

No. 760,283.

PATENTED MAY 17, 1904.

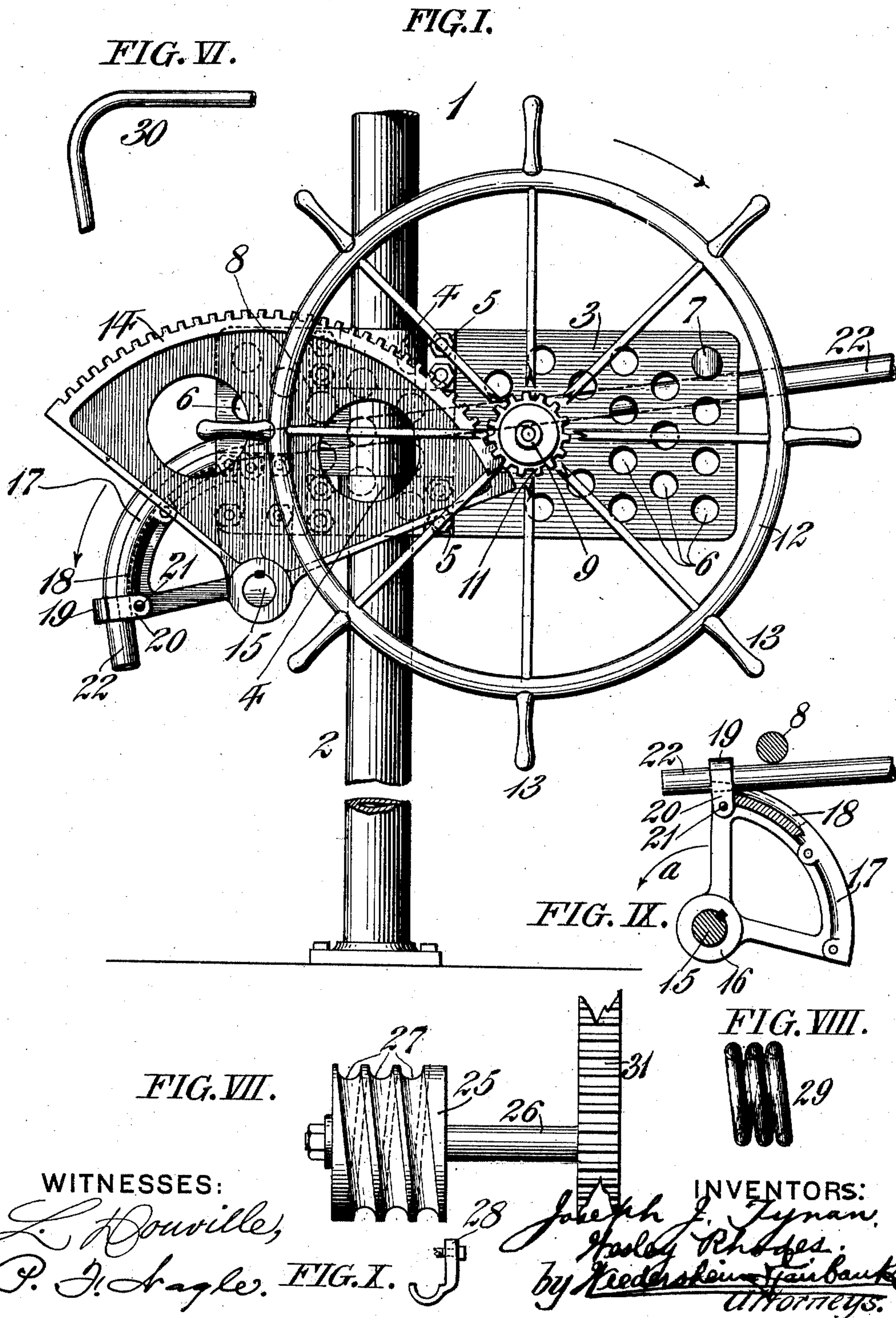
J. J. TYNAN & W. RHODES.

PIPE BENDING MACHINE.

APPLICATION FILED DEC. 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. II.

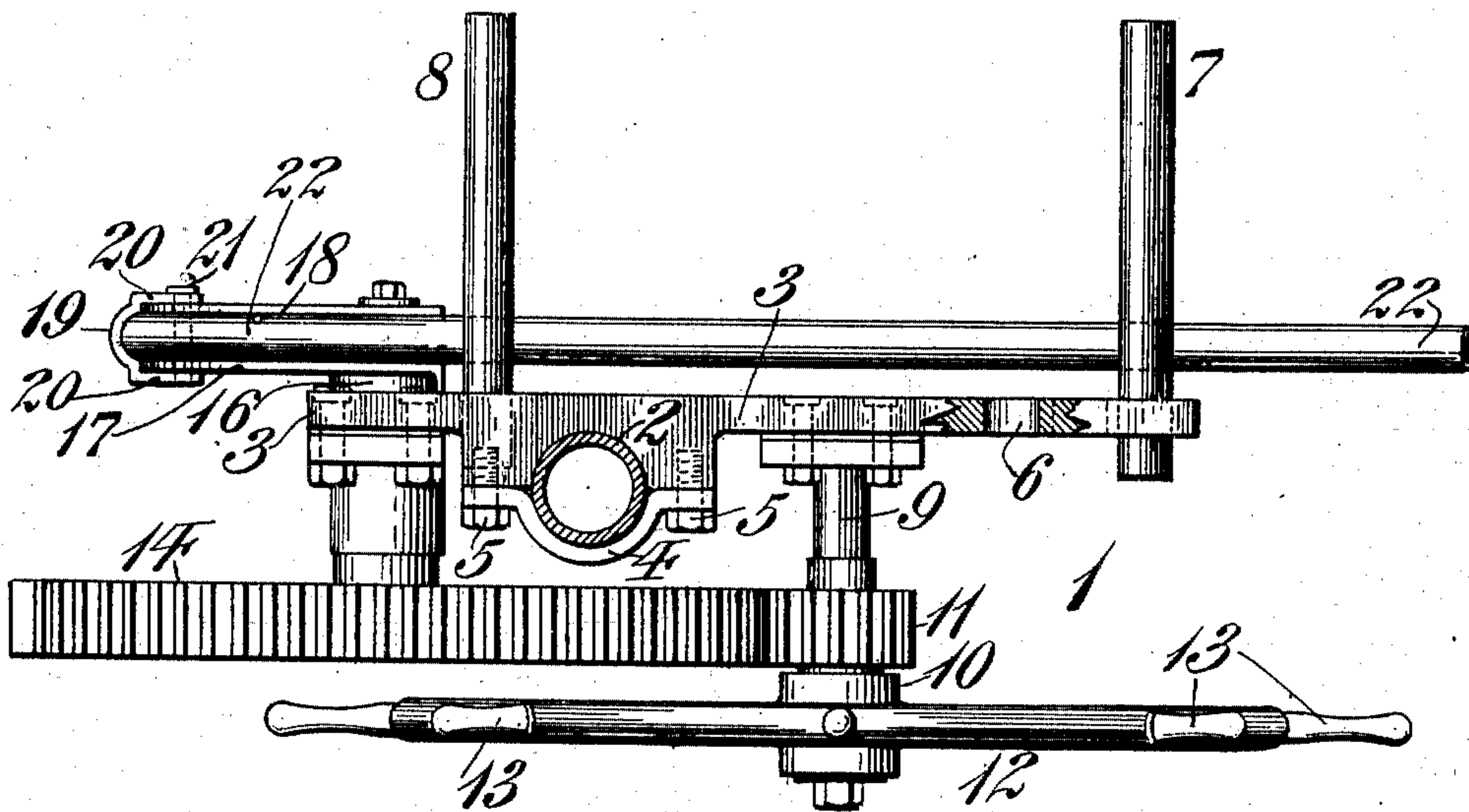


FIG. III.

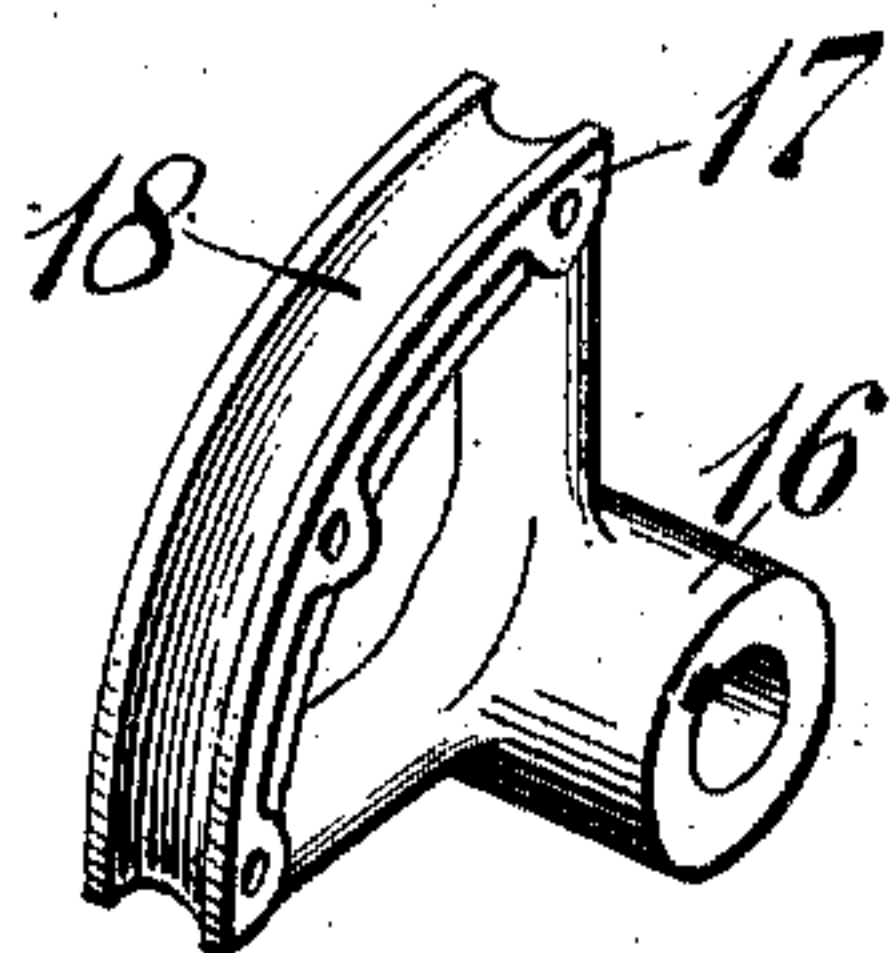


FIG. IV.

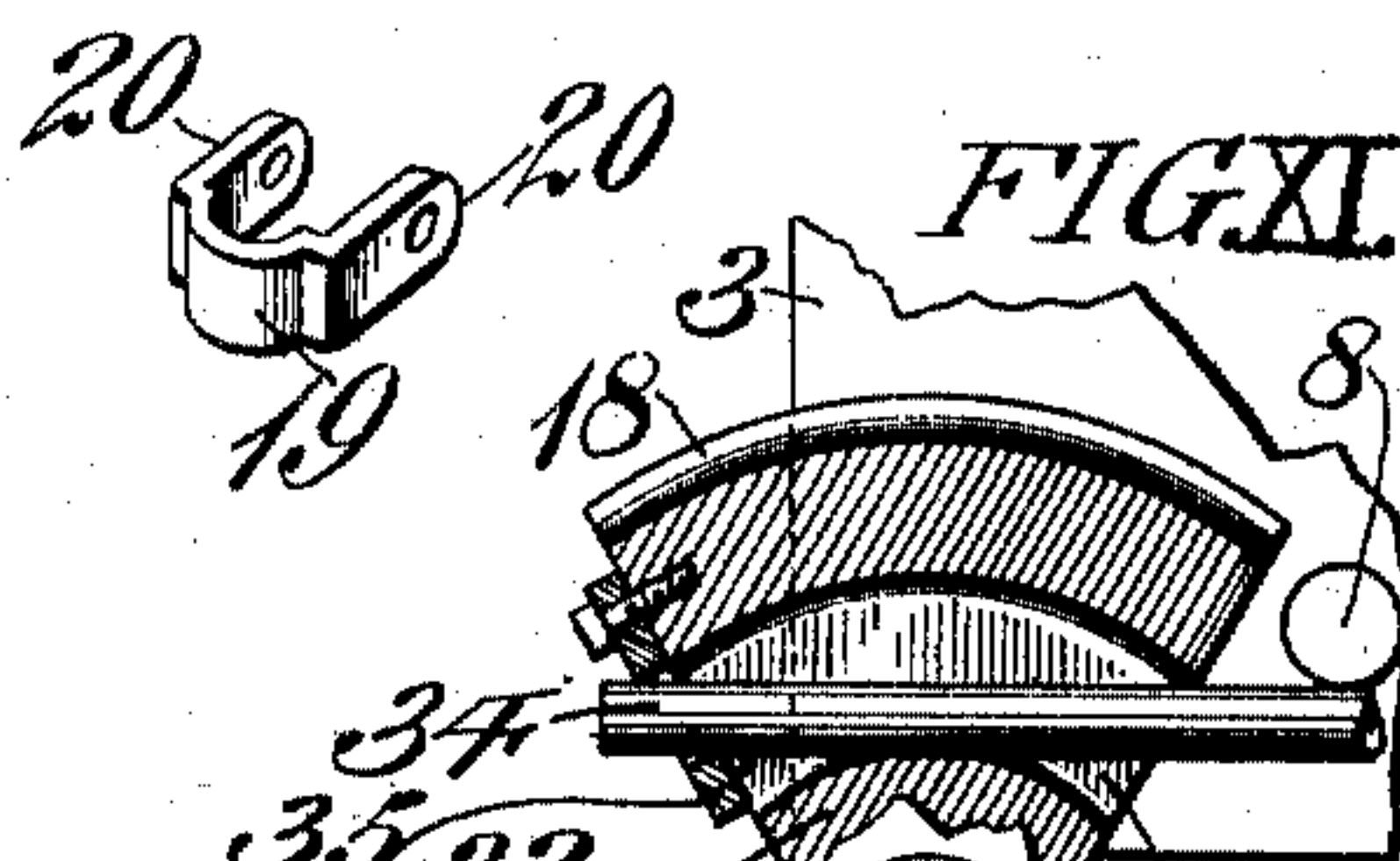
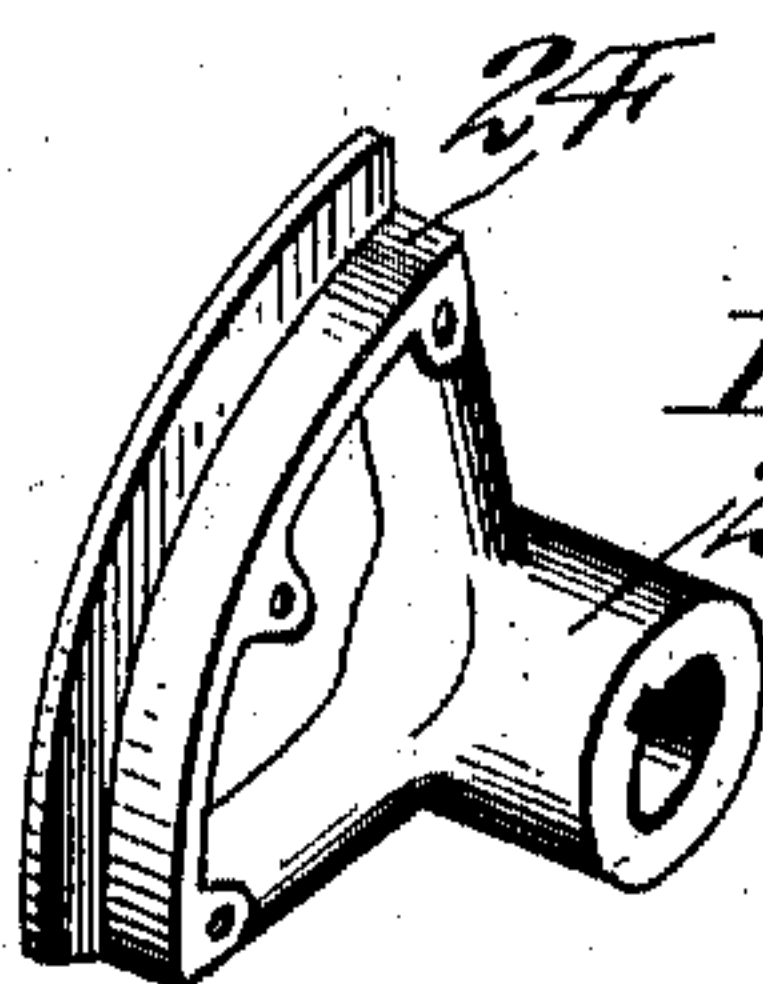


FIG. V.



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# UNITED STATES PATENT OFFICE.

JOSEPH JAMES TYNAN AND WESLEY RHODES, OF PHILADELPHIA, PENNSYLVANIA; SAID RHODES ASSIGNOR TO SAID TYNAN.

## PIPE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 760,283, dated May 17, 1904.

Application filed December 22, 1903. Serial No. 186,171. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH JAMES TYNAN, a citizen of the United States, and WESLEY RHODES, a subject of the King of Great Britain, both residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Pipe-Bending Machines, of which the following is a specification.

Our invention consists of a novel construction of a pipe-bending machine which can be cheaply manufactured, is powerful and efficient in its operation, and not liable to easily get out of order, and wherein different sizes of pipe or other material can be readily and expeditiously bent or coiled.

The invention further consists of other novel features of construction, all as will be hereinafter fully set forth, and pointed out in the claims.

Figure 1 represents a side elevation of a pipe-bending machine embodying our invention. Fig. 2 represents a plan view of Fig. 1, certain parts being shown in section or broken away. Fig. 3 represents a perspective view of the bending-die employed in detached position. Fig. 4 represents a perspective view of a clamping device employed in detached position. Fig. 5 represents a perspective view of another form of bending-die which may be employed in detached position. Fig. 6 represents a side elevation of a piece of pipe after being bent. Fig. 7 represents a plan view of a grooved roll which may be employed when it is desired to produce coils. Fig. 8 represents a side elevation of a coil produced by the roll seen in Fig. 7. Fig. 9 represents a side elevation, partly in section, showing the initial position of the segmental die seen in Fig. 1 prior to performing its bending function. Fig. 10 represents a modified form of clamp. Fig. 11 represents a section of a modified construction of die.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates an apparatus for bending pipe, the same consisting of an upright or standard 2, having secured thereto a frame or plate 3 by means of

clamping or other device 4, the latter being held in position by the bolts 5 or other means. The plate 3 is thus adjustable vertically and is provided with a plurality of openings 6, which are staggered and located on opposite sides of the standard or upright 2, into pairs of which openings the rods 7 and 8 are inserted, as will be understood from Fig. 2, the function of which will be hereinafter explained.

9 designates a shaft or projection which is bolted or otherwise secured to the plate 3, upon which is rotatably mounted the pinion 11 and hub 10 of the driving-wheel 12, the latter being provided with suitable handles 13 for evident purposes.

14 designates a segment which is provided with gear-teeth adapted to mesh with the pinion 11, said segment being keyed or otherwise secured to the shaft 15, which is rotatably mounted in suitable bearings in the plate 3, said shaft having mounted on the portion which projects to the opposite side of the plate 3 the hub 16, which carries the bending-die 17, which is provided with the curved trough-shaped die-face 18.

19 designates a saddle or clamp which is preferably constructed in substantially U shape and is provided with the members 20, which are adapted to engage the sides of the trough-shaped face 18 and to be secured thereto by means of a pin, bolt, or other fastening device 21, the office of said clamp being to hold an end of the pipe 22 firmly against the face 18 while the bending of said pipe is effected.

In the construction seen in Fig. 5 we have shown a modified form of bending-die, wherein 23 designates the hub carrying the die upon which is formed the angular-shaped curved face 24, it being apparent that either one of these bending-dies may be employed, as may be desired or for different kinds of work, and that other forms of dies having faces of different contours may also be employed.

In the construction seen in Fig. 7 we have shown another embodiment of our invention, wherein in place of the dies 17 or 24 we employ the roll or die 25, which is mounted on



the shaft 26, which corresponds to the shaft 15, (seen in Figs. 1 and 2,) said roll being provided with the helical grooves or convolutions 27, against which an end of the pipe 22 may be secured by means of the clamp 28. (Seen in Fig. 10.) The manner of applying this clamp to the roll 25 is substantially the same as already described with respect to Figs. 1, 2, and 4, and as its construction will be readily apparent it need not be described further in detail.

In Fig. 8, 29 designates a coil or spiral formed by the bending action of the roll 25, as will be hereinafter explained.

Fig. 11 illustrates a bending-die 32, which is provided with an opening 33 in addition to the trough 18 and into which one end of a pipe 34 may be inserted, after which said pipe is secured to the die 32 by a clamp 35, it being evident that when said die is operated the pipe 34 is bent.

The operation is as follows: The pinion 11, the toothed segment 14, the hand-wheel 12, and the shaft 15, carrying the bending-die 17 or 24 and their adjuncts, can be rotated in unison, as is apparent. When the parts are in their initial position, it will be understood that the bending-die 17 is in the position seen in Fig. 9 and that the pipe 22 to be bent is passed under the rods 7 and 8, as will be understood from Figs. 2 and 9, and is clamped at or near its extremity to the bending-die 17 or 24 by means of the clamping device 19, as will be understood from Fig. 9. Rotation in the proper direction having been imparted to the hand-wheel 12 it will be apparent that the die 17 will move in the direction of the arrow *a* (seen in Fig. 9) by reason of the coaction of the pinion, segment, shaft 15, and their adjuncts until the parts assume the position seen in Fig. 1, wherein the pipe 22 is shown as having been simultaneously drawn forwardly and bent, as into the position seen at 30 in Fig. 6. The pipe is now relieved of the clamp 19 and removed and the bending-die turned to the position seen in Fig. 9 by the proper manipulation of the hand-wheel, and another pipe inserted in its place to be bent according to requirements.

It will of course be apparent that a die having either the trough-shaped face 18 or angle-shaped face 24 or other shaped face may be employed, as may be desired.

When it is desired to bend the pipe or tube into the coil, the same can be done by the substitution of the roll or die 25 in place of the dies 17 or 24, as will be evident, the pipe to be bent being secured at or near its extremity to one of the helical grooves 27 by means of the clamp 28 or its equivalent and the pipe after bending or coiling appearing as seen in Fig. 8.

It will of course be apparent that the shape of the segment 14 can be varied and the number of teeth increased or diminished, accord-

ing to requirements, and that the manner of supporting the plate 3 and the shafts 9 and 15 can also be varied by those skilled in the art without departing from the spirit of our invention.

Upon the withdrawal of the rods 7 and 8 (seen in Figs. 1, 2, and 9) it will be evident that the same can be inserted in any of the holes 6 in the plate 3, so that the angularity of the bent pipe can be varied according to requirements and pipes of different lengths or diameters can be bent, provision thus being made for bending the same to any degree of curvature desired.

It will be apparent that the rotation of the pinion 11 can be effected by any other desired means, and instead of being rotated by hand the same can be rotated by power, if desired. It will be apparent that while we have described our invention as applicable to bending pipe the same may be employed with equal advantage to bending other materials. When a pipe is to be bent into a coil, a gear-wheel 31 is employed instead of the segment 14.

It will be apparent that other changes may be made by those skilled in the art which will come within the scope of our invention, and we do not, therefore, desire to be limited in every instance to the exact construction shown and described.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a bending-machine, a bending-die, a frame having a series of staggered openings therein, a rod adapted to be inserted in one of said openings and serving to guide the material to said die, and means for actuating said die.

2. In a pipe-bending machine, a frame having staggered openings therein, a standard for supporting said frame, rods adapted to adjustably engage said openings for retaining the material in position during the act of bending, a shaft supported on said frame, a bending-die carried by said shaft and located at the same side of said frame as said rods, a clamping device on said die, a gear mounted on said shaft, a pinion mounted on said frame and adapted to mesh with said gear, and means adapted to rotate said pinion.

3. In a pipe-bending machine, a standard, a frame adjustably mounted thereon, a shaft supported on said frame, a bending-die mounted on said shaft on one side of said frame, a gear mounted on said shaft on the opposite side of said frame, a pinion suitably supported and adapted to mesh with said gear, and means for rotating said pinion.

4. In a pipe-bending machine, a standard, a frame adjustably mounted thereon, a shaft supported on said frame, a bending-die mounted on said shaft on one side of said frame, a gear mounted on said shaft on the opposite side of said frame, a pinion suitably supported



and adapted to mesh with said gear, means for rotating said pinion, a clamping device for said bending-die and means on said frame for guiding the pipe during the act of bending.

- 5 5. In a pipe-bending machine, a standard, a frame having staggered openings therein, clamping devices for adjustably securing said frame to said standard, laterally-extending rods adapted to be inserted in said openings  
10 and to project from one side of said frame, a shaft having its bearings on said plate and projecting from each side thereof, a bending-

die mounted on said shaft on one side of said frame, a clamping device on said die, a gear mounted on said shaft on the opposite side of 15 said frame, a pinion having its bearing secured to said frame on the same side as said gear, and means for rotating said pinion, the latter engaging said gear.

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