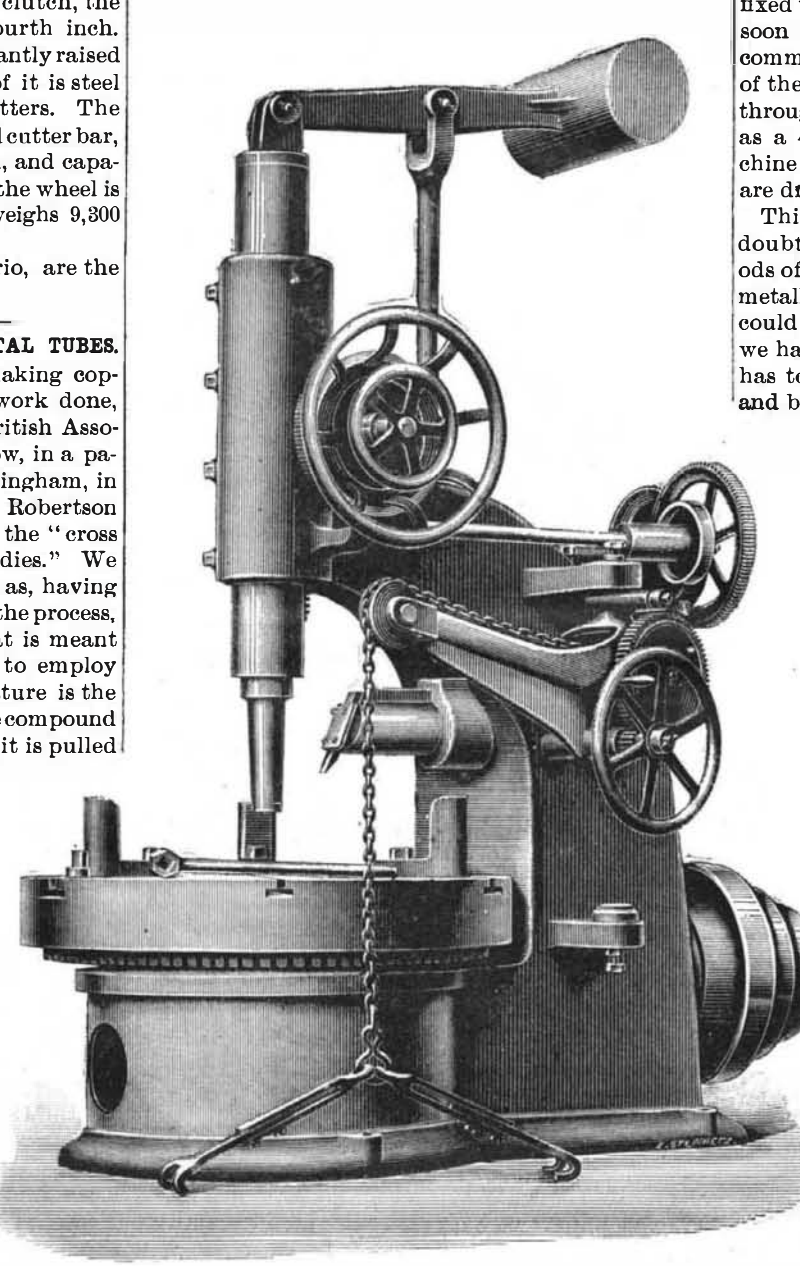
IMPROVED WHEEL BORING AND FACING MACHINE.

The illustration represents a 42 inch, very powerful car-wheel boring machine. It is provided with a light lifting tackle, to raise the wheel and place it in the horizontal chuck, which revolves in the bed piece. The boring bar stands vertically over the center of the chuck, and has a cast steel rack, to which the feed is imparted by a worm motion with a friction clutch, the cut varying from one-tenth inch to one-fourth inch. The bar is counterweighted, and can be instantly raised and lowered with little effort. The point of it is steel fitted in a taper socket for carrying the cutters. The hubs of the wheels are faced by a horizontal cutter bar, provided with an independent feed motion, and capable of being run close to the framing while the wheel is being placed in the chuck. The machine weighs 9,300 pounds.

McKechnie & Bertram, of Dundas, Ontario, are the makers.—*Engineering*.



IMPROVED WHEEL BORING AND FACING MACHINE.

A NEW SYSTEM OF MANUFACTURING METAL TUBES.

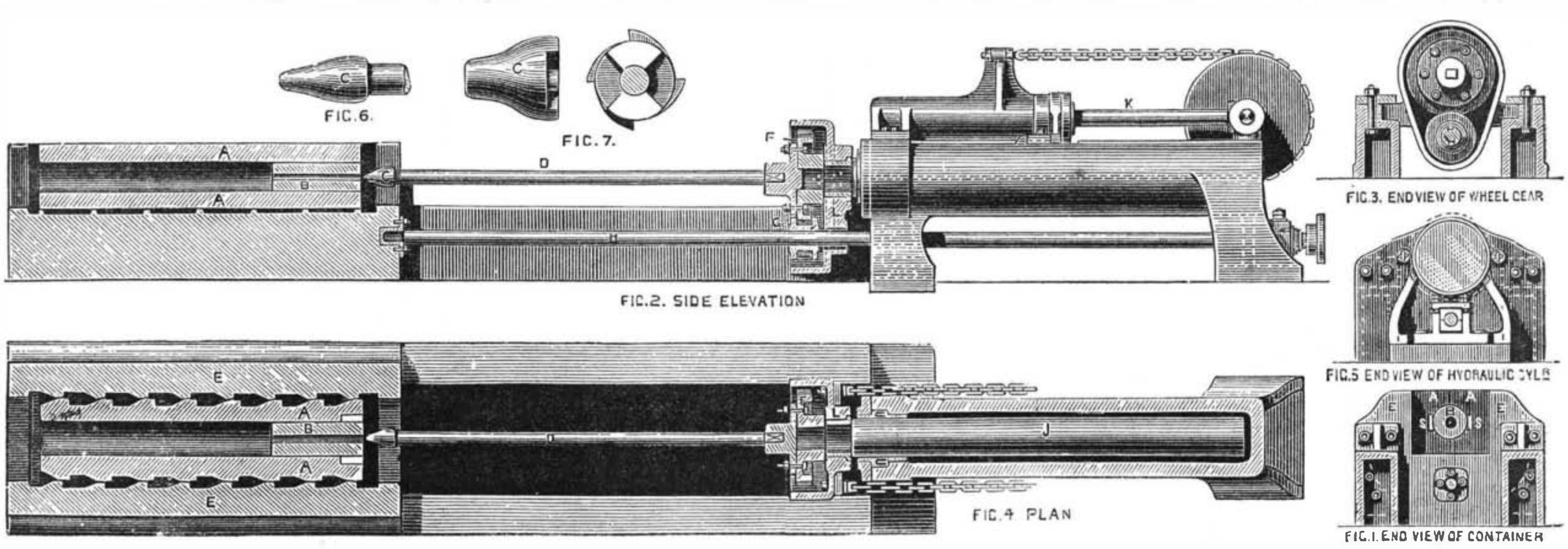
An account of a remarkable system of making copper tubes, illustrated by specimens of the work done, was given at the recent meeting of the British Association, by Mr. James Robertson, of Glasgow, in a paper read by Mr. Ralph Heaton, of Birmingham, in whose works the system is adopted. Mr. Robertson calls the principle involved in his system the "cross surface motion frictional contact of solid bodies." We need not reproduce Mr. Robertson's paper, as, having seen the machinery at work in carrying out the process, we may, perhaps, describe more briefly what is meant by the above, and then leave our readers to employ their own nomenclature. The essential feature is the application to tube-drawing mandrels of the compound motion which any one gives to a cork when it is pulled out by a slightly twisting movement, or of the partial rotative movement given to, say, a wheel when it is being pushed on to a shaft upon which it fits tightly. The same principle had previously been employed by Mr. Robertson as a means of making pistons and piston and slide rods move more freely than when the pull or push imparted to them caused them to move only in the direction of their axes, and not to rotate upon them. The same principle has recently been employed by Mr. Wicksteed for the rotating pistons in his autographic testing apparatus.

The difference between the force necessary to slide a gland along a rod when the rod is fixed and when it is rotated at a hundred or so revolutions per minute has been found by Mr. Robertson to be something like sixty times, and the force necessary to pull a bulb-ended mandrel through a tube is said to be from sixty to eighty times more when pulled in the ordinary way than when rotated at the same time that it is pulled. According to Mr. Robertson, the greatest saving of power seems to be effected when the movement in a rotative sense of the surface concerned is about equal to its linear axial advance. The rotating mandrel has been adopted for drawing welded tubes, and it is found that by rotation the mandrel is at the same time prevented from heating to any material extent, and that a tube which previously required two heats can now be made in one. This causes a saving in mandrels, and we are informed that the higher the speed the less the heating of the mandrel for given work, and a mandrel of proper form, if rotated at about 4,500 turns per minute, may be forced through a white hot billet of steel 1 foot in thickness so rapidly that the mandrel may be held in the hand when withdrawn.

The application of the invention of Mr. Robertson has been developed in the works of Messrs Heaton, of the Mint, Birmingham, where cast copper ingots are made direct into thick "shells" for large or small tubes. The ingots are from 4 in. to 7 in. diameter, and by means of a small mandrel a hole may be, and often has been, forced into one of these smaller sizes; but by making a small hole through in the first instance in a special machine, the mandrel enlarging the hole from say 1 in. to 3·5 in., may be pushed through the ingot at the rate of from 6 in. to 9 in. per minute, and even a foot per minute, a current of oil being maintained through the hole and the mandrel rotated at about 20 revolutions per minute and pushed with a pressure of about 50 tons.

The engravings below, Figs. 1, 2, 3, 4, 5, show a machine for the purpose of converting ingots into "shells," and Figs. 6 and 7 show enlarged views of the ends of the mandrel; Fig. 6 being as used up to about 4·5 in., and Fig. 7 as used for sizes up to 6 in. and 7 in. These mandrels are rotated in the opposite direction to that which would be necessary if they were reamers. They are made of steel, and for the larger sizes ordinary Bessemer steel is found to be the best adapted for the work and to stand the hardening. Reference to the engravings will show the mandrel at C carried by the spindle. D, and rotated by the wheel, F, driven by a pinion, G, which slides on the shaft, H. The mandrel is forced forward by the plunger, J, which is pressed by water forced into the cylinder containing it by special pumps, no system of step bearing being sufficient for the purpose, although everything was tried before the water bearing for the plunger was adopted. The plunger revolves, and is brought back to the small plunger, K, head, L, and wheel and chain gear seen in Figs. 2 and 4. The ingot, B, is held in the containing shells, A, by the gripping pieces, S S, the container holder being a very powerful casting, A A, in which the inclined surfaces of the two halves of the container fixed themselves and the ingot, as seen in the plan. As soon as the ingot is operated upon by the mandrel it commences to elongate, and a 2 ft. ingot will come out of the container after it has had a 3·5 mandrel forced through it, there previously being only a 1·25 in. hole, as a 4 ft. shell. When the shells come from this machine they pass to tube-drawing rolls, in which they are drawn out upon a rotating mandrel.

This process is in course of development, and will no doubt work some great changes in the present methods of tube making. It is exceedingly interesting as a metallurgical process, and would have delighted Tresca could he have seen it. As may be expected from what we have said as to the rate at which the copper ingot has to make up its mind to change its form, a hard and bad ingot will not stand the first process, but those which do stand it—and they are nearly all—have thereafter a comparatively comfortable time in the succeeding drawings which follow the annealing after the first. The surface sometimes shows that the ingot has been heavily dealt with, but a light cut is run over the shells in a lathe at a high speed, and this surface defect, when it exists, is removed at very low cost, and the result is that splendidly sound and strong copper tubes are the result, especially adapted, owing to the way in which the metal is compressed, for calico printing rolls, as well as for the purposes of large and medium size copper pipes for general steam purposes.—*The Engineer*.



NEW MACHINERY FOR MANUFACTURING METAL TUBES.

An International Telephone Exhibition.

The Belgian Society of Industry and Engineering will open an international exposition on Jan. 9, 1887, at the Palais de la Bourse at Brussels. The design is to have as complete an exhibition as possible of all the apparatus for transmitting articulate speech, and to show what progress has been made since the first conception of the telephone. The exposition will comprise telephones, microphones, radiophones, phonographs, also the applications to which these may be put, central telephone systems, telephone stations, etc., conductors, and methods of insulation.

All the new inventions in this particular line will be shown by means of models, apparatus, plans, or diagrams.

A complete library on the subject of telephones will be connected with the exposition. The exhibition will last for five weeks, and those intending to enter should give notice to the directors through the secretary, Mons. Ch. Legrand, Brussels, before December 1.

A Ton of Coal.

There is more in a heap of coal than most persons are aware of. Besides gas, a ton of gas coal will yield 1,500 pounds of coke, 20 gallons of ammonia water, and 140 pounds of coal tar. Destructive distillation of the coal tar gives 69·6 pounds of pitch, 17 pounds of creosote, 14 pounds of heavy oils, 9·5 pounds naphtha yellow, 6·3 pounds of naphthaline, 4·75 pounds of naphthol, 2·25 pounds of alizarine, 2·4 pounds of solvent naphtha, 1·5 pounds of phenol, 1·2 pounds of aurine, 1·1 pounds of aniline, 0·77 pound of toludine, 0·46 pound of anthracine, and 0·9 pound of toluene. From the last named substance is obtained the new product known as saccharine, which is said to be 230 times as sweet as the best cane sugar.—*Iron*.