

(No Model.)

2 Sheets—Sheet 1.

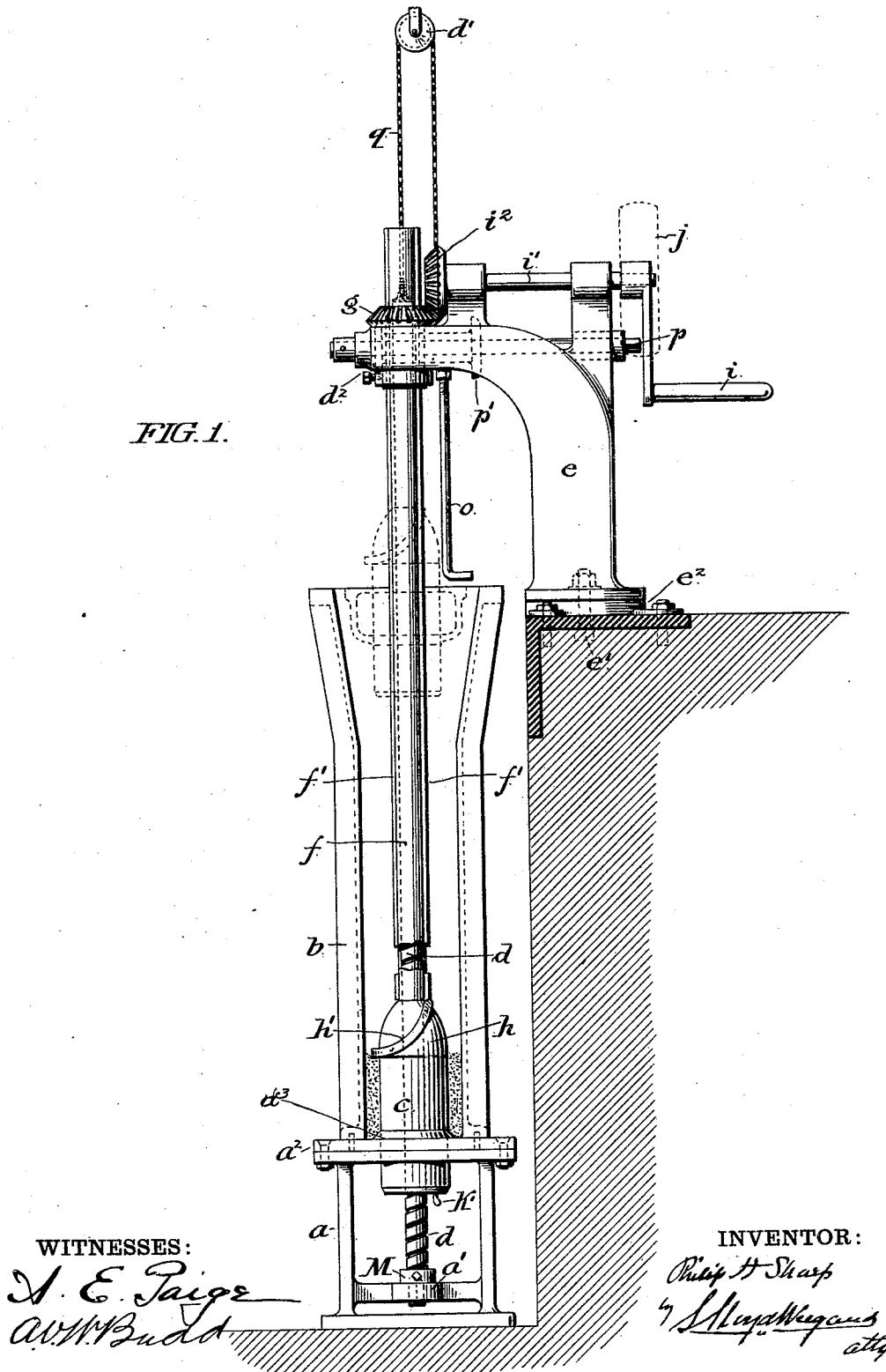
P. H. SHARP.

APPARATUS FOR FORMING SAND MOLDS FOR PIPES, &c.

No. 475,349.

Patented May 24, 1892.

FIG. 1.



(No Model.)

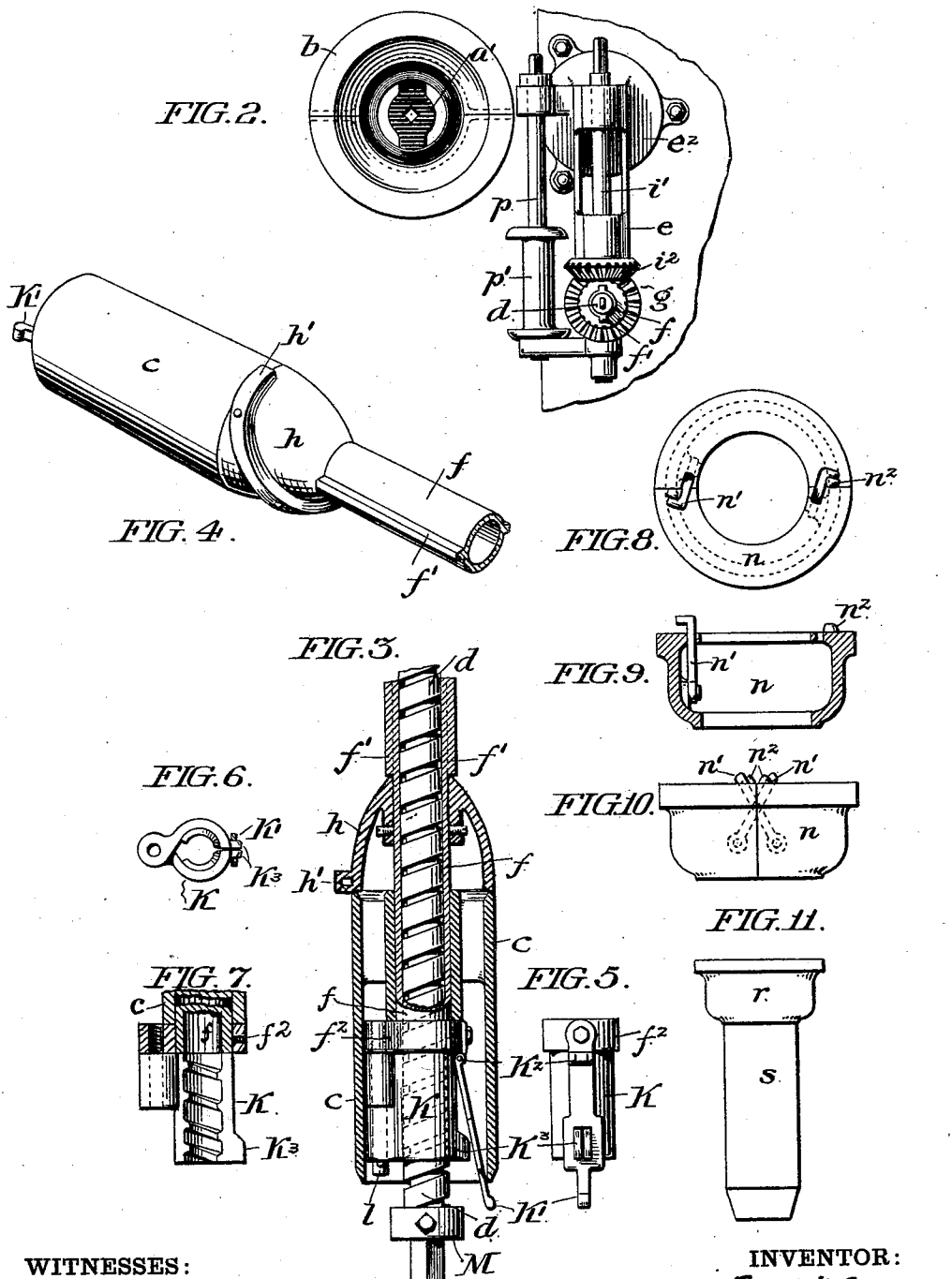
2 Sheets—Sheet 2.

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WITNESSES:

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APPARATUS FOR FORMING SAND MOLDS FOR PIPES, &c.

SPECIFICATION forming part of Letters Patent No. 475,349, dated May 24, 1892.

Application filed April 30, 1891. Serial No. 391,088. (No model.)

To all whom it may concern:

Be it known that I, PHILIP H. SHARP, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Forming Sand Molds for Pipes and Cylindric Castings; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof as to enable others skilled in the art to make and use the said invention.

This invention relates to the making of sand molds for casting pipes and similar cylindric metallic forms, and has for its objects the more expeditious preparation and greater perfection of such work; and it consists of the mechanism hereinafter described, and shown in the accompanying drawings.

Figure 1 is a transverse section of a pit with side elevation of my apparatus in operation, one-half of the flask being removed, showing said sand mold partly made. Fig. 2 is a plan view of the same with machine turned away from the flask; Fig. 3, an enlarged view showing the internal arrangement of the packer and connections; Fig. 4, a perspective plan of the packer. Figs. 5, 6, and 7 are respectively elevation, sectional plan, and vertical section of details shown in Fig. 3. Figs. 8, 9, and 10 are respectively plan and section and side elevation of the split-bell pattern used in conjunction with my apparatus. Fig. 11 shows an alternative arrangement in view of the split bell.

a, Fig. 1, is a stand-bracket resting on the pit-floor and by preference secured in a fixed position. Connected to its upper surface is a seat *a*², planed to receive the flask *b* (one-half only shown) in a vertical position, and is centrally bored out to permit the passage of a pattern *c*, as also furnished with the customary bead-ring *a*³, used on the tamp-seat for pipes, cast with the bell uppermost. Near the bottom of the bracket is a step *a*⁴, made true with the hole above it and squared to receive the lower end of a screwed stationary shaft *d*, extending upward concentrically with the flask through a bearing *d*² on the projecting end of the jib *e*, placed in true ver-

tical line with the step *a*⁴. This shaft is encircled by the tubular shaft *f*, fitted with feathers *f*¹ *f*², as shown, its upper end passing through the tube-bearing and gear-wheel *g*, and its lower end connected to the packer *h*, carrying ridge-blade *h*¹. The winch-handle *i* or pulley *j* (shown in dotted line) imparts rotary motion through the shaft *i*¹ to the gear-wheel *i*², and so through the gear *g* and the feathers *f*¹ *f*² to the tube *f* and packer *h*.

Referring to Fig. 3, it will be seen that the packer *h* is secured to the tube *f* by set-screws through the internal hub, the tube projecting through the hub on the pattern *c* and having a collar *f*² secured to its lower end, the "pattern-hub" riding upon its upper surface.

Letter K, Fig. 3, shows a split nut in side elevation, grasping the screw-shaft *d*. (Seen in plan view, Fig. 6, in front elevation, Fig. 5, and vertical section, Fig. 7.) The nut K has its fulcrum on the stud *l* tapped into the collar *f*², and when closed is fastened by the strap *K*¹, as seen in Fig. 5. This strap, pendent from a fulcrum *K*², is slipped over projections *K*³, formed on each half of the split nut, as shown.

M shows a collar placed beneath the split nut K and secured to the shaft *d*.

The jib *e* is adapted to rotate around a fixed stud *e*¹ on a connected bearing on the foundation-plate *e*², as clearly shown in Fig. 1.

Figs. 8, 9, and 10 show plan, section, and side elevation, respectively, of a split-bell pattern *n*, the two halves capable of being locked together by means of the L-headed bars *n*¹ *n*², pivoted internally, as shown, one on either half, and engaging lugs *n*³ *n*⁴, formed on the upper surface of either half.

The operation of the machine is as follows: Sand being thrown or poured in the flask and rotary motion imparted to the tube *f* and packer *h*, the split nut *k* within the pattern being closed by the strap *k*¹, the tube-shaft *f* and packer *h*, with its ridge-blade *h*¹, are forced upward at the same time they are rotated by means of the nut *k*, revolving with them around the stationary screw-shaft *d*, the pattern *c* following after the packer *h* by reason of its resting upon the collar *f*². The pattern *c* is supported loosely upon the collar *f*² of the nut K. The pattern is not attached thereto, and

is therefore raised without rotating by means of the said nut and collar rotating upon the shaft *d*, leaving the said pattern in one and the same position on the collar by the pressure of the packed sand in the flask surrounding it. The pattern or former *c* thus imparts smoothness as well as correct diameter to the interior of the mold. When the packer has reached the position shown in dotted line, the split-bell pattern *n*, Figs. 8, 9, and 10, is then placed around the pattern *c* and the bell formed by hand in the usual manner. The packer is now drawn up until the pattern clears the bell-pattern, when the swivel-hook *o* is placed under the lower edge of the pattern, the nut *k* opened by releasing the strap *k'*. (See Fig. 3.) The winch-handle *i* is transferred to the end of the shaft *p*, carrying a spool *p'* and having bearings from the jib *e*. The chain or rope *g*, connected to the upper end of the screw-shaft *d*, passing over the sheave *d'* to the spool *p'*, is now wound upon the latter, elevating the screw-shaft *d* until it reaches its original position, being prevented from ascending too high by the collar *M*. The jib may now be swung around one-fourth of a circle, carrying with it the screw-shaft, tube, packer, and appurtenances to permit the removal of the flask to the oven. (If desired, the bell may be formed by inserting in mold a tube *s*, Fig. 11, carrying bell-pattern *r* in usual manner.) Where it is desired to move my apparatus from one flask to another, it may be mounted upon a truck suitable for the purpose, running on tracks parallel to the flasks to be prepared.

From the above description it will be noted that the stationary screw-shaft is permitted to remain in the flask during the whole operation of packing the flask by my apparatus, as well as forming the bell by hand, being shielded from sand particles by the tube-shaft above the packer and by the pattern below the same, and is only withdrawn after operations within the flask are concluded. It will further be noted, in reference to the spiral packer-blade, a device old in itself, that the sand is compacted by reason of the difference in pitches of the screws of the stationary screw-shaft and that of the packer-blade, as, although the latter commenced at or near the tube-shaft, it only feeds the sand into the required position for compacting, which commences as soon as the blade passes over the cylindrical portion of the packer-body, of which it forms a part, except when attached thereto for purposes of renewal, the blade thus encircling only a fraction of the circumference, and has a steep pitch in comparison with that of the stationary shaft.

Having described my invention and the operation thereof, what I claim is—

1. The flask and the stationary screw-shaft placed centrally within the flask and extending above and below the same, the lower end of said screw-shaft being stepped below an

annular bead-ring and its upper end extending through an upper bearing, in combination with said bead-ring, a tubular shaft, a nut carried by the tubular shaft and receiving the screw-shaft, the pattern supported by said nut, and means, such as described, for rotating the tubular shaft, substantially as and for the purpose set forth.

2. The tubular shaft provided with one or more longitudinal feathers, the gear-wheel having grooves to receive the feathers, the stationary screw-shaft fitted within said tubular shaft, the packer attached to the lower end of the tubular shaft, and the ridge-blade with which the packer is provided, in combination with a loose or non-rotating pattern located below the packer and the nut carried by the said tubular shaft to engage the screw-shaft and to support the pattern, substantially as and for the purpose set forth.

3. A split nut connected with a tubular shaft, a pattern supported by the nut, a stationary screw-shaft placed centrally within said tubular shaft, the stationary flask, and means, such as described, for rotating the said tubular shaft, substantially as and for the purpose set forth.

4. A stand-bracket having an opening to receive a pattern, an annular bead-ring secured thereto, and a step for the reception of a stationary screw-shaft, in combination with said screw-shaft, the tubular shaft, the packer attached thereto, the nut located upon said tubular shaft and carrying the pattern, and means, such as described, for rotating the tubular shaft, substantially as and for the purpose set forth.

5. The screw-shaft, the pattern, the feathered tube-shaft encircling said screw-shaft, the nut carried by the tube-shaft and supporting the pattern, and the jib provided with a tubular grooved collar adapted to rotate in a fixed bearing on the jib, substantially as and for the purpose set forth.

6. The combination of the screw-shaft, the jib, the tube-shaft, the pattern, the nut engaging the shafts and carrying the pattern, and means for hoisting said screw and tube shafts, nut, and pattern, consisting of the chain *g*, the shaft *p*, and the spool *p'*, located upon the shaft *p*, substantially as shown and described.

7. In a pipe-molding machine, the flask, the stationary screw-shaft, the divided nut fitted thereto, the pattern carried by the nut, said screw-shaft being centrally located within and extending through the upper and lower ends of the flask, and the feathered tube-shaft engaged by the divided nut, in combination with an upper bearing, such as described, for supporting the feathered shaft, the grooved gear-wheel receiving the feathers of said shaft, and the connected mechanism for rotating the grooved gear-wheel, substantially as and for the purpose set forth.

8. In a molding-machine, the flask, the

bead-ring, the pattern, the step-bearing below
the pattern, the stationary screw-shaft fitted
at its lower end into said step, and the divided
nut upon which the pattern rests, the nut be-
5 ing fitted on said screw-shaft and attached to
a hollow shaft, in combination with said hol-
low shaft and means, substantially as de-

scribed, for rotating it, for the purpose set
forth.

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Witnesses:

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