric Co.

As a Grist Mill Engine, the Leonard-Ball gives the most signified satisfaction in regularity and economy.

St. Lawrence Roller Mills, }
Coteau Landing, February 11th, 1887. }

MESSRS. E. LEONARD & SONS :

Dear Sirs,—In reply to yours of the 6th November last, I must excuse myself for the unavoidable delay of my answer as to your questions in regard to the Engine I bought of yours, last year, as to Ball Engine I must say I feel much satisfied to be able to answer satisfactorily to your demand. In the first place I consider your Boiler an economy of 20 per cent. compared with any other Boiler around, as for fuel, we are using pine wood. We burn about 2 cords of that kind of wood in 12 hours grinding. We carry 60 to 80 pounds steam. As for Engine the Ball Engine is superior to all engines for milling purposes as it carries a regular speed. Since we started we were visited by some of the best engineers in Canada and pronounced it first-class. We run 5 double sets rolls; 2 4-foot runners; 2 purifiers; 2 centrifugals; 20 pairs of elevators; 1 separator; 1 cockle machine; 5 scalpings; 3 bolting chests; 1 snutter and brush; all running together with 60 pounds steam. I must say that I am very well satisfied with your

Ball Engine and would recommend it to any one who wishes to buy for regular speed as it works very perfectly.

Dear Sirs, wishing you success, as I think your business merits,
I remain yours, with respect,

R. PARISIAN.

Great Comparison and Fuel Saving between the Leonard-Ball and a common Slide-Valve Engine.

W. G. SCOTT, Furniture, Lumber, &c., }
Dunnville, Ont., March 10th, 1887. }

MESSRS. E. LEONARD & SONS :

Dear Sirs,—The 20 H.-P. Leonard-Ball Engine I purchased from you last month is giving first class satisfaction. We are running the following machinery with it:—1 large planer and matcher, a 4 sided sticker, 2 circular snaws, 1 resawing saw for splitting siding, 1 scroll saw, a buzzer and sand-pm, ering drum and have plenty of power and can keep steam at 80 lbs. with my 15 H.-P. Boiler, using less fuel than I did with the old 8 x 12 Engine, and I could only use my planer and small machinery with it at a time, but with the Leonard-Ball I can use all my machines at once.

I supply the Boiler with water by a No. 10 Inspirator running about half the time.

Yours truly,

W. G. SCOTT.

Leonard-Ball in a Planing Mill.

Parkdale, February 3rd, 1887.

E. LEONARD & SONS, London :

Sirs,—I am getting on very well with the 8x10 Leonard-Ball Cut-off Engine I purchased from you. She has done so nicely that I have not required an experienced engineer to attend to her. The man who is running her never ran an engine before and has no difficulty in running her. She is very steady in her motion. The Governor having complete control. The speed is the same with the load off or on. In economy of fuel she is all that could be asked. In running her I cannot burn the shavings from my matcher alone.

Yours truly,

W. ABERCROMBIE.

80 H.-P. Leonard-Ball in one of the largest Implement Factories in Canada.

Office of JNO. ELLIOT & SON, }
Phenix Agric'l Works, Phenix Plow Works, }
London, Ont., March 17th, 1886. }

E. LEONARD & SONS, London :

Gentlemen,—It is now some two months since we started operations in our new Factory, which is driven by the Leonard-Ball Automatic Cut-off Engine which we purchased of you, and we can truthfully say we have never had as much satisfaction given us for any money we have ever invested as we have had in your Engine. We find that we use from one to one and a-quarter cords of wood less per day than we did with our former Engine, and we drive nearly double the amount of machinery. Have never seen or heard of an Engine that is so perfectly balanced, nor that runs with so much ease to itself. When running our full capacity, by closing the engine-room door, and standing in the boiler room, you cannot tell that the Engine is running at all. Another great point, to our idea, is the economy of space, it not occupying as much as a 15 H.-P. Engine we have driving our Plow Factory, and not more than half the space of any Cut-off Engine of the same power we have ever seen. The foundation has not cost us

TESTIMONIALS OF LEONARD-BALL AUTOMATIC ENGINES.—Continued.

one-third that our previous Engine did, the Engine is so compact that it cannot get out of line. The attendance can be done by any intelligent man capable of running any ordinary Engine. We have had practical engineers call purposely to see the Engine at work, and about their first word would be in reference to the Automatic Governor. We have closely watched its action, and no matter what quantity of machinery may be in use, the regulation is instantaneous, and, to our idea, perfect in adapting itself to any load at once—something most requisite, as all mechanics know, in running high-speed machinery. With a cylinder diameter of ten inches, and a boiler pressure of 80 pounds, the Engine is capable of giving motion to the following machinery to their full capacity, without any change of speed, viz. 1—614 feet line shafting; one 24" revolving bed planer; one heavy three-side sticker; one 14" buzz planer; one shaper; one 8" knife tenoning machine; one heavy power mortiser and borer; one six-gang borer; two post borers; one horizontal borer; one gaining machine; one swing saw; two rip saws; one cross-cut saw; two sand-papering machines; one hand-saw; one gauge lathe; one turning lathe; one large exhaust fan; one combined punch and shears; one Bradley hammer; one Oliver bolt header; one set two rollers; one fan for six forges; one large blower for foundry; two large tumbling mills; six Josee lathes; one turret lathe; one B. & S. miller; one B. & S. universal; two bolt cutters; one 3-spindle nut tapper; seven drills; one iron planer; one slotting machine; one centring machine; one cutting-off machine; and three emery grinders. We do not think we can give you any fuller particulars than above, nor say any more than if we were purchasing another Engine to-morrow, than that you would have to supply us with another Leonard-Ball.

Yours truly,

JOHN ELLIOTT & SON.

60 H.-P. Leonard-Ball running a 125 Barrel Mill.

Letter from E. LEONARD & SONS

to R. HOARE, Esq., Head Miller, Hunt's City Mills,

London, Ont., October 19th, 1886.

Dear Sir,—Will you kindly oblige us again with a statement of all machinery in Mill and pressure of steam required to run the same, also state the fair capacity per 24 hours in barrels.

Yours truly,

E. LEONARD & SONS.

Answer.—The following is a memorandum of machinery driven by Leonard-Ball 10 x 12 Cut-off Engine:—13 pairs of rolls; 2 flour packers; 4 purifiers; 7 scalpings; 1 universal flour dresser; 1 bran

duster; 4 centrifugals; 7 bolting reels; double conveyors; 1 dust collector; 1 separator; 1 cockle machine; 1 smutter; 1 brush machine; several conveyors; and 29 set of elevators. Capacity 125 barrels in 24 hours, taking about 75 pounds steam pressure.

R. HOARE,

Head Miller, City Mills.

Letter from N. RHEAUME & BRO., Montreal, Q.
to J. ELLIOTT & SONS, London, Ont.

July 2nd, 1886.

We have been referred to you by E. Leonard & Sons, as having bought one of their Ball Automatic Cut-off Engines and would like to know from you whether the Engine is solid and could be recommended.

Yours respectfully,

N. RHEAUME & BRO.

Answer.—We have much pleasure in saying that the Ball Automatic Engine, purchased from E. Leonard & Sons, pleases us beyond all that we can say of it, both in power, the saving of fuel and in attention, and we can conscientiously recommend it to any one who contemplates using an Engine

Yours truly,

J. ELLIOTT & SONS,

London, Canada.

The Leonard-Ball running a Planing Mill

Montreal, 28th March, 1887.

MESSRS. E. LEONARD & SONS:

Gentlemen,—In answer to your question whether I am satisfied with the Engine received from you, I have to say that I am; for the Engine has greater horse-power than it was intended to produce. According to the contract, it was to yield 50 horse-power whilst from the indicator it shows 85,939. I can therefore compliment you on this Engine. It drives the following machines:—one exhaust fan; one large planer and matcher; one resawing machine, 48" saw; one large Munro planer; one surface planer, 28"; five rip saws; two stickers; one band sawing machine; one shaper; one jig saw; one turning lathe; also, tenoning and morticing machines and several small machines for blinds 48", as well as several emery wheels and a boring machine.

Yours truly,

J. PREFONTAINE.

Per J. O. MATHIEU

TESTIMONIALS OF LEONARD ENGINES (ONLY).

60 H.-P. Engine in a Cheese Factory.

Boston, Ont., May 28th, 1885.

MESSRS. E. LEONARD & SONS:

Gentlemen,—The little Engine you shipped me last Friday, 22nd, reached Brantford next day noon, all right and we got it all set in order, and it runs like a top. It runs our Curd Mill as fast as we want it to. Our little Boiler makes all the steam that is required to run the little Engine right along.

Yours respectfully,

ANDREW EDY.

16 H.-P. Engine in a Saw Mill.

Charlo, N. B., January 5th, 1886.

E. LEONARD & SONS:

The little Engine that I bought of you is working away every day and has not cost me one cent for repairs yet with exception of packing steam chest once.

JOHN GALBRAITH.

20 H.-P. Leonard Engine running a Saw Mill.

ROBERT BELL, JR., Hensall writes, December 1st, 1885:—

"Am much pleased with the new Engine. It is superior in finish to the other one and will drive our 48 inch saw through anything."

REFERENCES.

WM. HOGDEN, . . . EAST CLIFTON, QUE.
A. BURRITT & CO., . . . MITCHELL, ONT.
P. HUFFMAN, . . . NORTHFIELD CENTRE, ONT.
JAS. GAMBLE, . . . MOUNT BRYDGES, "
M. WILLIAMS & CO., . . . MONTREAL, QUE.
G. S. LANE, . . . KENTVILLE, N. S.
D. LEGER, . . . ST. ISIDORE DE PRESCOTT, ONT.
GEO. ELGIE, . . . JAFFA, ONT.
A. CAMERON, . . . NAIRN, "

Testimonials of Leonard Farm Engines.

The "Leonard Farm Engine."

A. B. SHAW, Thorncliffe, Ont., writes, October 22nd, 1886:—
 "The new Engine works like a charm. I threshed on the 9th inst., with your Farm Engine and a Dominion Separator, 545 bushels of oats and 471 bushels of wheat in 8½ hours."

REFERENCES.

WRIGHT & DUNBAR,	FELLOWS, ONT.
H. DAIGLE,	ST. FERDINAND, QUE.
WM. SWIFT,	LAMBETH, ONT.
JAS. BROWN,	DRESDEN, "
J. C. WESTMAN,	GRANTON, "
FRED. FESS,	SELKIRK, "
J. McKELLAR,	GLENCOE, "
J. & J. COULTEK,	ST. HELENS, "
J. FLETCHER,	OXENDEN, "
PETER WINGER,	SPRINGVALE, "
C. CAMPBELL,	RIDGETOWN, "
McCLARY & CO.,	MACCAN, N. S.
W. & T. DICKSON,	SHELBURNE, ONT.
J. & N. BELL,	CHATHAM, "
D. D. SNYDER,	ROSEVILLE, "

AND MANY OTHERS.

Testimonials of Leonard Engines & Upright Boilers.

6 H.-P. Engine running a Printing Office.

Extract from the *Milton Sun*, November 26th, 1885.

The "Campbell Complete" Power Press is run by power supplied by a new Six Horse-Power Engine and Boiler from the celebrated works of E. Leonard & Sons, London, Ont. The Boiler is upright, which is always used where room is an object, while the Engine is horizontal. The Boiler, which is steel, is on a heavy cast iron base, which contains a closed ash pan for putting out cinders. The Engine is almost noiseless, and the whole, Boiler and Engine, occupies only six square feet of floor space.

Twenty pounds of steam runs the "Campbell Complete" nicely, while forty pounds will run our three presses, including the Campbell.

The whole rig gives the utmost satisfaction, and is a credit to the makers whose reputation is already wide spread.

Engine running Ice Cream Freezer.

Chatham, Ont., January 22nd, 1887.

MESSRS. E. LEONARD & SONS, London:

Gents,—We take pleasure in stating that the Upright Boiler and Engine we purchased from you last June, has done all and more than we expected of it. At one trial of it we got up steam and had our freezers running seven minutes after lighting. I have run it all the season without any difficulty whatever.

Yours respectfully,

H. W. CROW & Co.

6 H.-P. with Upright Boiler used in Pump Factory.

Chatham, January 21st, 1887.

MESSRS. E. LEONARD & SONS:

Gents,—The 6 H.-P. Engine and Boiler we purchased from your firm for our Pump and Windmill Works, gives us the best of satisfaction. The short Port system is a great improvement over the ordinary Engine in the saving of steam. We use very little wood; shaving and borings

with now and then a little wood being sufficient to keep up 50 or 60 pounds of steam. We run cross and rip saws also, 2, 3 and 4 inch Hollow Augurs. Would recommend your Engines and Boilers to any person needing small power.

Yours,

TICKNER & MILLER.

REFERENCES.

D. N. BALDWIN,	ALBERT, N. B.
GOUGEON & HOULE,	MONTREAL, QUE.
K. F. BURNS & CO.,	BATHURST, N. B.
THEO. ALAIN,	MONTREAL, QUE.
G. NANTEL,	ST. JÉRÔME, "
C. LECAVALIER,	STE. PHILOMÈNE, QUE.
H. B. DONLEY,	SIRCOE, ONT.

Testimonials of Leonard Engines with Locomotive Boilers.

Fastest time on record. Engine with Boiler on Wheels running Saw Mill.

Greenfield, Ont., October 26th, 1885.

The Engine and Boiler I got from you has the fastest time of a portable on record. They come far and near to see it cut. It did good work and cut as high as fourteen thousand feet in ten hours of ordinary logs. I told a man I would cut eighteen thousand if logs were selected. Will write a long letter when I have more time.

JOHN McNAUGHTON.

Engine with Locomotive Boiler on Wheels used in Saw Mill.

Kenmore, Ont., January 6th, 1886.

E. LEONARD & SONS:

Gents,—Some time ago you asked us to write and tell you if our mill is all right. In reply would say it is giving us good satisfaction. We like the saw rig very well. The Engine, we consider is a first-class one and cannot easily be surpassed either in design or workmanship. With regard to the Boiler we think it is as good a portable as can be made. The workmanship is complete, every joint being good and is as easily fired as could be expected, considering the work the mill does. We have run it for eight or nine months, sawing from seven to twelve thousand feet lumber (depending on the kind of logs and weather) per day of ten hours.

Yours,

DUNCAN CARKNER.

Engine with Portable Boiler on Wheels in Saw Mill.

Lachevrotière, Que., 14th June, 1886.

MESSRS. E. LEONARD & SONS:

Gentlemen,—I am happy to inform you that I am entirely satisfied with the 25 H.-P. Engine and 30 H.-P. Boiler you sold me last year. I run circular saw and edger and butter and shingle mill. We generally saw thirty thousand feet of board measure, about half of which is 3 inch deals, balance in boards and 2 inch planks, and we burn nothing only saw dust and slabs. We are now running about one year and have not been obliged to do any repairs. So far everything seems to be in as good order to-day as when we commenced to run. Every one who has seen the mill are surprised at the quantity of work done with so small an engine. You will please remember that we only run 22 hours per day while doing the above work.

Yours truly,

Z. PERRAULT.

Testimonials of Leonard Engines with Locomotive Boilers.—Continued.

Deschambault, Que., 24th May, 1886.

MESSRS. E. LEONARD & SONS, London :

Dear Sirs,—My logs average 13" diameter. I have sawed 325 logs in 22 hours besides running a shingle mill at the same time. I am very well satisfied with my Engine and Boiler.

Yours truly,
Z. PERRAULT.

Z. PERRAULT, Deschambault, Que., writes, September 13th, 1885:—
that he is cutting 150 logs in eleven hours, and is happy to state that the Engine and Boiler work very well.

REFERENCES.

POTTER & LEE, PEMBROKE, ONT.
ISAAC WENGER, AYTON, "
MCNAUGHTON, McDONALD & Co., APPLE HILL, "
G. & H. GODDARD, ULVERTON, QUE.
L. DUMPHY, BLACKVILLE, N.B.

Testimonials of Leonard Engines with Stationary Boilers.

8 H.-P. Engine and 10 H.-P. Brickwork Boiler in Butter Factory.

Chatham, January 20th, 1887.

MESSRS. E. LEONARD & SONS, London :

Gentlemen,—The Boiler and Engine we bought from you last spring we can assure it has given the greatest satisfaction, the Boiler being very economical on fuel and the Engine doing its work with ease. We take great pleasure in recommending your 10 H.-P. Boiler and 8 H.-P. Engine to any person who may require one.

Yours truly,
TAYLOR & WILLIAMSON.

20 H.-P. Engine and 25 H.-P. Boiler running a Saw Mill.

Sutton, Que., November 15th, 1886.

I have not run it much yet, I have hitched on a saw mill to it and it drives a 50 inch saw into a hard maple log in out of sight without slackening the motion but very little. The little Engine surprises the natives.

ALDEN OLMSTED.

EITLE & LUNDY, of Wellandport, Ont., write Jan. 27th, 1887:—

"The Engine and Boiler are A 1. Would not exchange for any other make we ever saw—had not a cent of expense all season. Can recommend it to any one that wants a good article."

J. V. EITEL, Wellandport, Ont., says, June 14th, 1886:—

"The new rig is admired by every one that sees it work and I claim that it cannot be beaten. I never saw one that I liked better."

30 H.-P. Stationary Boiler and 25 H.-P. Engine in a Saw Mill.

B. M. SHEPPARD, East Dunham, Que., writes, January 11th, 1886:—

"Have cut 14,000 feet hard knotty hemlock in a day with 60 pounds steam. Never carry over 60."

REFERENCES.

W. KIRKLEY, SPRINGFIELD, ONT.
ALEX. HYNDMAN, HILLSBURG, "
T. MICHAUD & CO., LACHEVROTIÈRE, QUE.
W. D. RUTHERFORD, IROQUOIS, ONT.
F. LEMUEX, TROIS PISTOLES, QUE.
A. DEROUIN, GATINEAU POINT, "
J. & J. HUTCHISON, MORRISTOWN, N. S.
FLANNAGAN & FEE, SOUTH DURHAM, QUE.
EDEN CREAMERY CO., EDEN, ONT.
REFORM SCHOOL, MONTREAL, QUE.

Testimonials of Leonard Stationary Boilers.

50 H.-P. Boiler in Saw Mill.

St. Laurent, Que., July 27th, 1885.

Gentlemen,—I am very happy to tell you, after six months experience that the 50 H.-P. Boiler with tubes 2½ inches, which you sold us last fall gives full and entire satisfaction. After my experiences, having worked many years with a boiler with four inch tubes.

I am now saving one fourth to one third the fuel and have double the power I had formerly. I am now burning saw dust and a very few slabs.

Further,—If the Boiler had to be made now I would prefer 2 inch tubes. I find tubes from two to three inches for a Saw Mill more economical.

A thousand thanks for your advice and with best wishes for your success.

I remain,
Yours truly,
J. LECAVALIER.

Stationary Boiler in a Cheese Factory.

Kohler, May 27th, 1885.

E. LEONARD & SONS, London :

Sirs,—Enclosed please find notes. I should have sent them sometime ago, but intended all the time to run over to London myself, but the work came on so fast that I could not get away.

The Boiler works splendid and takes such a small quantity of wood that I am more than pleased with it.

Yours truly,
CLARK McCOMBS.

REFERENCES.

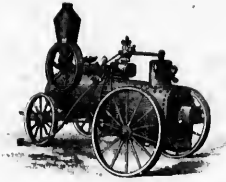
J. H. WILKINSON, VERCHOYLE, ONT.
J. LANGWITH, WALLACEBURG, ONT.
A. S. & W. H. MASTERMAN, MONTREAL, QUE.
C. ARCAND, PORTNEUF, "
CARKNER & McMASTER, KENMORE, ONT.
ISAAC SARGEANT, LONDON, "
JOHN HAMILTON, " "
CASCADE FABRIC CO., COATICOOKE, QUE.
LONDON CROCKERY CO., LONDON, ONT.
W. J. CLARK, TRENTON, "
ZEITER & WISHMAN, HUMBERSTONE, ONT.
A. J. MORRILL, NICOLET FALLS, QUE.
A. ROBB & SONS, AMHERST, N. S.
T. BROWN & CO., INGERSOLL, ONT.
J. D. SMITH, MOUNT ELGIN, ONT.
C. H. CAPELLI, MONTREAL, QUE.
E. BIGELOW, GEORGEVILLE, QUE.
T. L. DODGE & CO., KENTVILLE, N. S.
CARTHAGE CHEESE & B. Co., CARTHAGE, ONT.

WORTH READING.

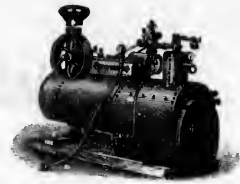
In a recent Catalogue, issued by a prominent Engine Builder, we find the following hints to purchasers, which will be of interest and value to whomsoever may desire to buy an Engine for their own use, and regardless of the style or class of Engine which they intend to use :

- 1st. Don't forget** that in selecting an Engine it is highly important to get not only a good kind, but it should be of the proper size.
- 2nd. Don't fail** to have plenty of Boiler capacity, and at least a small margin beyond ordinary requirements. Be sure to have the Boiler or Boilers properly set, so that the best results may be obtained from the fuel burner. Many good Boilers fail to give satisfaction on account of bad setting, and the maker is sometimes blamed because the Boiler *don't steam well*.
- 3rd. Don't think** it will be an advantage to carry low steam in your Boiler. Economy is in the line of high pressures rather than low. We recommend an average Boiler pressure of 75 lbs., which is not too high for safety nor too low for fair economy.
- 4th. Don't think** that any dark corner or cellar is good enough to put an Engine or Boiler in. They should be placed, when possible, in dry, well-lighted rooms, so arranged that any part can be reached without trouble or delay. Walls and floor should be kept clean, and a reasonable supply of oil cans, waste, wrenches and other tools needed should be provided, and kept in their proper places.
- 5th. Don't think** that any kind of a foundation will answer for your Engine. The best is always the cheapest and we advise the use of stone or hard brick and cement, and the employment of a skillful mason in every case. To purchasers of our Boilers we furnish plan of Brickwork which can be built for the lowest cost possible, consistent with solidity and permanence.
- 6th. Don't make** the too common mistake of thinking a cheap engineer is the man you want. The Engine and Boiler which furnish the power are important factors in the success of any business, and no matter how simple or strong they may be, it would pay to put them in charge of a man fully competent to care for them, and particularly so if far from facilities for quick and proper repairs. For a small plant it is not necessary to have the highest grade of ability—for there are grades among engineers—but it is better to pay a suitable man for competent and faithful service, than to pay for what may happen through the incompetence or neglect of one whose only recommendation is that he is *cheap*.





LEONARD FARM ENGINE



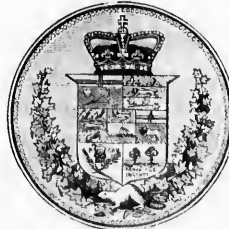
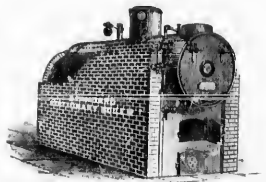
SEMI-PORTABLE ENGINE.

*Silver Medal, Dominion Exhibition, St. John, N. B., 1883.*

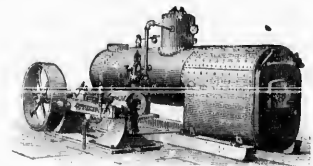
TERMS.

MANY OF OUR CUSTOMERS are situated so they cannot pay cash down, but can pay part and make a good note for the balance. Such we can, and do, accommodate, charging them usual rates of interest, and taking notes for the balance; and we request you, in asking for estimates, to state if you desire to pay all cash; if not, how much you *can* pay, and what time is wanted on the balance. To these we furnish a printed order filled out ready for signature; also a certificate which requires to be filled out giving number of acres or personal property, cash value, and if incumbered, and how much. **This is done so that we may judge of their responsibility and save time.**

In order to enable us to furnish the very lowest prices, we use this form of order to protect ourselves from loss by unprincipled men; it does not affect the honest and upright. It also prevents misunderstanding between both dealer and purchaser.

*Gold Medal, Dominion Exhibition, Montreal, Que., 1884.*

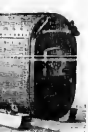
STANDARD STATIONARY BOILER

INDEPENDENT
SEMI-PORTABLE ENGINE AND BOILER.



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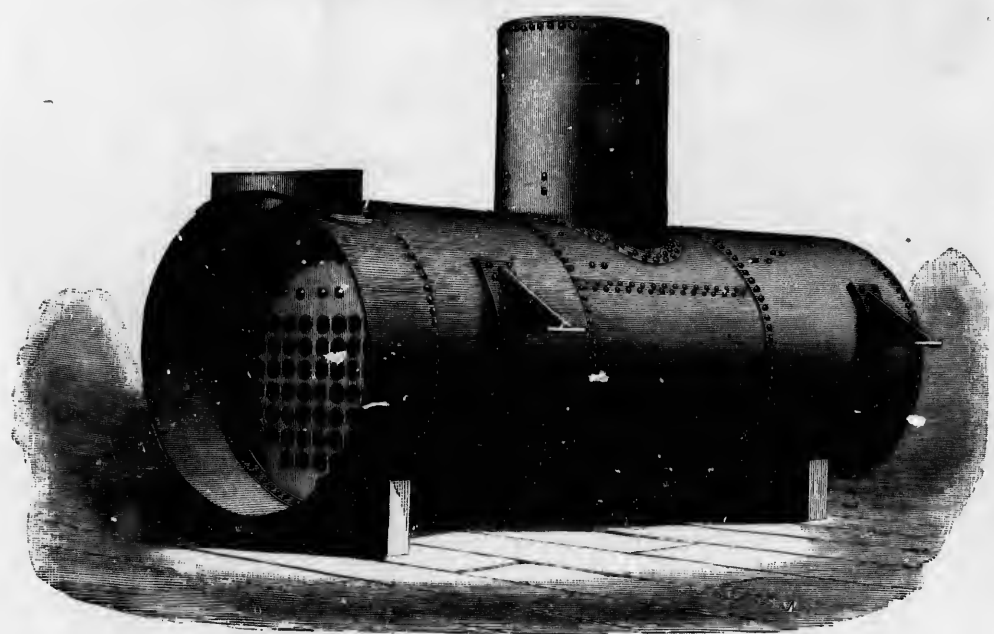


BOILER.

SUPPLEMENT

ENGINES AND BOILERS

6 STYLES OF ENGINES
EMBRACING 25 SIZES.



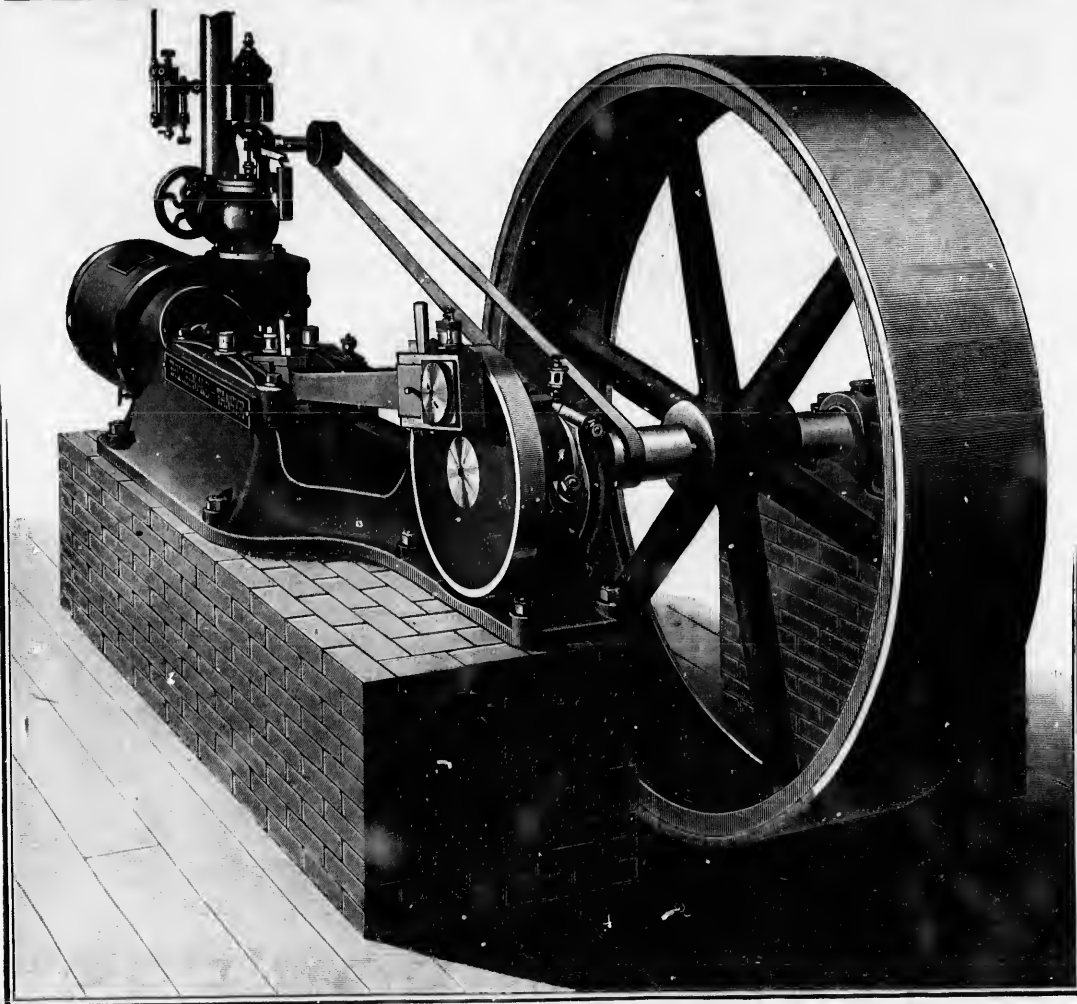
5 STYLES OF BOILERS
WITH 50 SIZES.

E. LEONARD & SONS,
LONDON, - - CANADA.

ESTABLISHED
← OVER 55 YEARS →

THE BEST IS THE CHEAPEST.

LEONARD-TANGYE ENGINE



35, 40, 50, 70 AND 100 HORSE-POWER.

An Engine with enlarged surfaces, for strong, durable every-day work. Quality and material fully equal to our Automatic Engines.

The 50 Horse-Power has a main bearing, 7 inches diameter and 7 inches wide, and a crank pin, 4 inches diameter and 3 inches wide.

Shipping weight, 6,300 lbs.

WRITE FOR FULL PARTICULARS.

LIST OF USERS

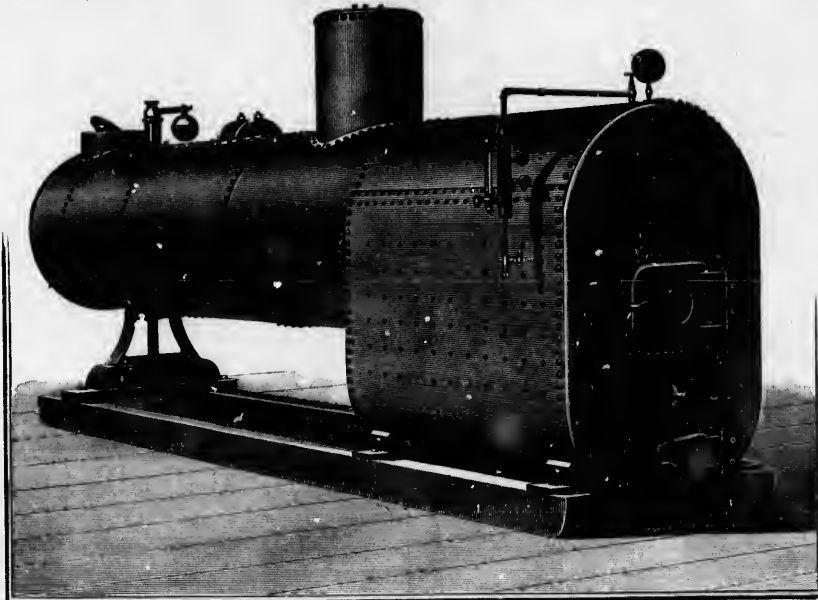
Roop & Bent,	- - - -	Springfield, N. S.	John Gettler,	- - - -	Fullarton, Ont.
Logan & Byrne,	- - - -	Norton, N. B.	Elle Lachance,	- - - -	St. Proxide, Que.
R. & H. R. Roberts,	- - - -	Portland, N. B.	E. J. Smith,	- - - -	Shediac, N. B.
Antoine Trahan,	- - - -	Weedon, Que.	A. R. McClellan,	- - - -	Hopewell, N. B.
J. W. Brown,	- - - -	Grand Pre, N. S.	W. Sage,	- - - -	New Floss, Ont.
Keith & Co.,	- - - -	Havelock, N. B.	Bras D'Or Lime Co.,	- - - -	Halifax, N. S.
Jas. E. Porter,	- - - -	Andover, N. B.	L. R. Medbury Estate,	- - - -	Windsor, Ont.

NE

LOCOMOTIVE BOILERS ON SKIDS

BELOW is perfect cut of this style of all sizes, except the two first (7 and 9 H.-P.), which have cast fronts. We have most splendid facilities in manufacturing, and can ship any size almost within four or five days' notice. Our sizes are: 7, 9, 12, 15, 20, 25, 30, 35, 40, 50 and 60 H.-P. The cut is from a photo. of the large size. Each Boiler is furnished with Steam Gauge, Combination with Glass-water Gauge and Gauge Cocks, Safety Valve, Blow off, Grate Bars (for wood, coal or saw-dust), Smoke Box, Check Valve, Tube Cleaner and Damper.

These Boilers can be put on Wheels, for which an extra charge is made.



Prices on Request. Write for Dimensions, Weights, Floor Space, etc.

All Locomotive Boilers 30" Dia. and above are Double Riveted on Longitudinal Seams of Fire Box and Shell.

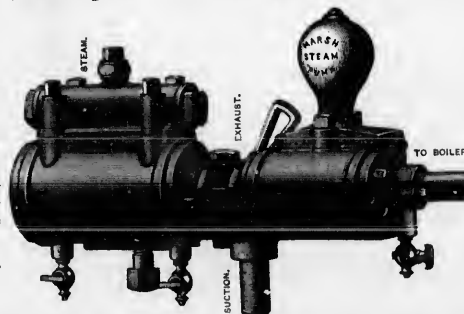
NUMBER OF STAYS

7 H.-P. BOILER	85 SCREWED STAYS.	— CROWFOOT.	30 H.-P. BOILER.	230 SCREWED STAYS.	6 CROWFOOT.
9	85	1	35	278	7
12	162	2	40	278	7
15	193	2	50	391	11
20	223	4	60	493	13
25	230	6			

MARSH STEAM PUMP

New, Simple and Reliable Boiler Feeder.

This Pump is designed to fill a noticeable want of engine builders and steam users for a reliable, economical, and efficient boiler feeder. Heretofore the state of the art has not furnished an efficient steam pump simple and compact enough to compete successfully with its less cumbersome competitor, the Injector.



Size.	H.-P. of Boiler.	Gallons per Hour.
B	10 to 20	360
C	20 to 50	750
D	50 to 100	1000

SOLD BY E. LEONARD & SONS.

SEND FOR PRICES.

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arton, Ont.
oxide, Que.
ndiac, N. B.
ewell, N. B.
Floss, Ont.
allfax, N. S.
ndson, Ont.

STANDARD (BOILER PRESSURE) HEATER.

CAPACITIES IN HORSE-POWER.

HORSE-POWER FOR	
20 to 30.....40 to 50.....70 to 90. . . .100 to 130	
DIAMETER AND NUMBER.	
15.....19.....22.....26	
HEIGHT.	
48".....48".....60".....72"	
HEIGHT OVER ALL.	
5' 6".....5' 6".....6' 6".....7' 6"	
TUBES (NUMBER.)	
12.....19.....26.....34	
DIAMETER.	
2".....2".....2".....2"	
LENGTH.	
24".....36".....48".....60"	
EXHAUST FLANGES.	
3 or 3½".....4 or 4½".....5 or 6".....7 or 8"	



"Standard" (BOILER PRESSURE) Feed Water Heater.

OUR engraving represents a very popular form of Tubular Heater, simple in construction and efficient in operation. A steam chamber is provided at each end of the Heater. The inner heads are connected by two inch tubes, and the outer heads are held in place by stud bolts, and are easily removed. Handholes, conveniently placed, afford ready access for cleaning. The body of the Heater is kept constantly filled with water surrounding the tubes, and the exhaust steam from the engine passes into the lower chamber, and through the tubes to the upper chamber, and thence to the air. This Heater is not open to the very serious objections found in the use of all those where exhaust steam is brought into immediate contact with the feed oil from the cylinder of the engine is constantly passing into the boiler with the feed water, and in time coats the inner surface of the boiler, and forming a non-conducting surface, and one which will repel the water when the boiler is heated, and cause the plates to warp and crack. A safety valve is furnished with each Heater, but all connecting steam and water pipes are subject to order, and are charged extra.

Swift Sight-Feed Lubricators

CLASS F (BRASS).



POSITIVE IN OPERATION.

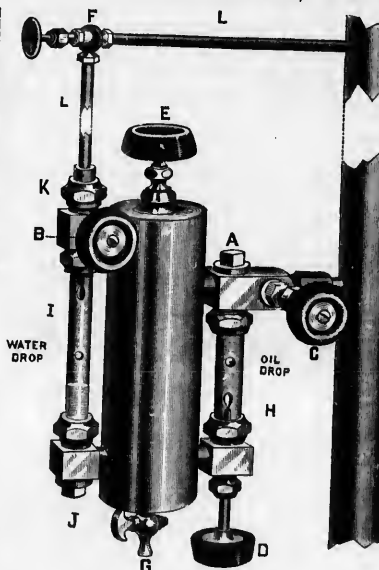
Light or Dark Oil can be used with equal results.
Will work the hardest Tallow in the coldest weather.
Range of Feed, from one drop per minute to one drop per second.

The above are made in the following sizes: 1-4, 1-3, 1-2, 1 pint, and 1 quart, of which we keep a stock. Send for prices.

E. LEONARD & SONS,

THE EAGLE LUBRICATOR.

THIS CUP IS GUARANTEED TO WORK UNDER ANY AND ALL



CIRCUMSTANCES WHEN PROPER QUANTITY OIL USED.

PRICE LIST

One-third Pint, Nickel-plated, \$.....
One-half " " " " " " " " " " " "
One " " " " " " " " " " " "
One Quart, " " " " " " " " " " " "
Half Gallon, " " " " " " " " " " " "

= LONDON, CANADA.

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Water Heater.

very popular form
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Handholes, con-
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This Heater is
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water pipes are
extra.

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CIRCUMSTANCES WHEN PROPER QUANTITY OIL USED.

ADA.

E. LEONARD & SONS

MANUFACTURE

The Leonard-Ball Automatic Cut-off Engine,

From 8 Horse-Power upwards,

Plain Slide-Valve Short Port Leonard Engines,

3 to 30 Horse-Power,

Leonard Automatic Cut-off Farm Engines on wheels,

Large Heavy-Bed Stationary Engines,

25 Horse-Power and upwards,

Standard Stationary Boilers

WITH HALF ARCH AND FLUSH FRONT; 4 to 100 Horse-Power and larger,

Independent Semi-Portable Engines and Boilers

ON SKIDS AND WHEELS,

Engines on Locomotive Boilers,

Engines with Stationary and Upright Boilers,

Leonard Farm Engine,

6, 8, 10 and 12 Horse-Power,

Adjustable Force Pumps,

Saw Mills and Centennial Tile and Brick Machines,

And keep in stock all goods incidental to the requirements of these classes of goods.

BEFORE PURCHASING WRITE YOUR ADDRESS, PLAIN, TO

E. LEONARD & SONS,

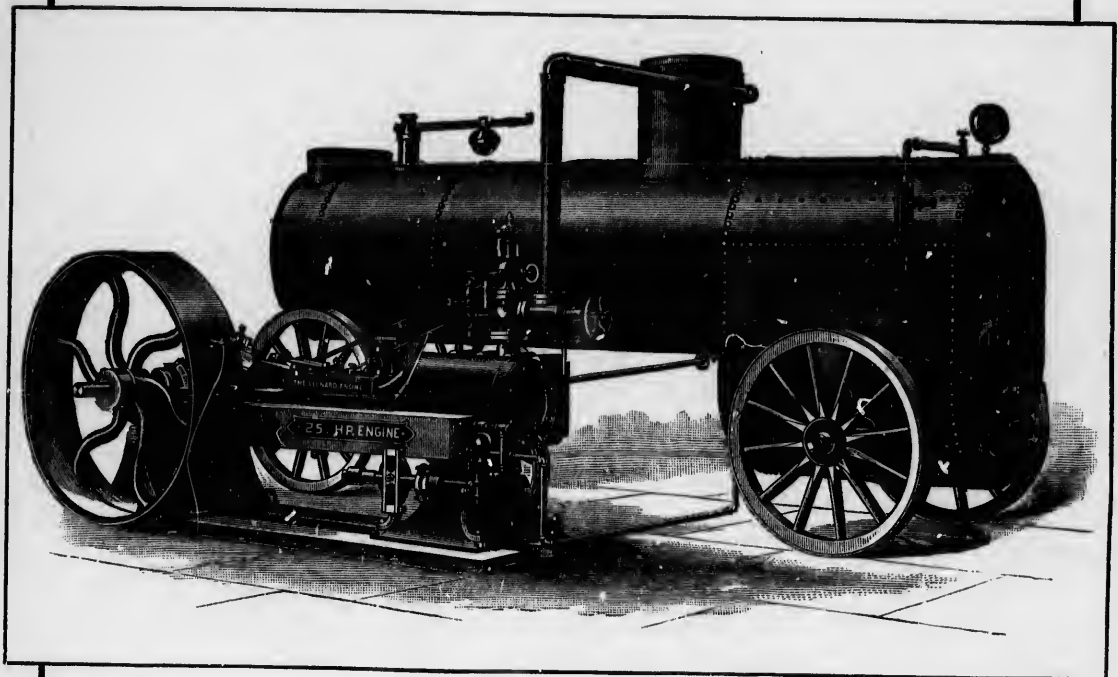
ENGINES AND BOILERS,

LONDON, CANADA.

5 STYLES OF ENGINES

EMBRACING

••≡≡≡ 25 SIZES. ≡≡≡••



5 STYLES OF BOILERS

WITH

••≡≡≡ 40 SIZES. ≡≡≡••



E. LEONARD & SONS, - - - LONDON, CANADA.

