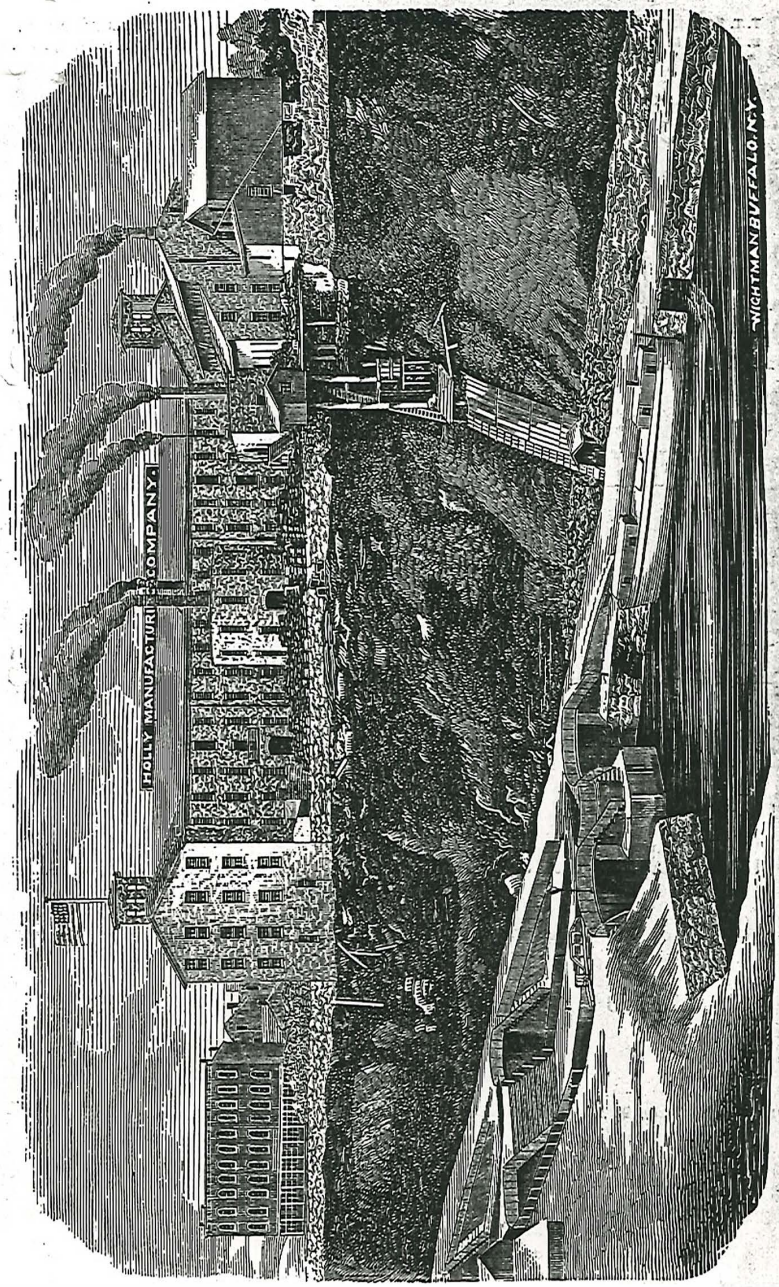

B. HOLLY'S SYSTEM

OF

FIRE PROTECTION

AND

WATER SUPPLY

FOR CITIES AND VILLAGES.

Machinery Manufactured and Warranted Superior to any other, by

HOLLY MANUFACTURING COMPANY,

LOCKPORT, N. Y.

BIGNALL & McDONALD, Gen'l Western Agents,

232 LAKE STREET, CHICAGO, ILLS.

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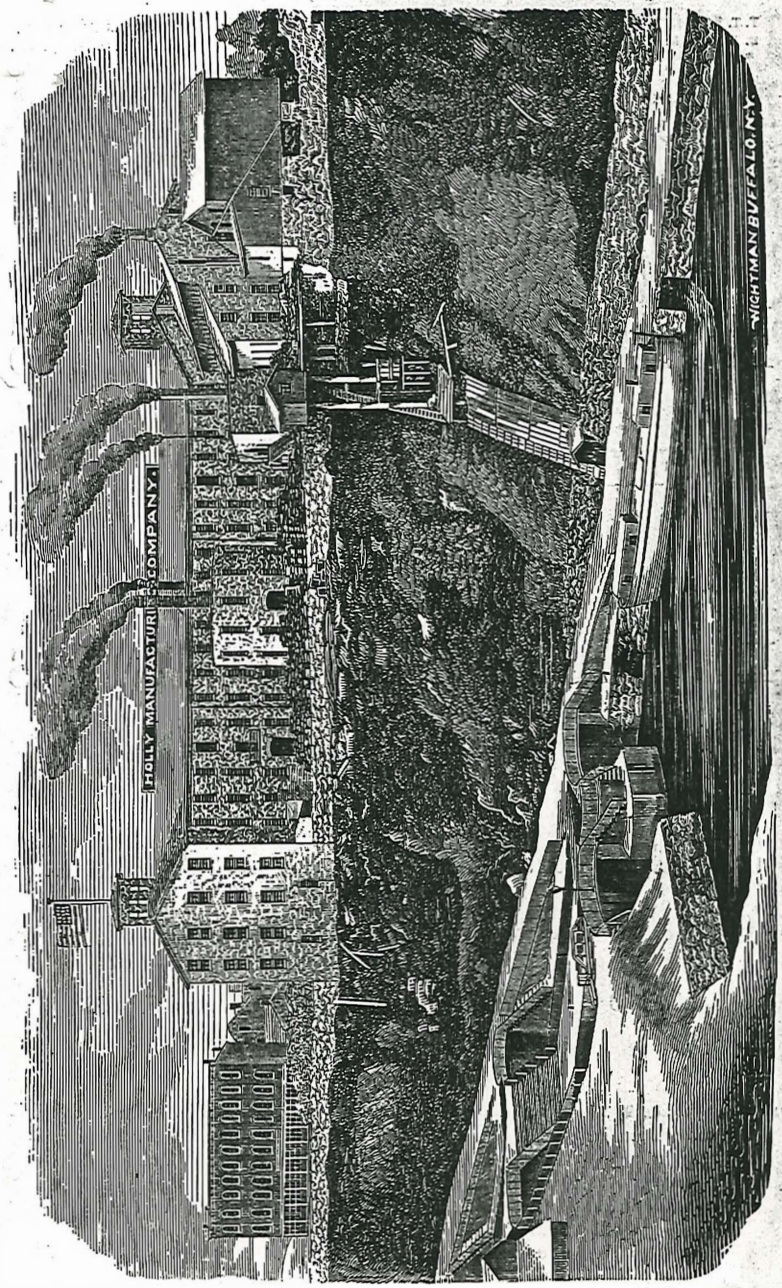
FRANKLIN PRINTING HOUSE.

1868.

FRANKLIN B. HOUGH
YORK STATE



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FRANKLIN B. NOURSE
NEW YORK STATE

FIRE PROTECTION AND WATER SUPPLY

FOR CITIES AND VILLAGES.

DESTRUCTIVE conflagrations are continually occurring; villages and cities are laid waste; multitudes of individuals are pecuniarily ruined; and insurance companies, hitherto safe to the insured and profitable to the stockholders, are being seriously crippled or made hopelessly bankrupt. Underwriters seek a partial remedy for this alarming state of things, by increased and onerous rates of insurance upon property, while the real and urgent want of the times, is increased protection against these disastrous conflagrations.

A full and reliable supply of water for communities—embracing household purposes, watering streets, sprinkling lawns and supplying fountains—is also more than ever felt to be a public necessity, because in this way is the public health and comfort largely promoted, and the beauty and attractiveness of cities and villages greatly augmented.

Happily, these two most important objects of fire protection and water supply, are fully accomplished by the new system of Water Works, invented by BIRDSILL HOLLY, and manufactured by the Holly Manufacturing Company, at their extensive machine shops at Lockport, N. Y. The machinery, in its new features and combinations, is covered by patents issued to Mr. Holly, whose inventive and mechanical genius has won for him an enviable and growing reputation, and under his immediate supervision these novel water works have been constructed, and are now in successful operation in the cities of Lockport and Auburn, and the village of Gouverneur, N. Y., and the city of Minneapolis, Minn. The attention of Mr. Holly was first called to the subject, by the frequency of fires in Lockport during the winter of 1862–3, which the fire department of the place, (as is well nigh universally the case everywhere,) was lamentably incompetent to check or control. It resulted in his devising the plan which—overcoming what hitherto seemed to be insurmountable difficulties, and dispensing with costly reservoirs and expensive but inefficient fire engines

NEW YORK

—gives communities the most perfect fire protection, and cheapest water supply in the world. The practical operations of these stationary water works, in the above named places, have more than realized the expectations of these communities, who enjoy their benefits and protection, and fully justify the eulogies pronounced upon them.

A description, in general terms, of these water works, now in operation in the above named places, may be of interest. The

LOCKPORT WATER WORKS

Were constructed in 1863, under a contract with the City Corporation. The wheel house is a circular brick building, located about 20 feet below the State Race, and is 20 feet in diameter. In the lower story is placed one of B. Holly's Patent Improved Turbine Water Wheels, five feet in diameter and of 140 horse-power, under a head of 19 feet. This wheel drives one of Mr. Holly's Patent Rotary Power Fire Pumps, which is capable of throwing 1,200 gallons of water per minute, when run at the rate of 160 revolutions. A 10-inch main leads up an elevation of about 40 feet to Main street, a distance of 30 rods, and the water is thence distributed through smaller pipes of 8, 6 and 4 inches, through the streets protected by the works. Aside from the compactness and efficiency of this machinery, an ingenious invention of Mr. Holly, of indispensable value, secures an uniform pressure of the water in the pipes. This Pressure Gauge, or Register, controls the water wheel gate, so as to give just the required pressure from 20 to 200 pounds, AND WHICH MAKES THE WORKS EQUIVALENT TO A RESERVOIR FOUR HUNDRED FEET HIGH. The agreement of the Holly Company, in the contract for the erection of the works, stipulated that, from a hydrant set at a point 50 feet above the pump, a stream of water should be thrown through 100 feet of hose 100 feet high. Upon the trial, the stream was thrown not only over the test pole placed for that purpose, but full 75 feet higher, as near as could be estimated, *when the hose burst!* Next, two streams were thrown at the same time, about the same height, *when the hose again gave way.* Then four streams at one time were thrown over the test pole. Next, in the language of the then Mayor, David M. Mather, Esq., who, with others of the City Corporation was officially present to decide upon the acceptance of the works, "the pump threw at the same time from nine hydrants, a stream from each, through nozzles from ⅞ to 1¼ inches in diameter, over the roofs of any of our buildings." The works were promptly accepted by the city, *the trial being rather a test of the hose than of the power of the machinery.*

In 1863, about 6,000 feet of pipe was laid and 27 hydrants set, the highest of them at an elevation of 72 feet above the stationary power. In 1867, 1,750 feet of additional pipes were put down, with a corresponding increase of hydrants, and ordinances have been passed by the Common Council, under which, in 1868, the present length of pipe will be nearly doubled. This extension of the district, covered by these works, attest the public estimation in which they are held after more than four years' trial, and was prompted by the cogent facts, that within the boundaries they protect, the rates of insurance have been reduced nearly 50 per cent.; that they have never failed to drown out, within the building wherein it originated, every fire that has broken out within the hydrant district, and have paid many times their cost in the reduction of insurance rates, and the saving of property which would otherwise have been destroyed.

Indeed, it is universally acknowledged, by the citizens of Lockport, that the prompt suppression of a single one of these fires, under the most unfavorable circumstances, by these water works, saved the business part of the town from destruction. The fire broke out about two o'clock in the morning, in one of the few wooden buildings remaining on Main street, occupied as a grocery and provision store. The building was 20 feet wide on the street, and 75 feet deep. When discovered, the flames had made formidable headway. The night was intensely cold, and the wind blowing furiously in the direction to sweep nearly the entire extent of Main street. It was so cold that the fire engines and hose would have immediately frozen up. So apparent was this impotency of the fire department to contend, either with the frost or the fire, that the shivering firemen did not withdraw their engines from the engine houses. Within a few minutes after the alarm was sounded, and without the slightest impediment or delay, two streams in front, and two in the rear, of the burning building, were brought to bear from the nearest hydrants of the Holly Water Works, and their powerful and incessant flow covered and protected the adjacent buildings, drowned out the flames, and left a considerable portion of the building standing.

In reference to the Water Works in Lockport, the following disinterested statements are annexed, as conclusively establishing their great value:

LOCKPORT, *January* 21, 1865.

GENTLEMEN:—I consider it a pleasure to give you my testimony as to the efficiency of the Water Works Pumps erected by you for the purpose of supplying our village with water, both for fire and other purposes. As you are aware, this village contracted with you for one of your No. 7

Water Works Pumps in 1863; it was completed and put in successful operation the same year. Upon its trial, it threw from ten hydrants in the Main street, a stream from each, through various nozzles from 7/8 to 2 inch diameter, over the roofs of any of our buildings, and it has been in perfect operation ever since. It has reduced the rates of insurance, and has given all within its reach a perfect feeling of protection against fire. One of its great advantages is the self-regulator connected with it, which regulates the power in proportion to the amount of water discharged, without any attendance. I wish all places of importance had the same system of water works; we should then hear of less damage by fires. I think it one of the most beneficial inventions in the country.

D. M. MATHER,
President of Board of Trustees.

MAYOR'S OFFICE, LOCKPORT, N. Y., *March* 20, 1867.

The Water Works, constructed by the Holly Manufacturing Company, for the protection of the business part of this city against fire, have more than fulfilled the promise of the inventor, Mr. Holly, and more than realized the most sanguine expectations of our citizens. The works are of great strength and power, and are marvelously well adapted to extinguish fires promptly and surely. Although designed for only the central and compact part of our city, it is found they have capacity to protect a much larger district, and hence an extension of the pipes, in accordance with the wishes of property holders, will be made at the earliest practicable moment. Cities and villages in need of a supply of water and protection against the calamities of fire, may safely trust the ingenuity and skill of Mr. Holly, for the accomplishment of these increasingly important results.

B. CARPENTER,
Mayor.

FIRE DEPARTMENT, CHIEF ENGINEER'S OFFICE,
LOCKPORT, *March* 21, 1867.

As the head of the fire department of this city, I have had repeated opportunities to test the great value of the Water Works constructed in this city by the Holly Manufacturing Company. In the celerity with which water can be brought to bear upon a fire—in the steady, powerful and *untiring* flow—in the quiet application of the water just where it is wanted, without any of the noise, confusion and smoke attendant upon working hand and steam engines, and in the certainty of throwing water in extreme cold weather through these under-ground pipes, and comparatively short

stretches of hose, when increased lengths of hose, through engines, would inevitably freeze; in all these, and other respects, these works are incomparably superior to any arrangement for the suppression of fires I have ever seen.

I concur with Mayor Carpenter in recommending these works to other communities, who desire an economical, judicious and advantageous use of water, either for the daily use of cities or the extinguishment of fires.

H. F. CADY,
Chief Engineer.

MAYOR'S OFFICE, LOCKPORT, N. Y., *Feb.* 25, 1868.

T. T. Flagler, Esq., Prest. Holly Manf'g Co.

Understanding that you are about to publish a new edition of your pamphlet, on the subject of Holly's System of Water Works, I cheerfully and unreservedly add my testimony to that of my predecessors, Messrs. Mather and Carpenter, in favor of these works, constructed by your Company for our city. They continue to meet every requirement upon them, and are regarded by our citizens as unrivalled and indispensable for fire protection. The process of extending the water pipes is steadily going on from year to year, and I shall count it very fortunate for the place when the whole city is thus brought within the area they protect, and is thus enabled to dispense entirely with the far more expensive but comparatively inefficient mode of fire protection by fire engines.

JAS. JACKSON, JR.,
Mayor.

CHIEF ENGINEER'S OFFICE, LOCKPORT, N. Y., *Feb.* 25, 1868.

In my long experience as fireman, and repeatedly as head of the Fire Department, I have had good opportunities for forming an opinion as to the relative merits of the Holly system, which has been in use here for five years past, in comparison with the *old fogy* mode of hand and steam fire engines. I might perhaps, with greater propriety, say that I am well qualified to judge of the contrast between the Holly plan, which can be relied upon, and other modes which cannot be relied upon, for suppressing fires. There are numerous and obvious advantages of the Holly Works, which I think will speedily cause their introduction into numerous other cities and villages.

L. W. BRISTOL,
Chief Engineer Fire Department of the City of Lockport, N. Y.

The obvious advantages and perfect success of the new Water Works at Lockport, attracted the attention of the Auburn Water Works Company, organized to furnish that city with water for culinary purposes and also for protection against fires. After repeated visits to Lockport, and minute and careful examinations of the works in operation there, that Company contracted with the Holly Manufacturing Company to construct the

AUBURN WATER WORKS,

Modeled after those at Lockport, but with additional capacity and power to meet the increased demand upon them. The works were duly constructed and accepted, and have successfully met every requirement, both for the supply of water for daily use throughout the city, and also as a perfect safeguard from conflagrations. The supply of water is drawn from the outlet of the Owasco lake, about two miles from the city. At this point, a wheel house, 30 by 35 feet, has been erected, two stories high. The upper story is arranged for the family residence of the Superintendent in charge of the machinery. In the lower story is placed three of Mr. Holly's celebrated Turbine Water Wheels—one of 60 and two of 100 horse power—under a head of 15 feet. Each of the large wheels drives one of Holly's Rotary Elliptical Power Pumps, capable of discharging 2,000,000 gallons of water every 24 hours. The smaller pump has a capacity of about 425,000 gallons every 24 hours. The design of three sets of wheels and pumps is to vary the supply of water according to the wants of the city—running one, two, or three of them, as needed. The wheels are so arranged as to apply the power of either wheel to either pump, or the power of one wheel to two pumps, or the power of two wheels to one pump. The water is forced through 12 inch pipe into the main street of the city, and then through reduced sizes of 8, 6, 4 and 3 inches, is distributed to different localities. The farthest hydrant is fully three miles from the wheel house. The flow of water for the daily supply of the city, is secured with perfect regularity and precision. In case of fire, by combinations of safety valves and a system of telegraphing by water, ingeniously contrived by Mr. Holly, any additional amount can be almost instantly thrown to any required point in the city. By simply opening any one of the hydrants the pressure is reduced in the regulating cylinder at the wheel house—this reduction depresses the piston—starts the regulator which hoists one or more of the gates—rings a bell in the Superintendent's sleeping apartment, and promptly calls him to his duty. *Upon repeated tests, the opening of a hydrant in the city has rung the alarm*

bell in the Superintendent's room at the wheel house, from two to three miles distant, WITHIN THREE SECONDS, as near as it was possible to determine by watches set and compared. As soon as a fire is extinguished, the closing of one or more hydrants will so act upon the same regulator, safety valves, piston and cylinder, as to close the gates again, and bring the flow of water in the pipes to the same pressure required for the ordinary supply of the city.

Since the erection of these works, several fires have broke out in Auburn, and there, as well as in Lockport, they have proved themselves equal to any and every emergency, in promptly suppressing what would otherwise have proved to have been wide-spread, and desolating conflagrations.

One of these fires broke out in an Oil Refinery in Auburn, on the ninth of February, 1867, with the following results, as stated by the *Auburn Advertiser and Union*, of that city, in its issue of the next day:

"The Engine and Retort House of the extensive Oil Refinery of Messrs. Burgess & Bros., of this city, took fire about seven o'clock last evening. We are happy to state that the progress of the fire was arrested in the building in which it originated, containing the engines, boilers, and machinery. The street hydrants of the Water Works Company are about 1,500 feet from the Refinery. A sufficient quantity of hose was promptly connected, and a continuous stream of water was poured upon the storehouses, out-buildings, offices, &c. In the storehouse was a large quantity of oil, naptha, &c., which was all saved. The engine, boilers and machinery were also uninjured, and will only interrupt the business of Messrs. Burgess & Bros., a few days. We think no one present, who saw the operations of our Water Works Company upon this fire, at a distance of three miles from the works, and 1,500 feet of hose attached, and then a sufficient power to throw water over the building with great force, will doubt its efficiency in case of fire, and our city and citizens may congratulate themselves on the result of this trial. And we also think the public are largely indebted to Mr. Holly, of Lockport, who invented and also constructed the machinery for this Company."

Another fire in Auburn broke out about two o'clock in the afternoon, in a large wooden building occupied as a Chair and Cabinet Manufactory. The building contained shavings, oils, varnishes and other combustibles incident to carrying on that kind of business. The fire originated from upsetting a pot of varnish, and in a very brief space of time the smoke and flame burst out of the openings in front, nearly to the middle of the street, and within three minutes, by the watch, four full sized and powerful

streams were thrown from as many of the nearest hydrants of the water works, which, by their overwhelming flow, speedily subdued the flames and saved the building and part of the contents, without much injury.

Still another fire occurred there about ten o'clock at night, in a frame barn, caused by breaking of a lamp, which at once set fire to the hay and other combustibles, communicated to the wood-work, thoroughly charred the roof-boards, rafters and ceiling, and yet, upon the alarm being given so, prompt and effectual was the application of water from the water works hydrants, that the flames were extinguished without harm to adjacent buildings, and the structure itself left standing, in a condition to repair at a moderate expense.

Other remarkable instances might be cited, to prove the incomparable superiority of these works over any other system, but it is deemed unnecessary, especially as the following official testimony is furnished for publication:

OFFICE OF THE AUBURN WATER WORKS COMPANY,
AUBURN, N. Y., *March* 29, 1867.

Holly Manufacturing Co., Lockport, N. Y.

GENTS:—Our Water Works, constructed with a view of furnishing an abundant supply of water, not only for general city purposes, but also with the design (if practicable) of providing ample protection against fires, have been in successful operation since November, 1865.

The Water Engines and machinery manufactured and put up for us by your Company, as well as the novel plan suggested by your Mr. Holly—dispensing with Reservoirs and Stand-pipes—have fully satisfied our expectations, and enabled us to secure the objects contemplated.

We have now about eight miles of mains laid in the city, of 12, 10, 8, 6 and 4 inches diameter, to which are attached some eighty fire hydrants, and at all times a constant and abundant supply of water has been furnished.

FOR FIRE PURPOSES WE HAVE NO NEED OF FIRE ENGINES, if there is a sufficient supply of hose to reach from the nearest hydrant. The pumps are of sufficient power to force the water directly from the hydrants, through any reasonable length of hose, far above the highest buildings, and without any perceptible difference whether one or a dozen streams are thrown at the same time.

As a protection against fires, we regard the plan adopted as especially invaluable, being not only less expensive but of greater efficiency than that ordinarily obtained by reservoirs and the force of gravity.

The hope originally entertained has not only been realized, but our confidence in the permanent success of the plan and works, fully established.

Respectfully, Yours,

E. H. AVERY,
Pres't Auburn Water Works Co.

JNO. S. FOWLER,
Mayor City of Auburn.

D. H. SCHOONMAKER,
Chief Eng'r City of Auburn.

Since the above was written, about five miles of additional pipe have been laid at Auburn.

WORKS ERECTED IN 1867.

Two sets of these water works were built by the Holly Company during last year. One of them was for the thriving village of Gouverneur, St. Lawrence County, N. Y. The Black river runs through it, separating it into two parts. Upon an island in the river, a building was erected, 20 by 24 feet, and two stories high. In the lower, or basement story, two of Holly's 72 inch Patent Turbine Water Wheels, of 75 horse power each, are placed, and in the story above, three of his Patent Elliptical Rotary Power Pumps, of capacity to throw, by their united power, 1,500 gallons per minute, or 2,160,000 gallons every twenty-four hours. The water pipes from the island to the shore banks, on either side, rest upon the bed of the river. The water varies from extreme shallowness to a depth of some fifteen feet, and the bottom quite irregular. The pipes were laid without coffer-dams, and by means of ball-joints the lay of the pipe to the unevenness of the beds was provided for, and perfect joint secured. It is believed this is the first instance of laying, successfully, water pipe beneath a deep running stream. The works were completed and ready for operation on the eleventh of December, 1867. At that time about 3,000 feet of street mains had been laid, when the severity of the weather stopped the further extension until the return of spring, when it is proposed to put down 9,000 feet additional, making a total of 12,000 feet, giving the town, what it so well deserves, a sense of security against the ravages of fire, which other towns may well envy.

A trial of the works for acceptance, was made on the eleventh of December. It was a most unfavorable time for the test. An unexampled drought had reduced the head of water from 8 feet, as stipulated by the Gouverneur authorities, to 3½ feet, less than one-half the height promised. The performance of the works, notwithstanding this very material diminution of water power, is correctly set forth by one of the journals of the village, (*Gouverneur Times*, Dec. 12, 1867,) as follows:

GOUVERNEUR WATER WORKS.

"The Gouverneur Water Works Company have put in two of Holly's Patent Turbine Water Wheels, and three of his Rotary Pumps, which are now operating to the entire satisfaction of all. They were tested yesterday, under very unfavorable circumstances, the water in the river being lower than ever before known.

"Still they performed more than could have been expected considering the head—only 42 inches, and continually running down. They held a pressure of 65 lbs. to the square inch, as indicated by the steam gauge, throwing through short elbows (another disadvantage, as the hose purchased by the Company did not arrive in time for the trial,) two one-inch streams to the height of 105 feet. The Company's guarantee is, to throw four one-inch streams 80 feet high, with a head of 8 feet. That this machinery will perform all that its makers claim for it, there is not a shadow of doubt.

"Mr. W. G. Hamilton, the erecting Engineer, is a gentleman, and a mechanic of rare ability. He has spared no pains to complete the works, not only in the shortest time, but in the best possible manner. He was also called upon to lay the river pipe, which operation, though not in his direct line, he performed in a skillful manner, and although the cast-iron pipe proved as he predicted it would,—entirely worthless for the river use,—no blame could be attached to him. He has since put down wrought-iron pipe in its place, and it can now safely be said that the Gouverneur Water Works Company is in every respect a perfect success. There is also attached to these wheels and pumps, an improved regulator, which 'takes care' of them in the absence of the engineer or operator, regulating the speed of the wheels and the pressure of the pumps in as accurate a manner as possible, whether there is a large or small amount of water escaping the pipe.

"We would invite the people of our neighboring villages to examine these works, feeling confident that they will have no hesitation in pronouncing them the best protection against fires, and at the same time reducing their rates of insurance. They can also have a supply of ready running water in their dwellings and yards. The Holly Manufacturing Company are the parties to furnish the machinery, and Mr. Hamilton is *the* man to put it up."

A further testimonial, as to the merits of these works, may be quoted from the *Rochester Democrat*, of January 27th, 1868. A correspondent of that paper, on his travels through the Northern part of the State, made a short stay in Gouverneur, and jots down the following paragraph:

"At Gouverneur we found the people rejoicing over some new Water Works, just introduced from Lockport. In this village of three thousand inhabitants, the running stream is made to force the water all through the streets, to supply the houses and to extinguish fires. The Lockport man was here who erected the works, which seem to possess great power. The machinery regulates itself. If the stream is running low, the enginery is so adjusted as to raise the gates and let in more water, so as to send a more powerful current through the town. If the pressure becomes greater than is needed, the same machinery quietly shuts the gate partly down again, and the pressure on the pipes is proportionately reduced. Why is not this much better than a fire engine for any village, where there is a stream of water sufficient to drive the necessary machinery?"

The pertinent inquiry of this unknown but sensible correspondent, is susceptible of but one answer, and that in the affirmative. He might with propriety have raised the same question even where steam power is required, for whether moved by water or steam power, the Holly Water Works are destined to become a conceded necessity for the safety and comfort of communities.

MINNEAPOLIS WATER WORKS.

The last set of works completed by the Holly Company, was for the City of Minneapolis, Minnesota. Repeatedly scathed by fires, that community, upon hearing by chance of the new and wonderful water works at Lockport and Auburn, wisely instituted inquiries. These inquiries resulted in sending a committee of intelligent and practical citizens to give these works a careful examination. That examination prompted a report,

which resulted in giving that young, but prosperous and growing city, the credit of first planting these works upon the banks of the Mississippi river.

The Minneapolis Water Works are, in their arrangement, somewhat different from either Lockport or Auburn. The pumps, gearing, shafting, valves, and bearing of the wheel shafts, are mounted upon a heavy iron frame, making one compact and massive piece of mechanism. The regulator, pressure gauge and telegraph, are in like manner placed upon a suitable frame work of iron. There are two of Holly's Turbine Water Wheels, of 72 inch diameter each, and of 150 horse power each, under a head of 16 feet.

The two pumps have a capacity to throw, for fire purposes, 2,500 gallons of water per minute, or at the rate of 3,600,000 gallons every 24 hours. The works, as placed and in operation, are equivalent to a reservoir of any desired height, from 20 feet to 500 feet high.

The year 1867 was so far advanced when the order for construction of these works was given, that their final completion was carried into mid-winter of that rigorous climate, with thermometer running down to 40 degrees below zero, for days in succession, and the results have not been reported at the time this pamphlet goes to press.

Since the above was put in the hands of the printer, we have received the following:

MINNEAPOLIS, *February* 12, 1868.

Holly Manufacturing Co., Lockport, N. Y.

DEAR SIRS:—Your esteemed favor of 7th instant, making inquiry as to working of our new pumps, is received.

Mr. Carlos Holly leaves here for home to-morrow morning, having completed the erection of the water wheels, pumping machinery, &c., furnished under your contract with this city.

We are persuaded that you have given us a superior set of machinery, and it is declared by those who have seen both, to be even more excellent than the effective apparatus erected by you for supplying water to the city of Auburn, New York.

The unusual severity of this present winter even here, where we prepare for extreme cold, has prevented our completion of the first division of city mains. The early summer, however, will enable us to get all in good condition, when, we are convinced, we shall be able to considerably exceed the duty promised by you, for your pumps, in the contract with the city.

It gives us pleasure to add that the appearance of the machinery is not only substantial, but really handsome, and we think highly creditable to your establishment.

We hope, Gentlemen, that the opportunity to test this machinery under the trial of a large conflagration, will be for a long time denied us.

We remain, respectfully yours,

DORELUS MORRISON,
Mayor.

S. H. KING,
City Engineer.

GEO. A. BRACKETT,
Chief Engineer.

THE HOLLY SYSTEM.

It will be seen that Mr. Holly's plan is to place one or more of his powerful Elliptical Rotary Pumps within a frost-proof and fire-proof building. He propels them either by water or steam power. These patent pumps are connected with water pipes of suitable size, laid at a depth which secures them against frost, and running through the streets of the town to be protected against fire, or supplied with water. Hydrants are set at proper intervals—*each hydrant being equivalent to a fire engine, and also a water reservoir*—and branch pipes laid as required for the supply of dwelling houses, fountains, sprinkling streets and lawns, or for any other purpose. In addition—as a crowning feature and excellence—it embraces a set of Pressure Gauges, Registers, Safety Valves and Water Telegraph, which, by their practical operations, secure an uniform flow of water through all the pipes, notwithstanding the fluctuations in the amount of water drawn from them, and the still farther and most important peculiarity, that in case of fire, the Holly Water Telegraph provides for any required additional supply for its prompt and sure suppression.

It only remains to suggest a few of the advantages of this complete and comprehensive system, over any other plan for fire protection and water supply.

ADVANTAGES OF HOLLY'S SYSTEM.

1. One of the advantages of these works is, the great STRENGTH AND POWER OF THE MACHINERY, as compared with fire engines, for the suppression of fires. The latter are made light as possible, in order that they may be moved with celerity in case of fire alarm. This sacrifice of strength to locomotion, often results in their giving way in some weak point at the critical moment which determines whether the fire shall be quelled or rage unchecked, until immense amounts of property are destroyed. The Holly Water Works, on the contrary, are permanently located, and iron and steel are freely used to make them massive, strong and durable. That they will not give way in time of fire, may be relied upon with great certainty. That they are constructed with superabundant amount of power, and in duplicate sets of machinery, is an additional guarantee of unfailing efficiency.

2. Another advantage of these works is, that they save and make available the precious time consumed by fire engines in reaching a fire, after the alarm is given. Fire engines wait for men to draw them, or are liable to be detained by a balky horse, or by overturning the engine, or by muddy streets, or a deep fall of snow, or some other difficulty, which keeps them from reaching the spot where their services are required, until too late to be of any service at all. The Holly Works, on the contrary, reach out by their under-ground pipes, throughout the entire town, and wherever a fire breaks out there will always be, near at hand, several hydrants —which, under this system, is but another name for most powerful fire engines—ever standing sentinel, and always ready without waiting to be moved, (upon the turning of a wrench, and the attaching of a section of hose,) for instant and successful action. The value of these works, in this feature, cannot be over-estimated, for a few minutes gained in throwing water upon a fire at the outset, are more than the equivalent of hours at a later period, when the conflagration has spread, and is sweeping all before it in its devastating course.

3. Another advantage of these water works is, that they obviate a serious difficulty, with other systems, in regard to a supply of water for the extinguishment of fires. It too often happens that even when the fire engines are in good working order, and arrive promptly at the conflagration, they cannot grapple with and master it, because of a partial supply of water. In marked contrast with this, by the Holly system, each and every hydrant—OR FIRE ENGINE—is also A NEVER FAILING RESERVOIR, which will yield its full supply, from the main source of supply,

until the flames are subdued. The failure of this main source of supply can, in the construction of the works, be abundantly guarded against, and hence it is hardly a conceivable contingency that a lack of water will prevent the suppression of fires promptly, wherever they occur.

4. Still another advantage of these water works is, that the severity of winter weather does not in the least interfere with their efficient operation. Very different is it with the other modes of suppressing fires with either hand or steam fire engines. They may be in perfect working order, and the supply of water may be abundant, and yet, with the thermometer at or below zero—and it is then fires are most frequent—how often communities stand appalled at the spectacle of conflagrations, which frozen fire engines and frozen hose cannot furnish a drop of water to repress and subdue. To this cause is attributable the destructiveness of the fire in Buffalo, which involved the American block in ruins, and for some time after the flames died out, the hose belonging to the fire department, lay in the streets of the city, frozen and totally unfit for use. Had another fire occurred, while the fire department was in this frozen condition, no one can guess the amount of the destruction of property, which would have been inevitable. Similar instances might be multiplied indefinitely. With the Holly system, it is noticeable that the suction is taken within a frost-proof building, the water is thence pumped into and through long stretches of pipes beneath the ground, and below the reach of frost, is thrown to the surface at the required point, with temperature considerably warmer than the open atmosphere, and thence, with great and unchecked velocity is showered in torrents upon the fire, through short stretches of hose, in which the water cannot congeal in its rapid flow. This circumstance, alone, very strongly recommends these works above all others, in that the security they afford is not diminished when most needed in intensely cold weather.

5. Another consideration in favor of these water works, is their comparative economy of construction, in that they dispense with reservoirs. These involve a heavy outlay to construct them at the needful altitude, and often require another large amount to convey the water by pipes long distances to the town where it is used. Frequently, too, as a part of the reservoir plan, costly machinery is required to keep up the supply of water, and a large sum per year for operating this machinery. The folly of this plan of forcing water two or three times higher than the level to be supplied, has an apt illustration in a King of France, who,

"With twenty thousand men,
Marched up the hill,—and then—
Marched down again."

This folly and waste of power is avoided by the Holly system. Its ponderous machinery reaches after the water, lifts it through its underground pipes, to the required altitude, and then supplies it in uniform flow for ordinary water supply, or in increased volume and strength for extinguishing fires. When it is borne in mind that with reservoirs ordinarily, fire engines are required for fire protection, while the Holly system supercedes them as well as the reservoir, the great pre-eminence of the Holly plan is obvious and overwhelming.

6. Another weighty circumstance bearing upon the question of adopting this system of Mr. Holly's, is, that since it *dispenses with fire engines, engine houses, &c.*, the sale of this property, no longer needed, will contribute largely to pay the cost of the Holly Water Works. In many cases the sale of the engines, engine houses, &c., would provide for nearly, or quite the entire cost of the Holly machinery.

7. Another circumstance in favor of these works, which commends them strongly, is *the nominal sum it costs to superintend and keep them in repair*. At Lockport, for three years after their construction, the care and superintendence was but $150 per year, and recently the authorities have contracted with a practical mechanic to take the entire charge, and keep in repair the entire works, including thirty-two hydrants,—equivalent to thirty-two fire engines—for the pittance of $250 per year. Let the comparison be made between this and the annual cost of maintaining a single fire engine, whether hand or steam, and tax-payers have an all powerful reason for immediately adopting the Holly system. Repeatedly, at Lockport, have ten good and effective streams, for fire purposes, been thrown at the same time from that number of hydrants by the water works. When tax-payers ascertain and foot up the annual cost of maintaining existing fire departments, they will be startled at the amount, and will appreciate the importance of the Holly system, which reduces it to a trifling sum annually.

8. Yet another circumstance in favor of these water works is, that it relieves communities of the expense, controversies, and demoralizing influences of fire departments as now organized. By the Holly system, hose companies alone are required, and since, wherever laid, the water pipes to that extent take the place of hose, only a small amount, comparatively, is required. In Lockport, two hydrant hose companies have been organized, composed of citizens interested in the protection of property, and in other places the same classes, prompted by this motive, will readily perform the same trifling service.

9. Conclusive proof of the superiority of these works, is found in the fact that underwriters readily make large concessions in the rates of insurance, within districts covered and protected by them. It is pertinent to state that in Lockport, with a view of overcoming the incredulity of tax-payers, a prominent citizen, who had faith in the system, secured a large portion of signatures to the petition, asking the Common Council to authorize their construction, by the promise that he would obligate himself to pay the tax of each one, for the amount of saving in insurance for the term of three years. *He has not been called upon to make up any deficiency under his stipulation.* In fact, in many cases, two years' saving has more than equaled the tax paid for construction.

10. It is also worth remembering, that the aggregate value of property which these works would save, if generally introduced, over and above any other system, would annually pay the interest on the debt of the United States, and provide a sinking fund for retiring the principal at no distant day.

11. These works, it is to be observed, also meet a public necessity, inasmuch as they combine fire protection and water supply, without the expense of constructing and maintaining reservoirs and fire engines, and thus place it within the reach and means of communities, to enjoy almost perfect immunity against fire, while at the same time a full supply of water is secured for household and other purposes.

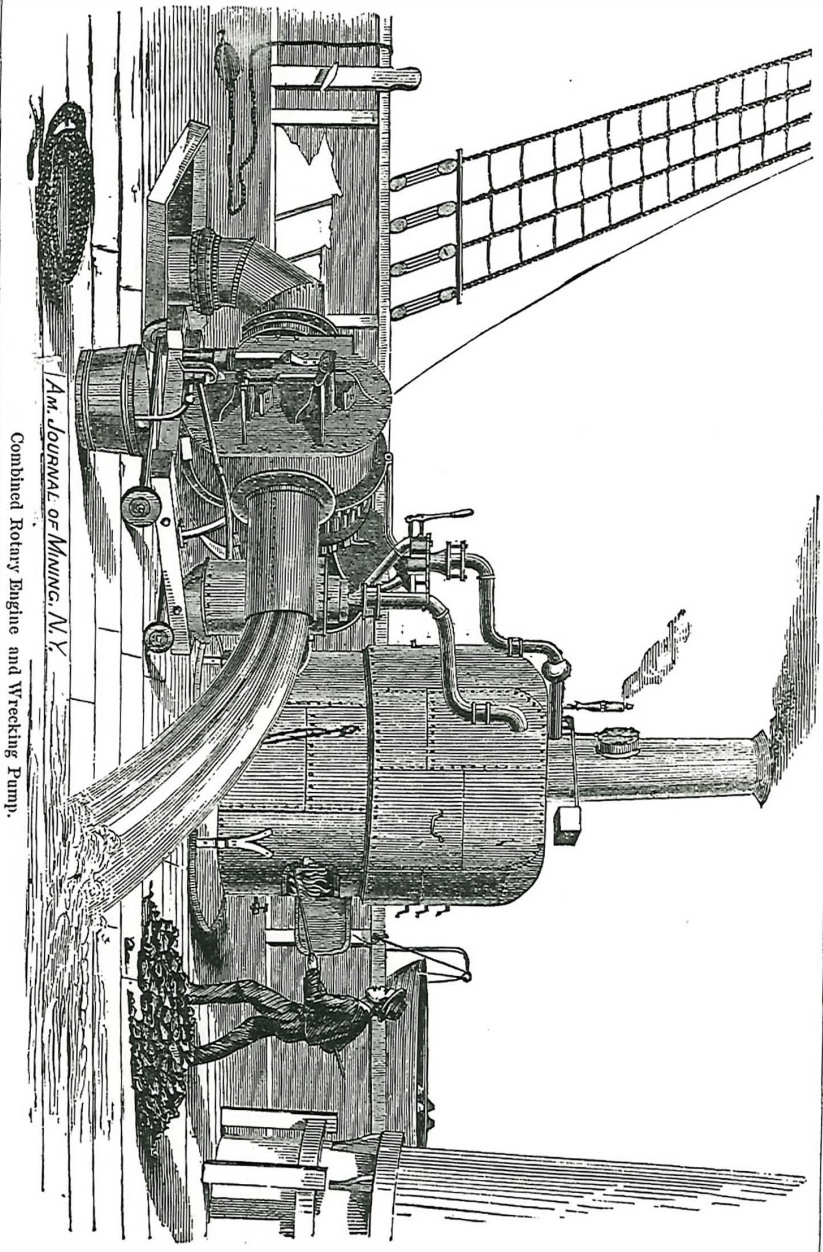
The City of Binghamton, which has a contract with the Holly Company for the construction of the Holly Works, to be operated by steam, and to be completed in the summer of 1868, was slow to believe that any other mode than a reservoir would answer their wants, but upon a presentation of the case, and an examination of the works at Lockport and Auburn, yielded all objections, and will soon be protected and supplied by the Holly Works. Other communities, to be in like manner convinced, need only to be informed of the advantages of the Holly system.

12. In further explanation of the extraordinary and superior efficiency of the Holly system, reference may be made to the rotary principle upon which the pumps are constructed. Water is incompressible, and its momentum, when flowing through pipes, is the same as all other heavy bodies in motion. In all reciprocating pumps, the water comes to a stand-still twice in every revolution of the pump, and has to start back in the opposite direction in order to escape from the pump, on account of this reacting motion of the water. In marked and favorable contrast is the action of the Holly Rotary Pump. From the moment the water comes under the influence of the pump, there is no reaction, no cessation, but one steady and unremitting flow, and with velocity largely increased by this difference of the rotary, over the reciprocating or piston pump.

The prescribed limits of this publication forbid multiplying points in which the Holly Works are preferable to other modes of accomplishing the objects of fire protection and water supply. If enough has been stated to put communities upon the inquiry in regard to them, the object of this pamphlet will have been attained. There are thousands of cities and villages which might, with great advantage, introduce them. An examination of the works now in operation afford a sure means of attesting the correctness of the statements of this pamphlet, and the Holly Company refer to what they have done for Lockport, Auburn, Gouverneur, and Minneapolis, as conclusively establishing their ability to accomplish similar and desirable results for other communities.

The Company is now engaged in manufacturing extensive works for the city of Binghamton. Contracts are substantially closed for the construction of them for two other cities, and numerous other applications are pending from other cities and villages. In anticipation of a large demand for these water works, which they are confident will surely come, the Company have been, and still are, enlarging the capacity of their shops, and to the extent of that capacity, and, in order of application, will they supply to communities the unrivalled HOLLY WATER WORKS for Fire Protection and Water Supply.

LOCKPORT, N. Y., *February*, 1868.



Combined Rotary Engine and Wrecking Pump.

Am. Journal of Mining, N. Y.

APPENDIX.

The Holly Company will hereafter furnish a superior FIRE HYDRANT, recently invented by Mr. Holly, which will be very desirable in connection with his water works.

Parties in want of Power Pumps, &c., are referred to the following certificates, selected from a large number, which have been voluntarily furnished to the company.

BUFFALO, *March* 17, 1865.

Holly Manufacturing Co., Lockport, N. Y.

GENTS:—During the last eight years I have had in constant use Holly's Wrecking Pumps of three different sizes, in raising sunken vessels on the lakes, and do not hesitate to say, that I consider them superior to any wrecking pumps in use in this country. In simplicity, capacity and economy, they have not been excelled. They are not liable to get out of order. Will not clog or choke with wet grain, etc. Have no valves to become obstructed, and in case the suction-pipe becomes obstructed by large debris, the engine can be instantly reversed so as to run the pump backwards, and thus instantly clean out the suction-pipe from any obstruction; when it can be started ahead again without trouble of priming or any delay whatever. The engine works with a very low pressure of steam, and they are very portable, and can be set up and got to work in less time than any other wrecking pump I ever saw. I will have seven of these pumps in use this year, stationed at important points on the lakes, and on board the wrecking steamer "Magnet."

Respectfully yours,

D. P. DOBBINS,

(See cut, page 21.)

General Agent Home Insurance Co. of N. Y.

BUFFALO, *March* 4, 1865.

Holly Manufacturing Co., Lockport N. Y.

GENTLEMEN:—I take pleasure in answering your request as to the merits of the Wrecking Pump purchased from you in the spring of 1864, with boiler and engine attached. I used the wrecker continuously during

the whole season following on the upper lakes, in raising wrecks and sunken vessels, and can speak of its performance in the highest terms. I have, in many cases, pumped the wet grain from the hold without any difficulty, the same as clear water, the pump never clogging or in any way becoming disarranged; in fact there is nothing about the pump to get out of order except by actual wear and tear, its construction is so simple. That it is the best pump for wrecking or any other purpose that a pump is required for, I firmly believe, and I unhesitatingly recommend it to any one who needs a pump that is durable and powerful and designed to run with little or no expense. In fact I cannot speak too highly of the engine, boiler and pump, each and as a whole; they need only to be seen in operation to be appreciated. I cheerfully give you permission to refer to me any party desirous of obtaining one of your truly valuable pumps or wreckers.

Yours truly,

ASA E. HART.

(See cut, page 21.)

OFFICE OF PHENIX INSURANCE CO.,
BUFFALO AGENCY, *February* 24, 1868.

Holly Manufacturing Co., Lockport, N. Y.

GENTLEMEN:—I take pleasure in informing you that the Rotary Wreckers, built for the Phenix Insurance Co. of Brooklyn, last spring, and used for wrecking purposes during the season of 1867, gave entire satisfaction; and from personal knowledge of work performed by the wreckers, built at your works, I unhesitatingly recommend the Holly Wrecking Pumps as being superior to any wrecking pump now in use in this country.

I have stationed at Detroit, one 14-inch and one 12-inch pump, which are always ready for business.

You may refer to me any parties desirous of information, or who might wish to purchase one of your valuable pumps.

Respectfully yours,

L. B. FORTIER,

(See cut, page 21.)

Agent Phenix Insurance Company.

ROCHESTER PAPER COMPANY.
OFFICE OF GENESEE PAPER MILLS, No. 69 STATE ST.,
ROCHESTER, N. Y., *January* 2, 1865.

Holly Manufacturing Co., Lockport, N. Y.

GENTLEMEN:—In reply to yours of a recent date, asking for our opinion of the merits of the Power Pump constructed for us by you, we would

say: We are now using one of your No. 12 Rotary Power Pumps in our Paper Mills, which we find capable of throwing one million gallons water per day, and raising the same about one hundred feet. We have used many different kinds of pumps, and take pleasure in saying that we have thus far had no pump that does its work so easily and with so little cost in the way of wear and tear—no valves or packing to get out of order—and we cannot speak in terms too strong of the excellence of its performance. It is the pump we have been in want of for years. We cheerfully give you permission to refer to us any party who may be desirous of obtaining a Power Pump that is right in all respects.

Yours, respectfully,

ROCHESTER PAPER COMPANY,
Per A. M. HASTINGS, Supt.

To Holly Manufacturing Co., Lockport, N. Y.

GENTLEMEN: It gives me pleasure to say that the large Rotary Pump of your make, which we purchased of you some two years since, has been running day and night continually (Sundays excepted) ever since; supplying our entire mill of eleven Rag Engines and two of the lagest size Fourdrinier Machines, making about one hundred revolutions per minute, and now has no appearance of wearing out, and to all appearances is as perfect as when first started; and what we consider of much importance, it has never given us any trouble. We have used a great variety of the Rotary Pumps, but yours has the preference, by far, over all.

Yours, very respectfully,

S. PETTIBONE,
Treasurer.

AUGUSTINE MILL, NEAR WILMINGTON, DEL., *Sept.* 30, 1861.

We have for several years been using the Rotary Pump of the Holly Manufacturing Co., to raise the water used at our Beating Engines and Machines, and find them superior to anything we have used heretofore, requiring scarcely any repair until worn out. One of the No. 4 Pumps, pumping some 75 gallons per minute, for some two years, and never had anything done to it, but one set of new leathers to prevent leakage at the journals. The water is raised some eighteen to twenty-two feet with quite a trifling amount of power.

WM. H. LINDSAY,
Foreman for Jessup & Moore.

(This company have purchased 40 of our Rotary Pumps for their various Paper Mills.)

T. T. FLAGLER, *President.*
B. HOLLY, *Mech'l Supt.*

CHARLES KEEP, *Sec'y.*
J. K. McDONALD, *Treas.*

HOLLY MANUFACTURING CO.

LOCKPORT, N. Y.

MANUFACTURERS OF THE

HOLLY WATER WORKS

AND

FIRE HYDRANTS

FOR CITIES AND VILLAGES.

ALSO

LIFT AND FORCE PUMPS

ELLIPTICAL ROTARY PUMPS, TURBINE WATER WHEELS,

Steam Engines, Portable and Stationary, both Rotary and Piston,

AIR AND GAS PUMPS,

AERATED BREAD MACHINERY, WRECKING AND MARINE PUMPS.

ALSO

LIFT AND FORCE PUMPS FOR HAND, IN ALL VARIETIES, THIMBLE SKEINS, GRINDSTONE ROLLERS, BARN DOOR HANGERS AND ROLLERS, AND CAST IRON BARN DOOR RAIL, AMALGAM BELLS, SINKS, SEWER AND BELL TRAPS, WELL WHEELS, CHAIN PUMP REELS, BLACKSMITHS' DRILLS, COACH SCREWS, CAST AND WROUGHT IRON PIPE, CAST AND WROUGHT IRON BENCH SCREWS, CHEESE PRESS SCREWS, STAIR PLATES, REVOLVING CLOTHES IRONS, BEDSTEAD FASTENERS, COAL SHOVELS AND TONGS, HOT AIR FURNACES AND REGISTERS, GAS PIPE TONGS, PULLEY BLOCKS, SAD IRON HEATERS, TAILORS' GEESE, &C.