PUBLIC WORKS.

Peninsula Creek Improvements—	
To complete dredging, and to sheet pile sides of channel..	$4,805
Gull and Burnt River Works—	
To construct dams at the outlet of Percy Lake	1,884
Mary's and Fairy Lakes' Works—	
To reconstruct dams at outlets of Mary's and Fairy Lakes	5,147
Madawaska River—	
Re-vote to construct swing bridge at Combermere.....	1,100

ADVANTAGES OF COMPRESSED AIR.*

BY JAS. F LEWIS, CHICAGO.

The first recorded experiments in compressing air were made by Hero, of Alexandria, who flourished 150 years before Christ Papin in the seventeenth century, investigated the subject to some extent, and according to Ganot's Physics, the air pump was invented in 1650 by Otto Guericke.

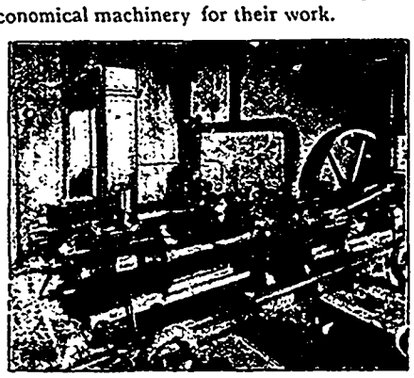
In 1726, 1753 and 1757, patents were taken out for different methods in compressing air. From 1810 to 1860, quite a number of patents were issued along this line, but the first work of any moment done by compressed air was in 1861, driving the Mt. Cenis Tunnel. The honor of first applying successfully to any great extent compressed air for the purpose of driving rock drills in America, belongs to one of your prominent and highly respected citizens, Walter Shanly, when he was driving the Hoosac Tunnel from Dec., 1868, to Dec., 1874 This tunnel is 24,100 feet long, 361,500 cubic yards of rock excavated, 544,735 lbs. nitro-glycerine and mica powder burned Mr. Shanly in that early day found great saving in cost over hand labor, as well as time in completing his work.

It was in this tunnel, also, that nitro-glycerine was first introduced in this country Therefore, Mr Shanly has the honor of being the first to make a success of the three great powers that have been instrumental not only in developing the great mining industries of this country- sinking to great depth for the precious metals—but making it possible to carry out wonderful engineering projects, driving tunnels and excavating canals from one to thirty-four miles long. These powers are air compressors, rock drills and high explosives.

The largest compressed air plant in the United States is at Quinnsec Falls, on the Menomonee River, the falls being forty-seven feet in height and furnishing unlimited power, which has been harnessed by modern skill to do economic duty.

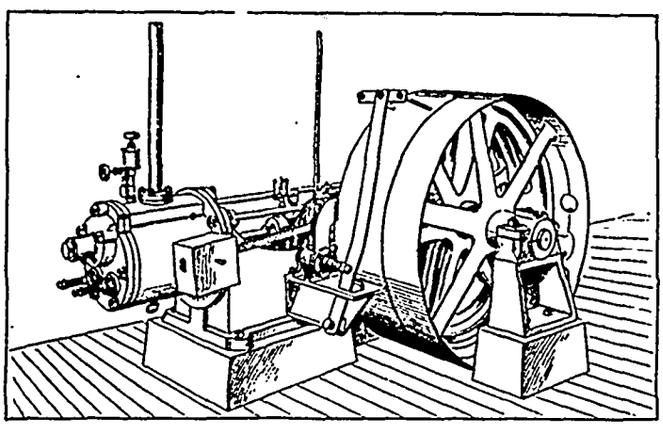
This plant consists of three pairs of air compressors, 23 inches in diameter by 60 inches stroke, and one pair 36 inches in diameter, by 60 inches stroke, delivering 3,000 h p. through 3½ miles of pipe to the Chapin and Ludington Iron Mines, at Iron Mountain, for pumping, hoisting and motive power engines above ground, and direct acting pumps and rock drills below ground. This power is carried through a twenty-four inch pipe, with a loss of only one pound in pressure, and the superintendent figures that he gets an efficiency of seventy-five per cent

Until quite recently the mine owner has taken no thought as to the economy or the efficiency in compressed air, feeling that it was a necessity and caring little about the cost, so long as it enabled him to prosecute his work, but during the last three or four years there has been a great change in this respect. The mining engineer has been looking carefully into the question of economy, and the manufacturers find with pleasure that they are willing to pay for the highest type of air compressors The same may be said also of contractors They are fast becoming educated by experience to the fact that there can be a great saving made by using the most economical machinery for their work.



HIGH-CLASS ECONOMICAL STEAM DRIVEN COMPRESSOR.

The Chicago Drainage Canal has been a great educator in this respect. It was a long time before the contractors on that work could be convinced that it was economy to use compressed air as a power on open work as against steam. Finally, however, Mason, Hoge, King & Co., and E. D. Smith & Co., were persuaded to purchase compressed air plants, but before they could be installed, the work had been prosecuted for six months by the use of a number of small steam plants scattered over the mile sections. The air plants were installed in the centre of the section, and the air carried in pipes along the banks of the excavation, and after working six months with compressed air, they were fully convinced that it was at least twenty per cent. cheaper than the use of steam for the same work. Therefore, ten rock sections out of fourteen were worked with compressed air. The other four with steam, and from data thus obtained, it shows conclusively that air was the most economical. The cost of drilling with steam was 8.64 cents per cubic yard of rock, with air 6.30 cents per cubic yard of rock. Two of the contractors had the courage to purchase a high type of air compressor, and the saving in the coal pile was greatly to their advantage and very soon paid for the extra cost of the compressors.



E. D. Smith & Co., who excavated two miles of the Chicago Drainage Canal, are now driving a two-mile tunnel near Boston. From the experience they had on the canal, they equipped the two miles of tunnel with two first-class Corliss engine air compressors, both of them duplex machines, 20-inch diameter cylinders by 36-inch stroke. The plant is installed at one end of the tunnel, the air carried the two miles through pipes, and the entire work of pumping, hoisting, and drilling is done by compressed air. This same company is also doing a large piece of work at Niagara Falls, excavating for the new wheel pits, which are to be 185 feet deep, 20 feet wide and 180 feet long. The entire work of drilling and channeling is being done with compressed air.

Great progress has been made during the past four or five years with compressed air as a power in mechanics. In fact, it is fast becoming universal for use in machine shops, boiler shops, foundries, railway shops, bicycle shops, and also for deep well pumping. There is yet much skepticism as to its economy or efficiency for mechanical purposes, but a great change of opinion has and is taking place among many of our most thoughtful mechanical engineers. They are becoming converted rapidly in favor of compressed air. They find no end to its uses, after it is once introduced into the shop or foundry. The advantages of it as a motive power in shops are numerous. It is easy to handle, it is clean and neat, it is always ready to do its work the moment the throttle is opened, it can be carried from one end of the shop or yard without loss, if properly piped.

It has been considered until quite recently rather of an expensive power, because railway shops have labored under the same impression as mining men—that any old cylinder or machine was good enough to make compressed air. For instance—you will find railway shops using five or six locomotive pumps that produce from fifty or sixty cubic feet of free air per minute. This means an investment of $600 or $700 tied up on the wall. With an air compressor, that would not cost over $500, they can produce double this quantity of air with one-fifth the amount of steam. Many railway shops are being fitted up with the most economical air compressors, and mechanics are becoming ready to testify to its efficiency and great saving over other powers.

Four or five years ago, the Cramps installed a large economical air compressor in their shipyard, piping the air throughout their works They say to-day that it has been one of the greatest money saving machines they ever purchased.

About a year and a half ago, the Atchison, Topeka & Santa Fe Railway installed a duplex 20x48 air compressor in their shops at

* From a paper read at the Federated Canadian Mining Institute, Montreal.