SPIRALLY WELDED TUBING.

At the recent meeting of the American Institute of Mining Engineers, Boston, Mr. James C. Bayles read a paper on the above subject, an abstract of which we give from *Engineering*:

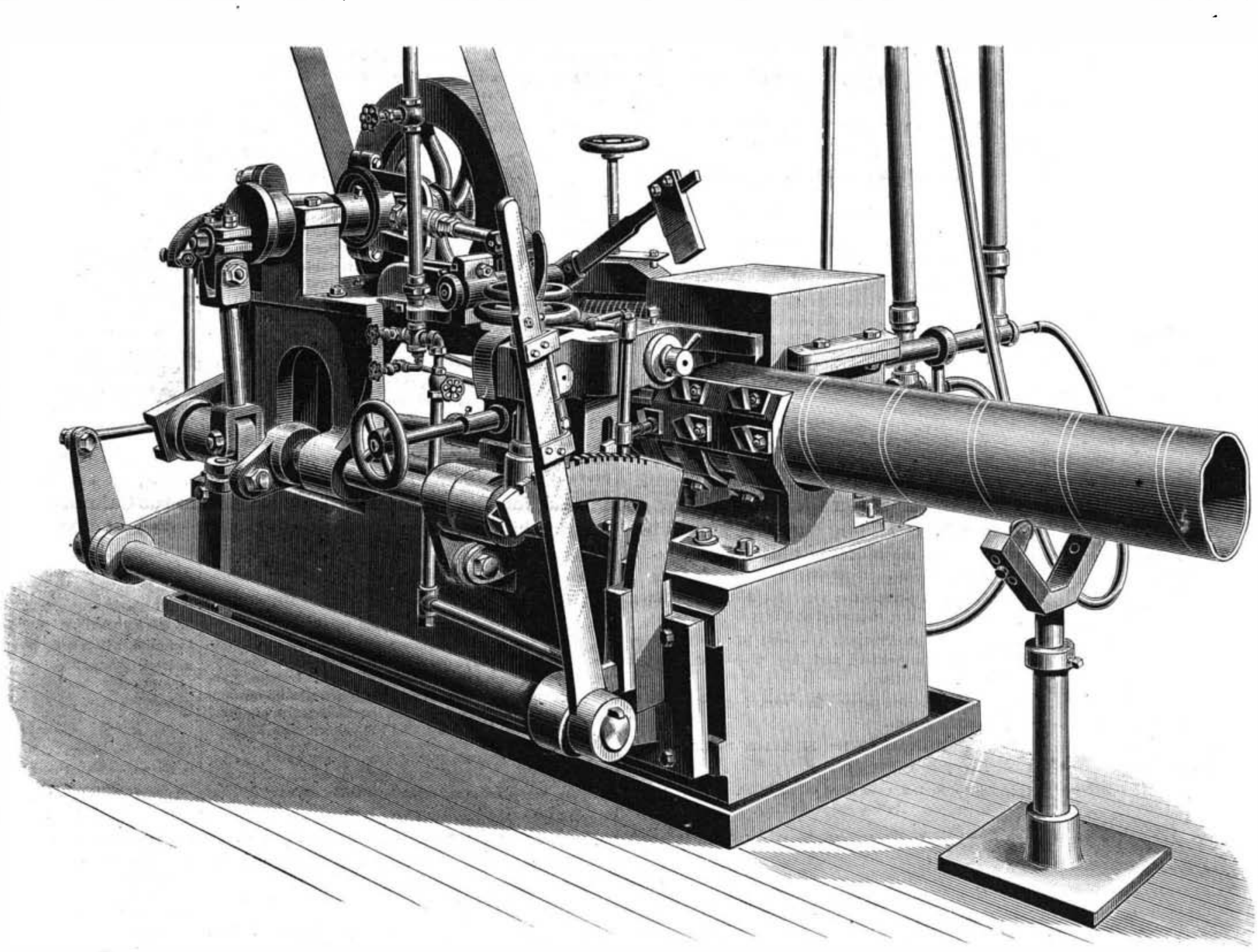
According to the first process described, namely, that adopted by the Spiral Weld Tube Company, of Orange, New Jersey, the tubing is made from strips of steel or iron skelp, which are wound spirally and heated along the overlapping edges, the welding being accomplished by hammering. The tube made is of uniform diameter, and its length is optional, being only limited by convenience of handling and transporting. The sizes range from 4 in. to 30 in., and it was stated this could be increased to any required size. Of the thickness of metal, the lightest used was No. 29 iron, and the heaviest No. 14 steel.

The metal is slit in widths varying with the desired diameter of the pipe—thus for 6 in. pipe 6 in., 8 in., 10 in., or 12 in. skelp is used. Of course, the widest possible skelp makes the pipe more rapidly. Using 8 in. skelp, 8·175 in. is added at each revolution in a 6 in. pipe, and with 12 in. skelp 14·59 in. In practice, it has been found more convenient to use 6 in., 12 in., 18 in., and 24 in. for the width of the skelp, and in the case of long pipes the ends are united by lap welding.

A ribbon 49 ft. long, for instance, is used in making a 30 ft. pipe 6 in. in diameter. In welding, the sheets are so placed as to have a ½ in. lap. They are clamped in this position, and the heat is applied above and below from movable furnaces along the seams; then a vertical hammer acting against an anvil with a reciprocating motion makes the weld, the whole process occupying about a minute to each cross section. Pressure rolls smooth out any inequality in the hot metal, and the latter is trimmed by rotary shears. In case of a defective weld or failure of the shears to act in the proper line, the weld is cut by a shear suspended by a counterbalance when not in use, and a new weld is made.

The pipe machine proper—of which we give a perspective view on the present page—occupies about 3 ft. by 6 ft. of floor space. One end of the ribbon of skelp is placed upon a guide table, which is set at an angle varying with the width of the skelp and the diameter of pipe into which it is to be made. The metal is carried into the machine between feed rolls geared together and actuated by a ratchet, giving them an intermittent rotation, and a rate of feed variable between ⅛ in. and ⅝ in. at each impulse, at the pleasure of the operator. The ratchet then carries the metal to the forming jaws, which bend it to the desired curvature.

The guide table for the skelp is adjustable to any desired angle, and this is one essential feature of the machine; another consists in the rolls which pass the skelp forward, a process so arranged that it moves when the hammer is raised and stops at its fall. There is also an adjustable former to shape the metal to its proper diameter, and finally the movable furnaces, and the hammer and anvil. No mandrel is used in this process, but the pipe is held in place by a pipe mould, and rotates inside of it as the stock is fed in. The anvil is quite heavy and steel faced, but the hammer is light and strikes about 160 blows to the minute. The lever and notched sector seen at the side of the engraving regulate the feed. The heating furnace heats both edges of the skelp at once, and is kept a few inches in advance of the point where the welding is being made. The heating is effected by one or two blowpipes of water gas and air, two being found to work better than one, as they heat the metal more rapidly, and admit of a faster rate of feeding. The speed varies with the thickness of the metal fed, and the relation of the width of the skelp to the diameter of the pipe. The present average is about 1 ft. per minute, although more rapid progress is expected. One strong feature of this process is that it requires but little skilled labor. After the pipe is finished it is treated with asphalt, and after testing is ready for sale. Another method of making spirally arranged pipe was described as being employed by the Providence Steam Engine Company. Two ribbons are used which lie over a mandrel, the ribbons overlapping for half their width, so that the pipe consists of two thicknesses. These are not welded, but soldered together by means of a bath into which the mandrel dips as it revolves, thus putting a thin coating of solder on the strips, which are at once soldered together by the pressure of the winding.



MACHINE FOR MAKING SPIRALLY WELDED TUBES.

New Petroleum Engine.

Interesting reports have been presented on Messrs. Priestman's engine by Sir William Thomson, F.R.SS. L. & E., LL.D., M. Inst. C. E., Sir Samuel Canning, M.Inst.C.E., Boverton Redwood, Esq., F.I.C., F.C.S., and by Messrs. H. Alabaster, Gatehouse & Co.

Sir William Thomson says: I have inspected Priestman's petroleum engines (made under Priestman's, Humes', and Eteve's patents), at their works, Holderness Foundry, Hull, where I found six engines all working with common petroleum, of gravity about 800. In one shop I saw a 4 horse power petroleum engine doing ordinary duty in a perfectly satisfactory manner, I am informed, in place of a semi-portable engine and boiler, which has now been entirely dispensed with for some months past.

Another shop, containing lathes, etc., is being driven constantly by a smaller engine. This is similar to another engine supplied by the makers to Messrs. Richardson Brothe s, of Newcastle, which I had previously inspected in Newcastle, and found working very satisfactorily. A small double cylinder engine has been mounted upon a truck, which is worked on a temporary line of rails, in order to show the adaptation of a petroleum engine for locomotive purposes, on tramways, and in my opinion there is a great future for this engine in that important direction. I was shown a launch in progress, designed for being driven by petroleum, the engines for which were also in hand.

The exemption from boiler and "getting up steam," and from need for fresh water supply for the boiler, and the smallness of the weight of the fuel in proportion to duty done in Messrs. Priestman's petroleum engines, and the convenience for stowing the oil in tanks in the bottom of the boat, give what seem to me important advantages to these engines in comparison with steam engines for launches and small steamers in many places, and for varied applications. I made careful tests on a 6 horse power engine. After seeing it started and stopped several times, and kept running on the brake for an hour at 7¼ horse power, and for two hours at 6 horse power, without measuring the oil, I gave it exactly an hour's run with the brake loaded slightly more than for 6 horse power, and with arrangements to measure the oil accurately.

The result was that the engine ran with very admirable regularity at from 158 to 160 revolutions, doing 6·43 horse power on the brake. The quantity of oil used was very exactly 11 pints, being at the rate of 1·71 pints per hour per brake horsepower,* or 1·69 lb. per hour per brake horse power, which seems to be remarkably good economy, considering the great difficulties which had to be overcome in using the combustion of oil directly as a motor. It must be noted that these results refer to the horse power of work actually done externally by the engine, and not merely to "indicated horse power," which in the steam engine, and still more in the gas engine, falls short of true horse power by a large difference.

Messrs. Priestman's engine, unlike one upon another system to which my attention has been called, does not use only the lighter portion of the oil, leaving a large residuum which cannot be utilized, but has the great advantage of consuming the whole of the oil put into the cistern, which I verified by careful examination of the working of the engines which I tested. Messrs. Priestman's engines are simple in construction, and there are few working parts liable to get out of order. By a new and effective mode of regulating the supply of vapor to the cylinder, combustion so perfect is obtained that deposit of carbon in the cylinder and passages is most satisfactorily obviated, as I have myself verified by careful examination. As the engine is governed by reducing the charge admitted into the cylinder, instead of cutting off the supply, the explosion takes place with great regularity, thus securing steady running with or without load, and with varied loads, which, judging from my own experience of the irregular running of gas engines running at anything less than full load, is a very important advantage. Some of Messrs. Priestman's engines are fitted with a combined circulating water tank and pump, obviating the necessity of having a separate tank with overhead piping, which in many cases is objectionable. The piston requires no oiling, as the vapor admitted into the cylinder lubricates it sufficiently. As this engine has all the advantages of a gas engine, without being dependent on gas works and a gas supply, it is available for many important applications from which the gas engine is precluded.

Succi, the Fasting Man.

The Accademia Medico-Fisica of Florence has just given a diploma to Signor Succi, on the occasion of his having completed his thirty days' fast. The document runs as follows:

"We, the undersigned, do certify that Signor Giovanni Succi, of Cesenatico, in the Romagna, African traveler and explorer, has completed at Florence a fast of thirty days—from the midnight of the 1st to the midnight of the 31st of March of this year—subjecting himself to all the regulations imposed by the Committee of Surveillance created *ad hoc*, and to all the scientific observations of the commission nominated by this Academy, the results of which will be made *publici juris* at as early a date as possible. We further declare that by his courageous experiment, and by his scrupulous fulfillment of every moral pledge undertaken by him toward us, Signor Succi has deserved well of science." Then follow the signatures of Professor Angiolo Filippi, President of the Committee of Surveillance, and of Dr. Vincenzo Crapolo, his secretary, of Professor Luigi Luciani, President of the Academy, and the secretary of its proceedings, Dr. Aurelio Bianchi.—*Lancet.*

* This equals about 0·85 of a pint per indicated horse power per hour.—P.B.