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W. N. SPRINGER.

APPARATUS FOR MOLDING THREADED SHAFTS.

APPLICATION FILED AUG. 20, 1904.

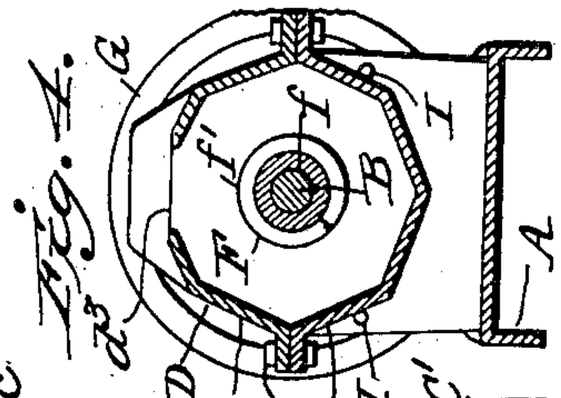
Fig. 4.

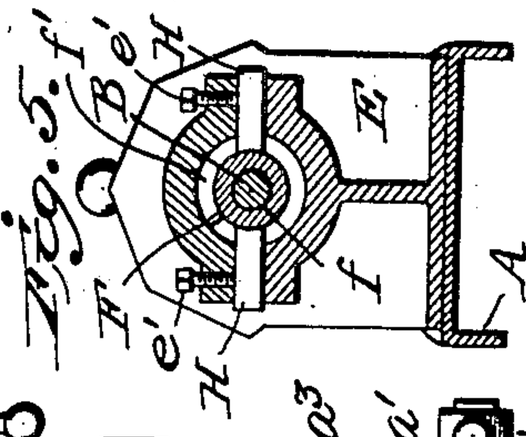
Fig. 5.

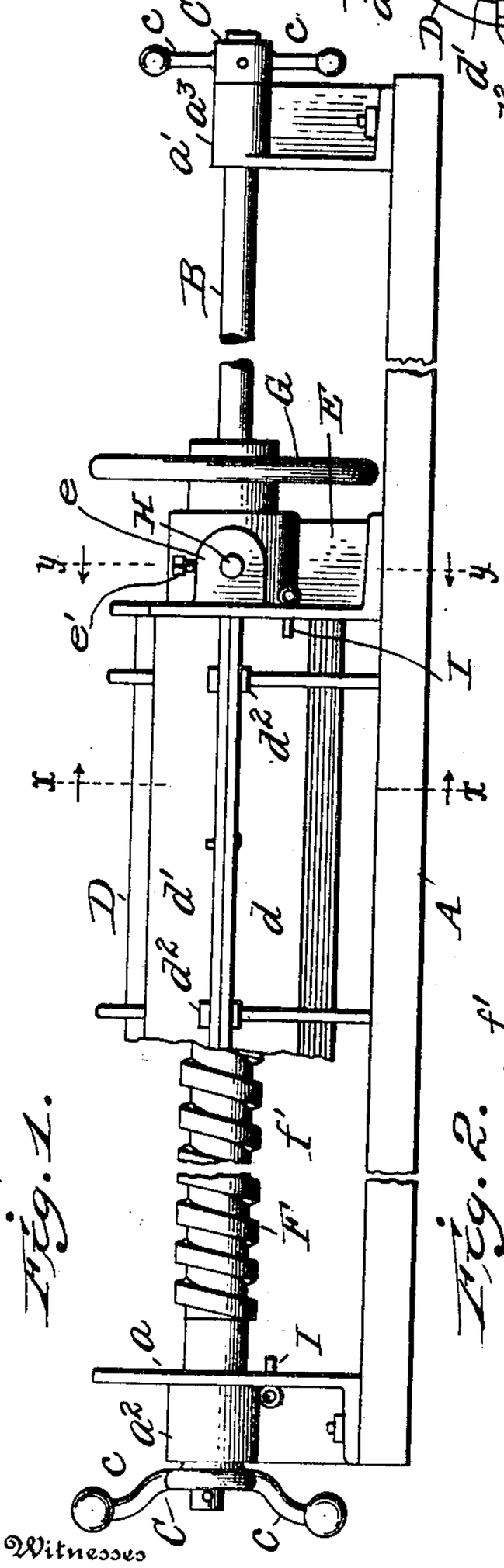
Fig. 1.

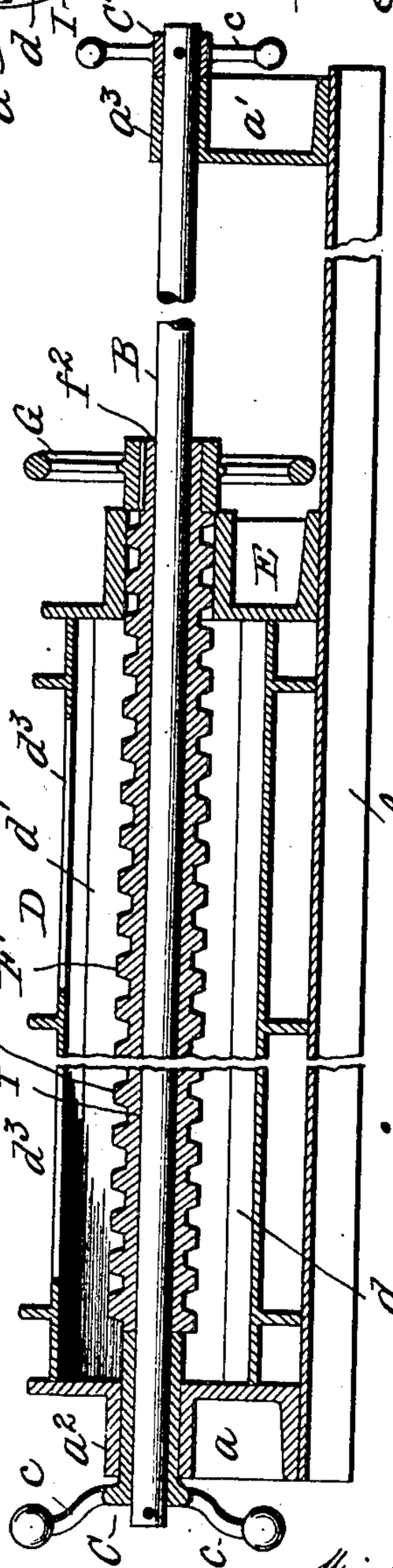
Fig. 2.

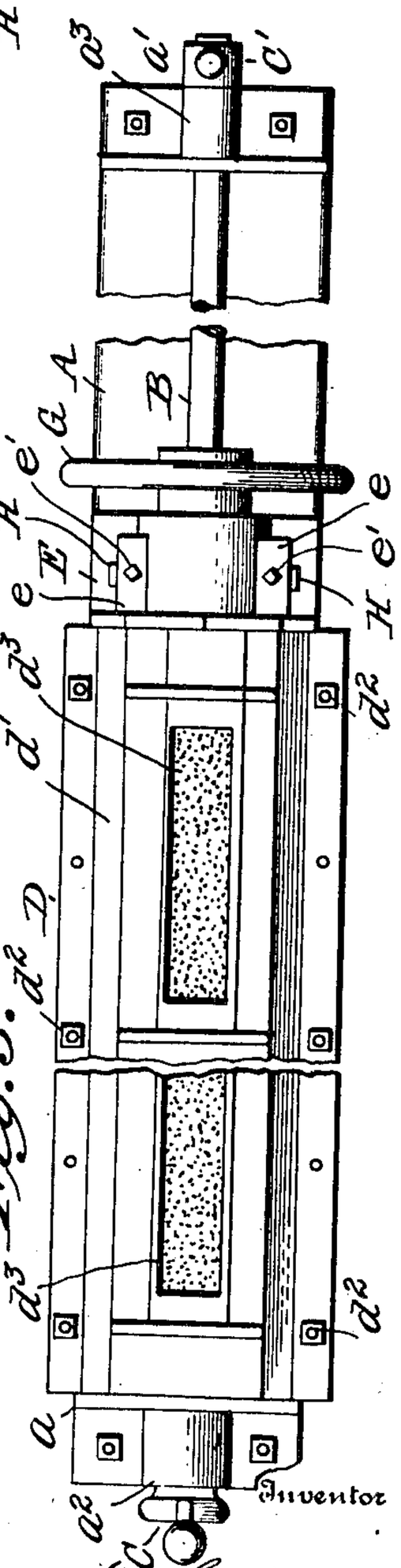
Fig. 3.

Witnesses

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APPARATUS FOR MOLDING THREADED SHAFTS.

No. 819,094. Specification of Letters Patent. Patented May 1, 1906.

Application filed August 20, 1904. Serial No. 221,555.

To all whom it may concern:

Be it known that I, WILLIAM N. SPRINGER, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Apparatus for Molding Threaded Shafts, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in mechanism for forming molds in which castings are to be made that have body parts with lateral projections arranged along spiral or helical lines.

The invention relates particularly to means for providing molds for casting screw-shafts, and aims, among other things, to provide for rapidly and economically molding screw-shafts much longer than any, within my knowledge, that have been formed by the process of casting.

Figure 1 is a side elevation, partly broken away, of a mechanism embodying my improvements. Fig. 2 is a longitudinal central vertical section. Fig. 3 is a plan view. Fig. 4 is a vertical transverse section on the line x x, Fig. 1. Fig. 5 is a vertical section on the line y y, Fig. 1.

In the drawings, A indicates the base of a frame, upon which are supported the operative parts of the machine. At the ends it is provided with uprights or standards a a', these being respectively provided with bearings a^2 a^3.

B is a rod having its ends supported in the bearings at a^2 a^3, and in these it is held stationary.

C C′ are holding and spacing devices, each having two oppositely-arranged handles c, the handles of one being formed integral with the sleeve which extends through the bearing a^2 and supports the end of the shaft B. At the other end the shaft rests directly in the bearing a^3 and has attached to it the holder C′ outside of the bearing.

The flask or sand-holding box is indicated as a whole by D. It has the lower half or part d, the shape of which is shown in Fig. 4, and the upper part d', secured to the lower by means of flanges and bolts at d^2, and provided at suitable intervals in the top with apertures or passage-ways d^3. This flask or sand-box is adapted to be placed and held securely in position on the base A near one end.

E is a standard or upright secured to the base A, and is placed immediately adjacent to the inner end of the sand-box.

F is the pattern. It is a hollow sleeve with an external thread. The tubular or sleeve-like part f fits snugly upon the rod B, and the thread f' corresponds in pitch and other dimensions to the casting which it is desired to produce. The pattern terminates in a sleeve at f^2, to which is secured a wheel G, adapted to be grasped by the hand and through which rotation can be imparted to the pattern. The threaded pattern is while it is rotating caused to move longitudinally by a nut-like device which, as shown, consists of two lugs H, mounted in the standard or upright E and having their inner ends projected in far enough to lie in the helical groove of the pattern. These are supported in ears e and can be adjusted as desired and held in position by set devices at e'. When the latter are released, the nut-lugs can be withdrawn entirely.

The flask is removably connected to or supported on the frame. When it is put in position, it is centered in relation to the guide-rod and pattern and fastened by means of devices indicated at I.

The mode of operating the devices above described will be readily understood. When a screw-shaft is to be cast, the pattern F is placed in the position shown in Fig. 2—that is, in its extreme position to the left—at which time it lies in the flask or sand-box and extends approximately from end to end thereof. The upper part d' of the flask is removed, and the sand is packed in the lower part d around the lower part of the pattern. Then the upper part d' is bolted in position on the lower, and the sand for the upper part of the mold is introduced through the apertures d^3 and packed. After the sand has been properly introduced the pattern is withdrawn by rotating the hand-wheel at G. The thread f' leaves a corresponding recess in the mold-cavity in the sand. After the pattern has been withdrawn the rod B is released at one end and is drawn longitudinally out of the sand. Then the flask is detached from the framework and is set in a suitable oven and subjected to heat for attaining the ordi-

nary purposes of the foundryman. Subsequently the apertures in the ends of the mold are plugged and the molten metal is poured.

I am aware of the fact that it has been proposed in a number of instances to form a thread upon the external surface of a metal body by means of a threaded pattern, packing the sand around the pattern, rotating the pattern and at the same time causing it to move longitudinally in proportion to the pitch distance of the thread and then pour the molten metal into the mold thus produced; but I believe myself to be the first to have provided an apparatus having the novel and improved features of construction herein set forth. The long support for the journal-rod B in a correspondingly long frame enables me to withdraw the pattern from the sand with great accuracy and delicacy of movement, so as to leave the mold in a condition so perfect that the resulting casting can be used for gearing purposes with substantially the same accuracy as a machine-cut threaded shaft. The journal-rod B and the screw-pattern F need not ever be entirely detached from the machine. When the pattern has been drawn to its outermost position, it is supported at one end upon the rod B and at the other in the standard E, and when the rod B has been withdrawn from the sand at the time when the flask or sand-box is to be removed it (the rod B) is still supported in the pattern-sleeve and on the standard E. Consequently molds can be rapidly formed one after the other by placing the flasks in series in position on the frame, then restoring the journal-rod B to its position in the standard at *a*, and pushing the pattern back into position at the left. It is not necessary to rotate the threaded pattern in order to place it in position for packing sand, as the detachable nut-lugs H can be quickly loosened and drawn out sufficiently to permit the pattern to slide longitudinally without rotation.

What I claim is—

1. In an apparatus for casting metal bodies with spirally-arranged projections, the combination of a frame, a flask adapted to be removably supported on said frame, a supporting guide-rod passing through the flask and extending beyond the same, and a rotary, longitudinally-movable threaded pattern supported on said rod and having a support on the frame independent of the rod, substantially as set forth.

2. The combination of the frame having the two outside uprights or bearings and the intermediate upright or support and adapted to have a removable flask supported thereon between one of the outside supports and the intermediate support, a guide-rod on said frame held by the outside supports and passing through the intermediate support and the externally-threaded pattern on the said rod extending substantially the entire length of the flask and to points outside thereof, substantially as set forth.

3. The combination of the frame, the pattern-supporting rod, the rotary longitudinally-movable externally-threaded pattern on the said rod, the outside uprights or carriers on the frame for supporting the said rod, the intermediate upright having a bearing through which pass both the rod and the pattern, and means for causing the combined longitudinal and rotary movement of the pattern, substantially as set forth.

4. The combination of the frame having the upright or standard *a* and the upright or standard E and adapted to have a removable flask supported thereon between the said standards, the rod detachably fixed to the standard *a* and extending through the standard E, the rotary longitudinally-movable threaded pattern around the rod and extending through the standard E and supported at its opposite end on the rod and means for causing the rotation and the longitudinal movement of the pattern, substantially as set forth.

5. In an apparatus for molding metal bodies, the combination of a flask, a supporting guide-rod extending through said flask, and a rotary, longitudinally-movable threaded pattern loosely mounted upon said rod and adapted to move relative thereto as it is removed from said flask.

6. In an apparatus for molding threaded shafts, the combination of a flask, a supporting and guiding rod extending through said flask and supported at either end, a rotary, longitudinally-movable, externally-threaded, hollow pattern loosely mounted upon said rod, and means for causing the combined longitudinal and rotary movement of the said pattern relative both to the said flask and supporting-rod.

7. In an apparatus for molding threaded shafts, the combination of a flask, a supporting and guiding rod extending through said flask, a rotary, longitudinally-movable, externally-threaded pattern loosely mounted upon said rod and adapted to move relatively thereto, supports for the opposite ends of said rod, an intermediate support, and adjustable lugs carried by the intermediate support, adapted to engage the walls of the helical grooves of the said pattern.

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

WILLIAM N. SPRINGER.

Witnesses:
R. D. ANDREW,
E. D. HUDSON.