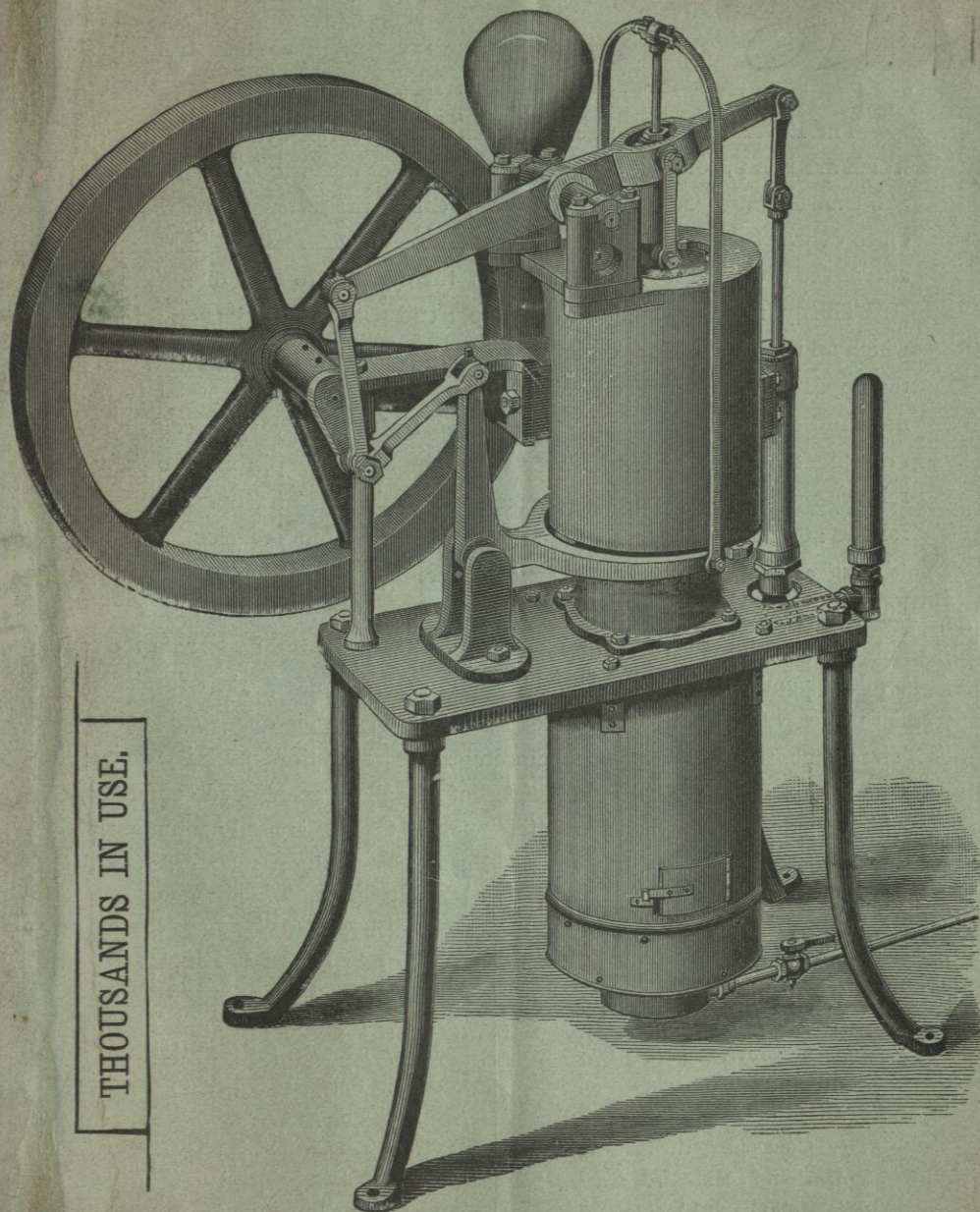


Ericsson & Garrison
Water for the Upper Floors of City or Country Residences.

ERICSSON'S NEW
HOT AIR PUMPING ENGINE.



THOUSANDS IN USE.

MANUFACTURED BY

DELAMATER IRON WORKS.

H. B. SMITH MACHINE CO.,

925 Market Street,

PHILADELPHIA.

Agents for Philadelphia and Vicinity.

Made expressly for Pumping Water into Tanks for City Residences, Country Houses, Farms, Greenhouses, Hotels, Stock Ranches, etc.

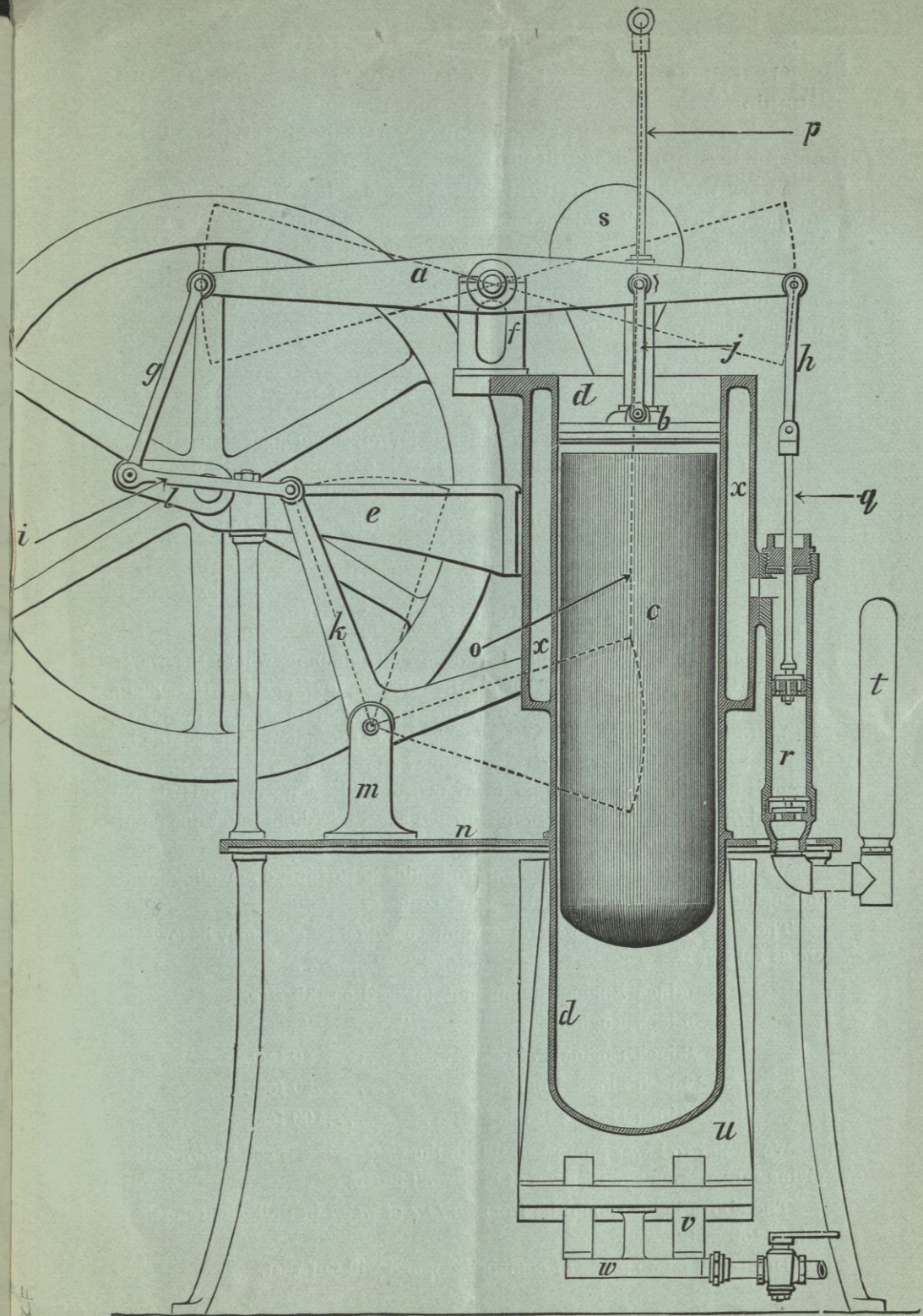
For suburban residences they are invaluable from a sanitary point of view, to say nothing of the luxury of having plenty of clear running water at all times.

DESCRIPTION.

The ERICSSON Hot Air Pumping Engine is a single-cylinder engine in which are two pistons, one called the "main" or air piston, which receives and transmits the power, and the other is called the "transfer piston," the office of which is to transfer the air contained in the machine alternately, and at the proper time, from one end of the cylinder to the other.

The cylinder is provided at its upper end with a water jacket, through which all the water passes on its way from the well to the tank. This keeps the upper end of the cylinder cool, while the lower end is exposed to the fire and becomes as hot as is practicable to make it. By the peculiar arrangement of connections between the air and transfer pistons, the proper relative motions between these pistons are obtained. The operation is as follows: After the lower end of the cylinder has been sufficiently heated, which usually takes only a very few minutes, the engine must be started by hand, by giving it one or two revolutions. The air contained in the machine is first compressed in the cold part of the cylinder; it is then transferred to the lower end, where it is instantly heated and expanded, thus furnishing the power. This engine, like all other hot air engines, is only single acting. The momentum of the fly-wheel continues the revolution until it receives an additional impulse by the repetition of the above mentioned conditions, which occur once in every revolution. The same air is used continuously, and is cooled, compressed, heated, and expanded in the regular order, and without noise.

- | | |
|---------------------------------|---------------------------------|
| <i>a</i> , Beam. | <i>m</i> , Bell Crank Bracket. |
| <i>b</i> , Air Piston. | <i>n</i> , Table. |
| <i>c</i> , Transfer Piston. | <i>o</i> , Side Rods. |
| <i>d</i> , Cylinder. | <i>p</i> , Transfer Piston Rod. |
| <i>e</i> , Fly-wheel Bracket. | <i>q</i> , Pump Rod. |
| <i>f</i> , Beam Center Bearing. | <i>r</i> , Pump. |
| <i>g</i> , Connecting Rod. | <i>s</i> , Air Chamber. |
| <i>h</i> , Pump Link. | <i>t</i> , Vacuum Chamber. |
| <i>i</i> , Bell Crank Link. | <i>u</i> , Gas Furnace. |
| <i>j</i> , Air Piston Link. | <i>v</i> , Gas Burners. |
| <i>k</i> , Bell Crank. | <i>w</i> , Gas Chamber. |
| <i>l</i> , Crank. | <i>x</i> , Water Jacket. |



ADVANTAGES.

No Boiler! No Steam! No Exhaust! Valveless Engine! Still Running! Easy to manage! No more care than an ordinary Cook Stove! Does not affect Insurance! Absolutely Safe! No Licensed Engineer required.

Every machine thoroughly tested before leaving our factory.

The pumps are all made of composition, and will not rust. The packings cannot burn, for the air-tight piston works in cold or water-jacketed part of cylinder. All wearing parts inexpensive, and every piece of machine made on the *interchangeable* plan, so that any part or piece can be supplied without delay, should it be necessary.

Recent Improvements.

Recently we have made many valuable improvements, suggested by the experience of years making this particular type of Engine, and an experience of thirty years making Hot Air Engines generally.

The Engine, as now made by us, is far ahead of anything and everything we know of for pumping water.

As Applied to Deep Wells.

These Engines may be applied to deep-well pumping, where the water is more than twenty-five feet below the surface, by lowering the pump cylinder down to the water—or down to within eight or twelve inches of the bottom of the well is better—and connecting the pump with Engine by iron pipe in short lengths, which may be screwed together as they are lowered down, it being unnecessary to go down in the well. The pump is simply screwed on end of pipe and lowered until it has reached the water, the pump rod being also in convenient lengths and inside of pipe.

We furnish brass pump and pump-rod guide; also pipe, connecting pump to Engine and pump rod, at small extra cost.

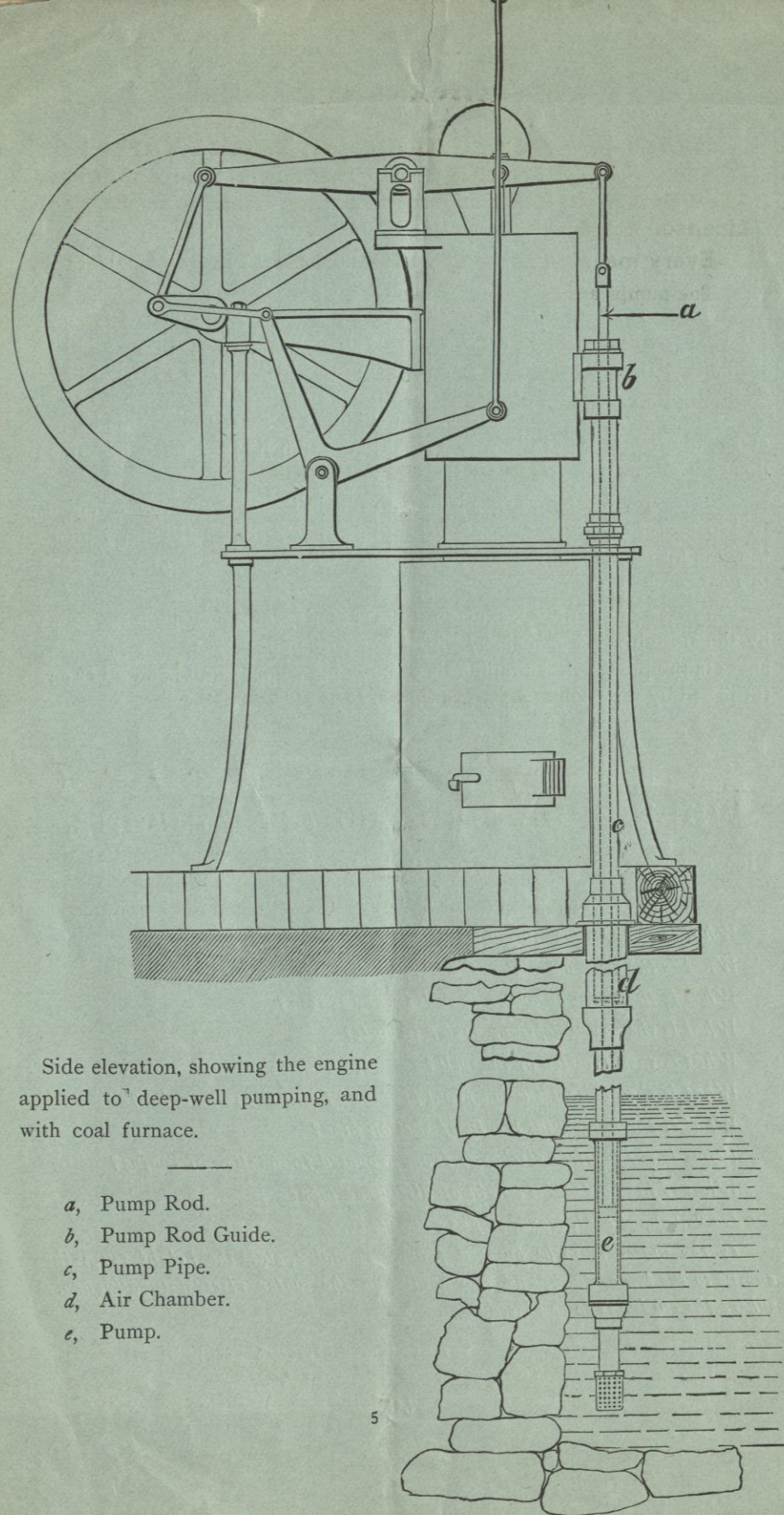
The extreme depths to which the pumps on different sizes may be lowered are as follows:

- 5-inch Engine—pump not lowered on this size.
- 6-inch Engine— “ “ “
- 8-inch Engine.....40 feet.
- 12-inch Single Engine.....80 feet.
- 12-inch Duplex Engine.....100 feet.

We prefer to lower pump barrel into the water when it can be done, thus giving no work on suction side of deep-well pump.

The above limits should be from *surface* of water in well when the lowest, to top of the well.

Deep-well pump made of composition, and will not rust.



Side elevation, showing the engine applied to deep-well pumping, and with coal furnace.

- a*, Pump Rod.
- b*, Pump Rod Guide.
- c*, Pump Pipe.
- d*, Air Chamber.
- e*, Pump.

FUEL.

One very important feature of these Machines is the fact that they may be successfully operated with almost any kind of fuel.

Coal.—The most economical fuel for these Engines is anthracite coal of small size (chestnut). The amount of this fuel necessary to run one of them all day is exceedingly small. Coke makes capital fuel also.

Wood.—We have lately made new patterns for an improved furnace for burning wood, which gives the very best satisfaction where wood is plenty. Several of our customers are using this fuel, and as they burn the chips from the wood-pile the fuel costs them nothing.

The advantage of using wood for fuel is that the machine can be heated and ready for starting in a very few minutes, much quicker than can be done with coal.

Gas.—In cities where gas is easy to obtain it makes a very convenient fuel to use for heating these Engines, and in some places, particularly where the amount of pumping to be done is small, it may be used in preference to coal.

Gasoline Gas.—Gas made from gasoline or other hydro-carbons by the portable gas machines, which are so extensively used at present, answers the purpose for running these pumping engines quite as well as gas furnished by the ordinary city gas works.

WHEN ORDERING A PUMPING ENGINE,

Please answer the following Questions from Actual Measurements and Careful Estimates.

What is the greatest quantity of water needed per day?

What is the extreme depth of well?

What is the depth of water in well in dry season?

What is the usual depth of water in well?

What is the diameter of the well?

What is the vertical suction from proposed foundation of engine?

What is the horizontal length of suction pipe?

What is the vertical discharge from proposed foundation of engine?

What is the horizontal length of discharge pipe?

Do you want coal, wood, or gas furnace?

If the water is to be pumped from city mains, state the height from the engine to the top of tank, and also how high the water rises naturally above where the engine is to be placed.

We furnish with every Machine printed Directions how to Set and Operate.

PRICE LIST.

Showing Sizes, Approximate Consumption of Fuel, Gallons per Hour, etc.

Size, Diameter, Air Cylinder, in Inches.	SPACE ON FLOOR.	Height.	Cubic Feet of Gas per Hour.	Anthracite Nut Coal per Hour, or equivalent of other Fuels.	Approximate Shipping Weight, in Lbs.	Size Suction Pipe.	Size Discharge Pipe.	Gallons per Hour, 30 feet high.	Price, with Coal or Wood Furnace.	Price, with Gas Furnace.
5-inch.	2 ft. 2 in. x 14 in.	4 feet.	15		250	$\frac{3}{4}$ in.	$\frac{3}{4}$ in.	150		\$150

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Gas.—In cities where gas is easy to obtain it makes a very convenient

THE 10-INCH ERICSSON ENGINE.

We have recently added to our list of ERICSSON Engines a new size, namely, the **10-inch ERICSSON ENGINE**. We have, for some time past, felt the necessity of having a size between the 8-inch and the 12-inch, as we find that there are many localities where the 8-inch Engine is rather small for the work, and the 12-inch Engine larger and more expensive than is necessary. We have made this engine much stronger and heavier in proportion to its size, than any we have previously built. We have also added important features to it, which make it much more powerful in proportion, and we take pleasure in offering it to the public at this time, with a feeling of confidence that it will prove very acceptable and successful.

This engine will occupy a floor space of 4 ft. 2 in. long, by 2 ft. 6 in. wide, and 6 ft. 1½ in. high, and we are prepared to furnish them with furnaces for burning either hard or soft coal, or wood. This engine weighs about 1300 pounds, and will require inch-and-one-half suction and discharge pipe, and will pump 800 gallons per hour to a height of 50 feet. The price is **\$300.00**.

We have also made new designs for our 12-inch ERICSSON ENGINE, making them much heavier and stronger; and have introduced the same new features in this size that we have in the 10-inch; and have increased its capacity to such an extent that it will pump a thousand gallons per hour 50 feet high. The price of this engine remains unchanged, namely, three hundred and twenty dollars.

PRICE LIST.

Showing Sizes, Approximate Consumption of Fuel, Gallons per Hour, etc.

Size, Diameter Air Cylinder, in Inches.	SPACE ON FLOOR.	Height.	Cubic Feet of Gas per Hour	Anthracite Nut Coal used in the test, or equivalent of other Fuels.	Approximate Shipping Weight, in Dbs.	Size Suction Pipe.	Size Discharge Pipe.	Gallons per Hour, 50 feet high.	Price, with Coal or Wood Furnace.	Price, with Gas Furnace.
5-inch.	2 ft. 2 in. x 14 in.	4 feet.	15		250	½ in.	¾ in.	150		\$150
6 "	3 ft. 3 in. x 20 in.	4 ft. 3 in.	18	2½ lbs.	425	¾ "	1 "	200	\$210	200
8 "	4 ft. x 21 in.	5 ft. 3 in.	25	3½ "	625	1 "	1 ½ "	350	250	235
12 "	4 ft. 6 in. x 2 ft. 3 in.	5 ft. 10 in.	.. 6 "	"	1,425	1 ½ "	1 ½ "	800	320	
12 " Duplex.	3 ft. 6 in. x 4 ft. 4 in.	5 ft. 10 in.	.. 12 "	"	2,240	2 "	2 "	1,600	450	

Arranged for deep-well pumping; 8-inch Engines are \$10 extra, 12-inch are \$15 extra, and Duplex are \$25 extra.

These Engines will pump approximately the number of gallons specified to a height of 50 feet, but they will pump more water to a lesser height, or less water to a greater height.

The above prices include Engine, Pump, Copper Air-chamber, Vacuum Chamber, Furnace, Wrench, Oil Can and Oil. *No charge for boxing or cartage.*

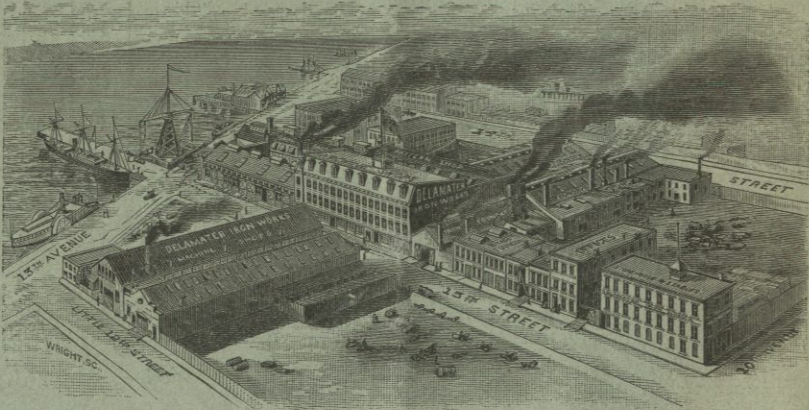
GUARANTEE.

Every Pumping Engine sold by us is guaranteed to be in every respect as represented in this circular. If an Engine fails in any particular, we agree to make the same fully satisfactory, or refund the amount paid us for it, on return of the Engine to us.

Where can an Ericsson Engine be seen in Operation.

In nearly every first-class dwelling and apartment house in New York City, and many of the same parties have them for pumping the water supply for their country residences. We would refer parties living in other States to any one of their acquaintances in this city, where the Engine is as staple and well known as a common hand pump. New York City architects call for them regularly. They are used all over the United States.

Heretofore we have published long lists of testimonials and users, which is necessary to the successful introduction of all *new* machinery. In this eight-page circular we have not the room for such a list, nor do we consider it necessary after having sold so many of these machines. Any one desiring such a list will please write to us for it.



DELAMATER IRON WORKS, NEW YORK, N. Y., U. S. A.

C. H. DELAMATER & CO., Proprietors.

ALSO MANUFACTURERS OF

DELAMATER STEAM PUMPS,
Delamater Duplex Steam Pumps,

— AND —

IMPROVED RIDER COMPRESSION

(HOT AIR)

Pumping Engines.