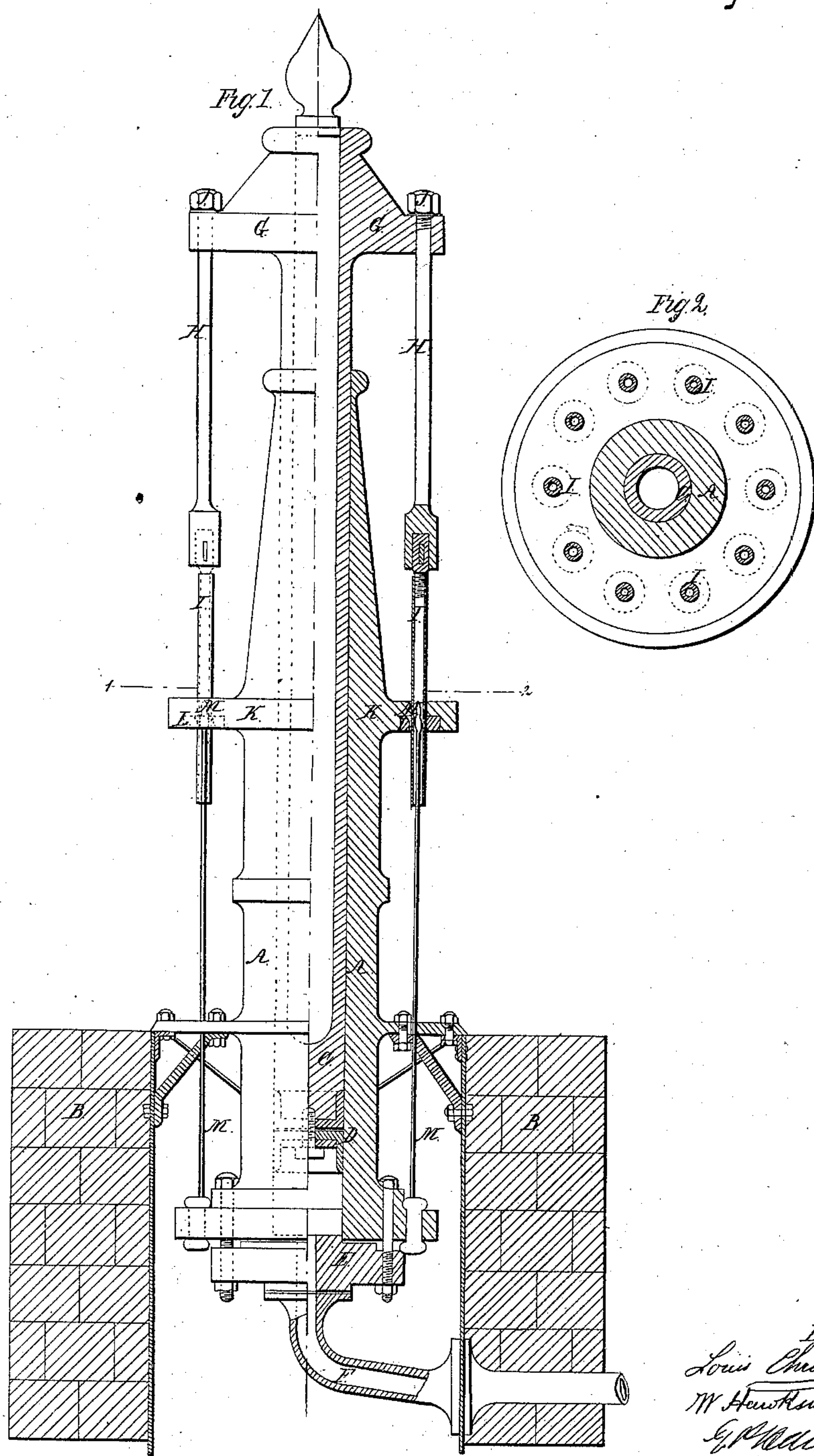


Christopher Hawksnorth & Harding,

Making Metal Tubing,

N^o 80,057,

Patented July 21, 1868.



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LOUIS CHRISTOPH, OF PARIS, FRANCE, WILLIAM HAWKSWORTH, OF GARTNESS, NORTH BRITAIN, AND GUSTAVUS PALMER HARDING, OF CHISWICK, ENGLAND.

Letters Patent No. 80,057, dated July 21, 1868; patented in England, April 10, 1862.

IMPROVEMENT IN APPARATUS FOR DRAWING METALS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, LOUIS CHRISTOPH, of Paris, in the Empire of France, WILLIAM HAWKSWORTH, of Gartness, North Britain, steel manufacturer, and GUSTAVUS PALMER HARDING, of Bohemia House, Chiswick, in the county of Middlesex, England, have invented or discovered new and useful "Improvements in the Machinery or Apparatus Employed in Drawing Metals;" and we, the said LOUIS CHRISTOPH, WILLIAM HAWKSWORTH, and GUSTAVUS PALMER HARDING, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof; that is to say—

Our said invention relates to a peculiar system or mode of drawing metals, whether of a tubular, hollow, or solid section, and consists in a peculiar construction of and the application to that purpose of hydraulic or hydrostatic presses, in lieu of the ordinary mechanical power heretofore adopted.

In carrying out this invention, we employ a hydrostatic or hydraulic cylinder and ram, the griper-bars being, by preference, secured to the end of the ram, whilst the draw-plates or "wordles" are fitted into a suitable support or flange cast on the cylinder, but this arrangement may be reversed.

And in order that our said invention may be fully understood, we shall now proceed more particularly to describe the same, and for that purpose we shall refer to the figures on the sheet of drawings hereunto annexed, the same letters of reference indicating corresponding parts in both figures.

Figure 1 of our drawings represents a partial vertical section and elevation of one form of hydrostatic apparatus, whereby a number of cylindrical tubes, of the same or different diameters, may be drawn simultaneously; and

Figure 2 is a horizontal section of the same, taken along the line 1-2 in fig. 1.

This apparatus is actuated by hydrostatic pressure. It consists of a long hydrostatic or hydraulic cylinder, A, securely fixed to the brick-work B, and having within it a strong hollow cast-iron piston or ram, C, provided at its lower end with a double-cup leather packing, D, fitting accurately the bore of the cylinder.

The cylinder A is terminated at its lower extremity by a strong cover, E, bolted thereon, and having a pipe, F, attached thereto, for the inlet of the water, which is pumped therein in the usual manner adopted for hydrostatic presses.

The body of the ram is made in one piece, with a strong and wide flange or collar, G, which is cast or otherwise formed or fitted thereon near its upper extremity, in which flange or collar is made a series of apertures for the reception of the ends of the draw-rods H H, which are firmly secured, by any suitable or well-known means, at their lower extremities, to the tubes I I, to be drawn, and are retained at their upper ends by the strong nuts J J, or otherwise.

Near the middle of the cylinder A, or other convenient part, is formed a somewhat similar flange or collar, K, in which is made a series of holes, corresponding in position to those in the flange G, in which apertures are fitted the draw-plates or "wordles" L L.

To the flange of the cylinder-cover E are secured, in any convenient manner, the lower ends of the several mandrels M M, by means of which, in combination with the draw-plates, the tubes are drawn.

In working the apparatus, the piston or ram is first lowered to the bottom of its stroke, when the smaller end of the tube or tubes is secured to the rod or rods H H, in any well-known or suitable manner. The mandrels are then so adjusted that the enlargements or swellings will be within the tubes and about the middle of the draw-plates or "wordles." The pump is now operated, when the ram will commence to rise, and will draw with it the several draw-rods H, and the tubes attached thereto.

By this means a steady and powerful tractive power is applied to the tubes, which will be all drawn simultaneously through the draw-plates.

The same arrangement is of course applicable to tubes of various sections other than circular.

In the arrangement shown the press is vertical, but, if preferred, it may be fixed in a horizontal position, or at an angle to the horizon. In some cases we use two cylinders at a distance apart, and two rams or plungers, fixed or formed end to end, in which case we prefer that the arrangement should be horizontal, but that is not essential.

Having now described and particularly ascertained the nature of our said invention, and the manner in which the same is carried into effect, we would observe, in conclusion, that what we claim is—

The combination of the hydraulic or hydrostatic press, the collars or flanges K G thereof, and drawing-apparatus, substantially as hereinbefore described.

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