

(No Model.)

2 Sheets—Sheet 1.

S. FOX.

MACHINE FOR MAKING METAL TUBES AND PIPES.

No. 258,740.

Patented May 30, 1882.

Fig. 1.

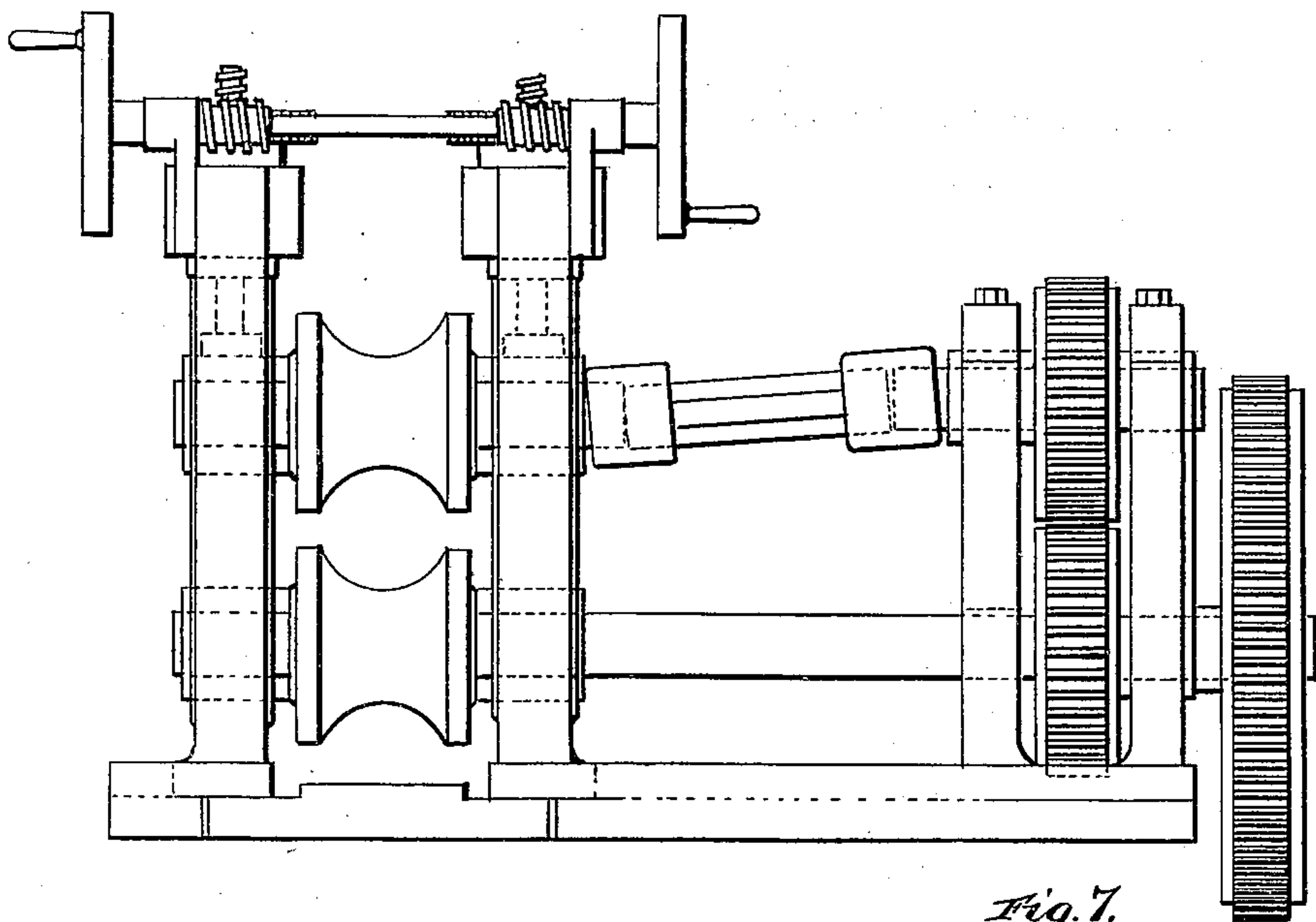


Fig. 6.

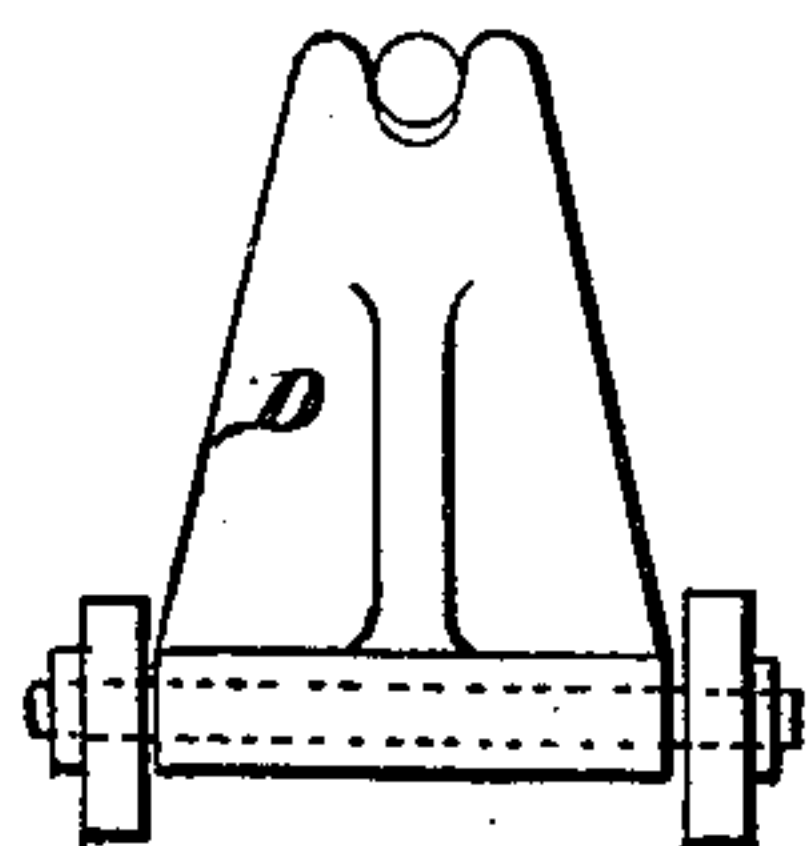


Fig. 2.

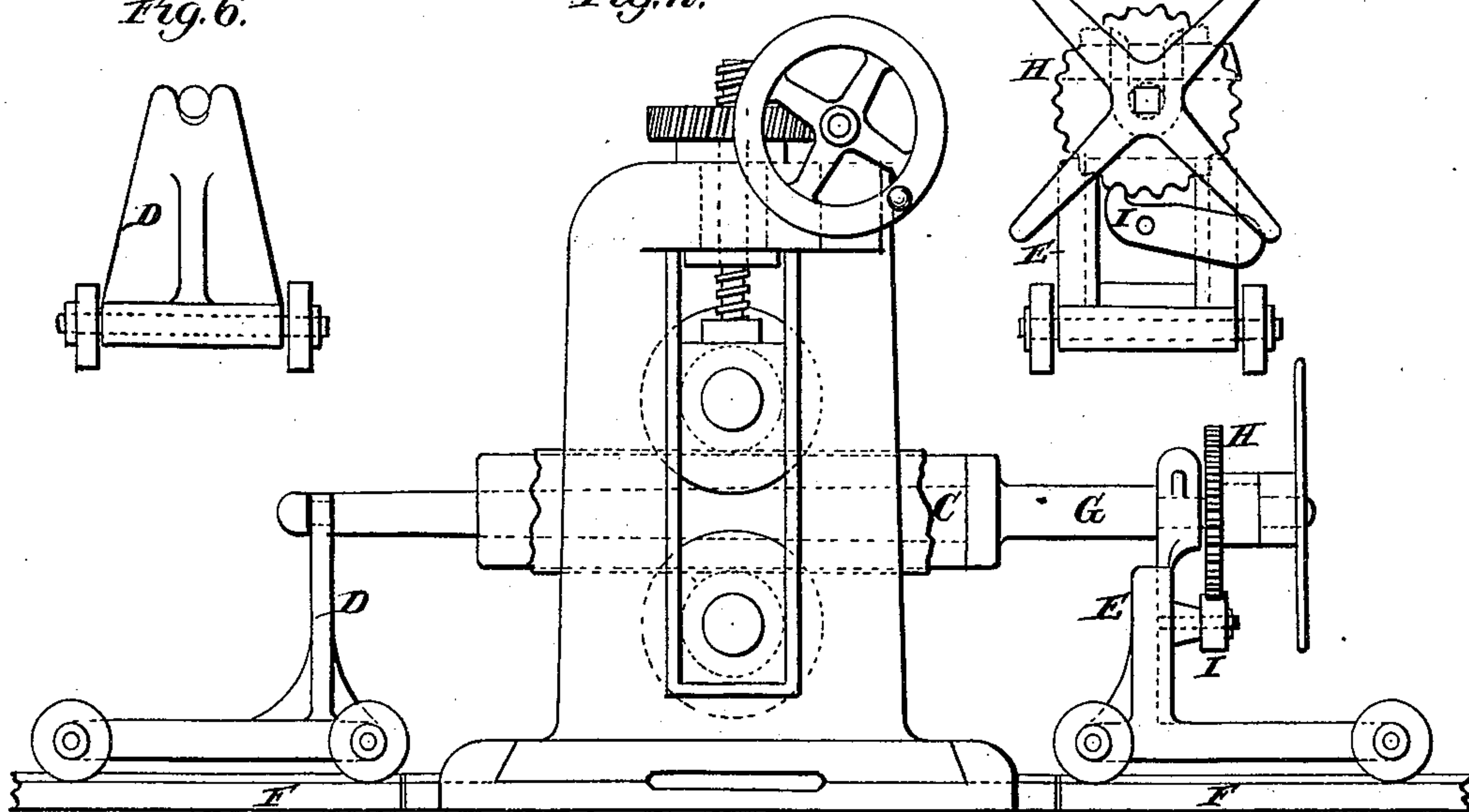
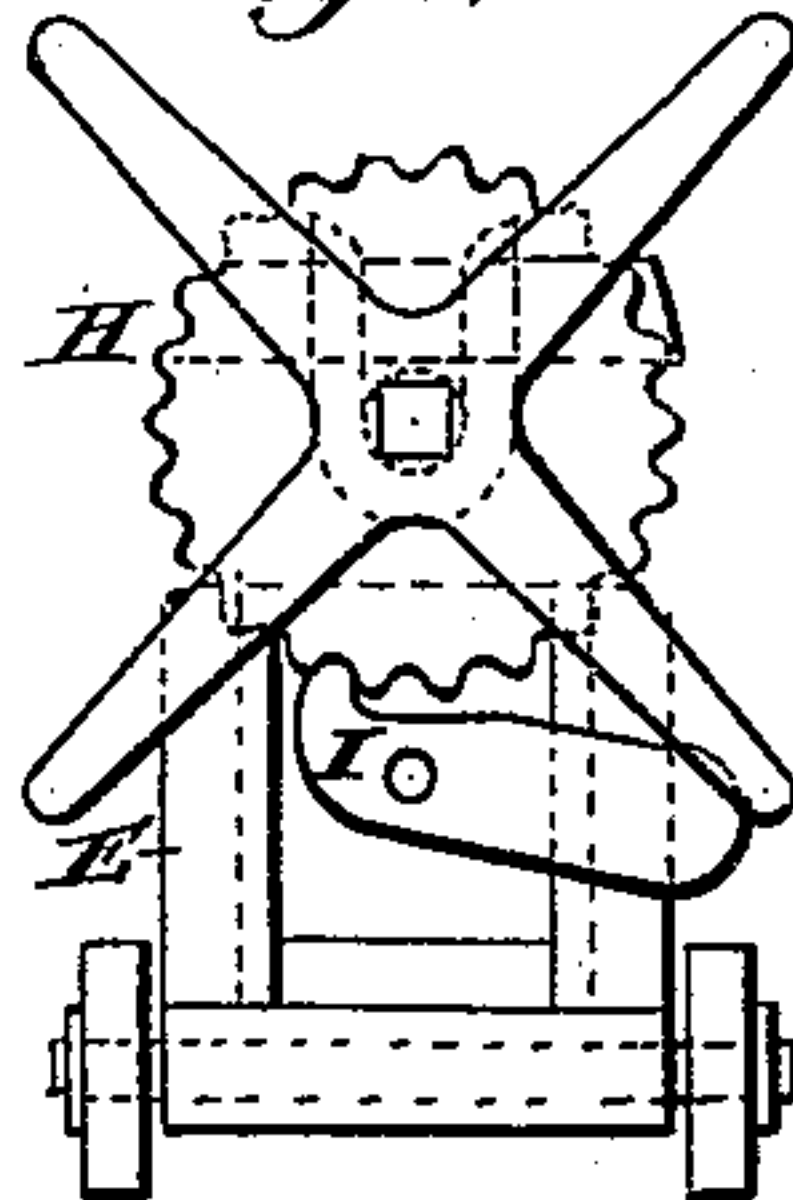


Fig. 7.



Witnesses.

Robert Everett.

Vinton Coombs

Inventor.

Samson Fox.

By J. J. Coombs,

att'y.

(No Model.)

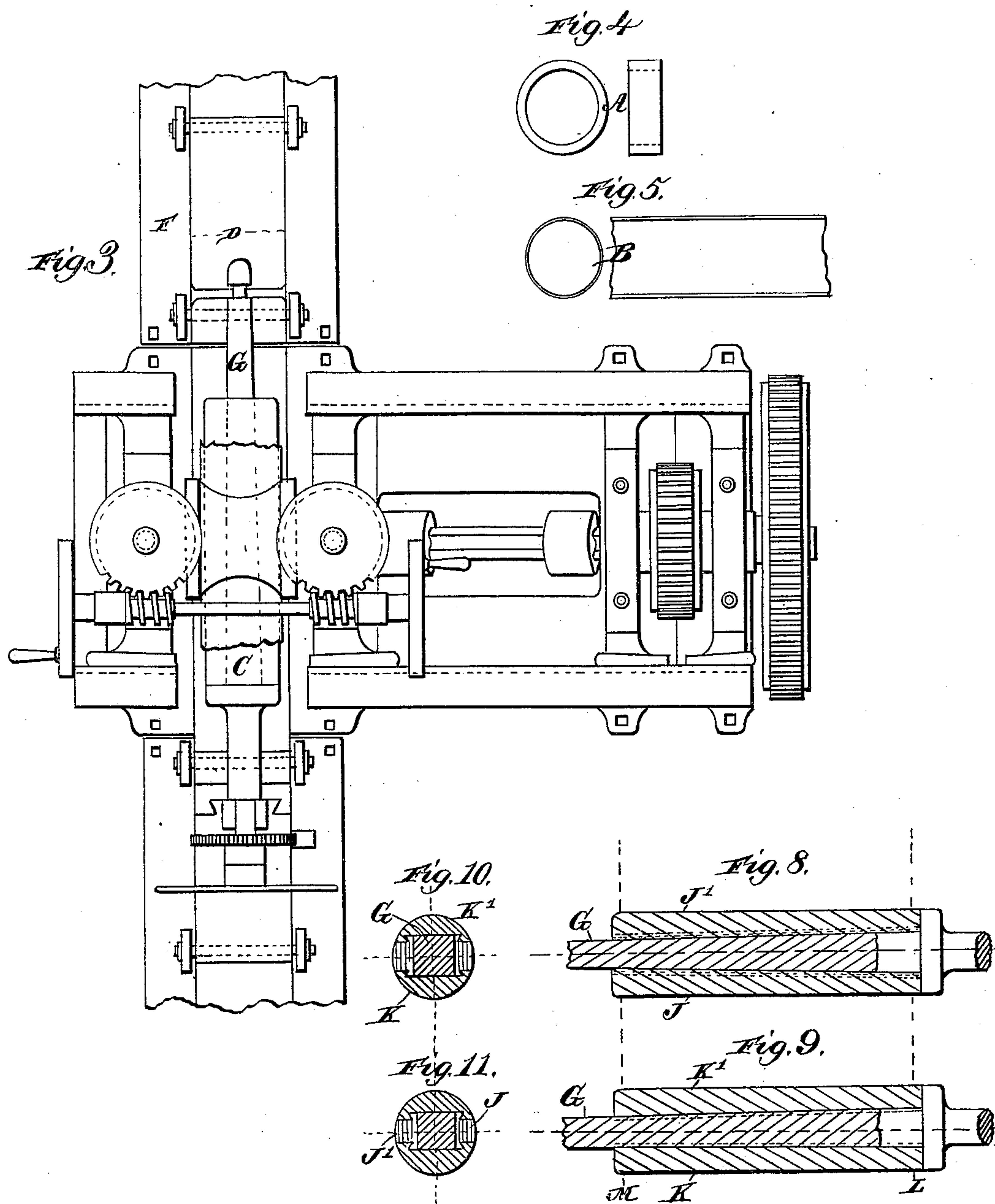
2 Sheets—Sheet 2.

S. FOX.

MACHINE FOR MAKING METAL TUBES AND PIPES.

No. 258,740.

Patented May 30, 1882.



Witnesses

Robert Corbett,

Vinton Coombs

Inventor

Samson Fox.

By J. J. Coombs,

Atty.

UNITED STATES PATENT OFFICE.

SAMSON FOX, OF LEEDS, COUNTY OF YORK, ENGLAND.

MACHINE FOR MAKING METAL TUBES AND PIPES.

SPECIFICATION forming part of Letters Patent No. 258,740, dated May 30, 1882.

Application filed April 7, 1882. (No model.) Patented in England February 25, 1879, No. 752; in France August 25, 1879, No. 132,404, and in Germany September 5, 1879, No. 8,720.

To all whom it may concern:

Be it known that I, SAMSON FOX, a citizen of England, residing at Leeds, in the county of York, England, have invented certain new and useful Improvements in the Manufacture of Metallic Pipes or Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention of improvements in the manufacture of metallic pipes or tubes and apparatus therefor relates to the rolling or forming of metallic pipes or tubes out of solid rings or blooms of metal in such manner that the said rings or blooms may, in process of manufacture into pipes or tubes, be increased first in length and afterward in diameter.

For the purpose of producing the increment in length I place the ring or bloom, (prepared by casting or forging, or by both combined, or otherwise,) while in a highly-heated state, on a suitably-constructed mandrel, which, together with the heated ring or bloom, I pass repeatedly through between a pair of grooved rolls suitably driven, one of which rolls is made to approach the other in the usual way. At each side of said pair of grooved rolls I prepare a traveling carriage, to receive, support, and move with the overhanging weight of the mandrel and ring or bloom during their passage between said rolls. The carriages are, or one of them is, provided with means for moving the mandrel and ring or bloom in an angular or axial direction, in order that at each succeeding passage of the mandrel with the ring or bloom between the grooved rolls the ring or bloom may be acted upon by such rolls at a different part of its circumference to that which was acted upon during the preceding passage through the rolls. This process is repeated until the ring or bloom is sufficiently elongated, (and which may now be termed a "pipe" or "tube,") or until the thickness of metal of such pipe or tube is such as to allow the said pipe or tube to be by the following process rolled or finished to the desired diameter and thickness of metal at the same time.

The mandrel referred to, on which I mount and roll the ring or bloom for elongation, I so

construct in sections as to be easily removed from the ring, bloom, pipe, or tube after the elongating process. The pipe or tube I now rehear and subject to another rolling process, the action of which is at right angles to its axis and to that of the elongating process above described, and for which process I use another pair of suitably mounted and driven rolls. I place the partially-finished pipe or tube over one roll of the pair, which roll I will call the "interior" roll, as it acts on the interior of the pipe or tube, while the other, which I will call the "exterior" roll, acts on the exterior of the pipe or tube.

In order that the pipe or tube may be readily placed in position over the interior roll, that roll is mounted in three (or more) bearings, one of which bearings at the end of said roll is made in parts capable of being moved away from the axis of the roll. By this arrangement, when a pipe or tube is to be placed into position for being operated upon, the said end bearing is removed, so as to leave one end of the roll free, the roll being meanwhile retained by the other bearings in its normal position. The pipe or tube is placed on the said roll, which it surrounds, one lateral portion of the pipe or tube being situated between the two rolls, so that it will be in a position to be operated upon (when the rolls are set in motion) on the inner surface by the interior roll and on the outer surface by the exterior roll. The pipe or tube having been thus passed over the free end of the one roll, the bearing of that end is replaced, so as to properly support the roll, and the rolling operation may be commenced. The exterior roll is caused to approach the interior roll with a sufficient force to give effect to the rolling process.

In order that my said invention and the manner of carrying the same into practical effect may be fully and properly understood, I now proceed to describe the accompanying drawings, in which the same reference-letters and figures are used to mark the same or like parts wherever they are repeated.

Figure 1 is a front elevation of a pair of drawing or elongating rolls, R R'. Fig. 2 is an end elevation, and Fig. 3 is a plan, of the same.

The elongating-rolls are mounted in suitable housings, and are provided with driving-gear, in the usual way.

A, Fig. 4, is a ring or bloom of metal in the first stage of manufacture. B, Fig. 5, is the same after passing through the process of drawing or elongating.

The sectional or collapsible mandrel C, Figs. 2 and 3, is shown in position with the elongated pipe or tube B upon it.

At the respective sides of the rolls are the traveling and supporting carriages D and E, mounted upon and guided by a sort of tramway, F F, at right angles to the axis of the rolls. On these carriages is mounted the said sectional or collapsible mandrel C, with the bloom or ring pipe or tube B upon it, as shown in Figs. 2, 3, where the bloom or ring is supposed to have undergone the process of drawing or elongating. In order that the drawing or elongating may proceed regularly, I mount on one end of the central arbor, G, of the said mandrel a dividing-index, H, into the notches of which a pawl, I, takes. The operator, at each passage of the ring or bloom between the rolls, turns the said sectional or collapsible mandrel angularly a certain number of notches, as may be found necessary to the proper drawing of the bloom. A worm and wheel, or other kind of power-gear, may be used for this purpose. After the drawing or elongating process the mandrel, with the pipe or tube B upon it, is lifted out of the carriages D and E, the central arbor or core, G, is withdrawn, and thereupon the outer parts, J J' K K', collapse and are easily removed from the pipe or tube B. The parts J J' K K' are afterward put together again, ready to receive another bloom or ring.

The sectional or collapsible mandrel C in Figs. 2 and 3 is shown in longitudinal section in Figs. 8, 9, while Fig. 10 is a cross-section of the same at L, and Fig. 11 is a cross-section at M. The central core or arbor, G, is tapered. The other sections, J J' K K', are also tapered internally to fit the central arbor or core, G, and are dovetailed together and tapered longitudinally at their joints, so as to be easily removable.

Figs. 6, 7 are end views of the traveling and supporting carriages D and E.

The drawn bloom or ring, which is now in the form of a pipe or tube, is next reheated and subjected to another kind of rolling in order to enlarge it to the required diameter, and at the same time to reduce the metal to the required thickness. This rolling process is at right angles to that for elongating, and is performed in a rolling-machine of similar construction to one which is fully described in English Letters Patent granted to me 30th June, 1877, and used by me for corrugating tubes and plates, the difference being that for my present purpose of enlarging pipes or tubes I use plain rolls having a hand or self-acting positive feed-motion for causing the rolls to approach each other, instead of the grooved rolls and lever-motion with steam, hydraulic, or other power, as described in the aforesaid Letters Patent.

Having described the nature of my said invention and the manner of carrying the same into practical effect, I desire to have it understood that I do not claim generally as of this invention the use of a rolling-machine for rolling metal into pipes or tubes, and, save and except as hereinafter mentioned, I do not intend to claim any of the mechanical parts of the apparatus hereinbefore shown and described when taken separately and apart from the combination or application thereof in manner and for the purposes herein described; but

What I consider to be novel and original, and therefore claim, is as follows:

The combination of the elongating-rolls R R', sectionally-constructed collapsible mandrel C, and supporting-carriages D and E, all constructed, combined, and arranged to operate substantially as and for the purpose specified.

In testimony whereof I affix my signature in the presence of two witnesses.

SAMSON FOX.

Witnesses:

GEORGE FISHER HAINSWORTH,

HENRY SHIRROW LEUTY,

Clerks to Messieurs Teale and Appleton, Solicitors, Leeds, England.