G. H. ROBERTS.

Mold for the Manufacture of Screws from Hard Caoutchouc.

No. 160,235. Patented Feb. 23, 1875.

FIG. 1.

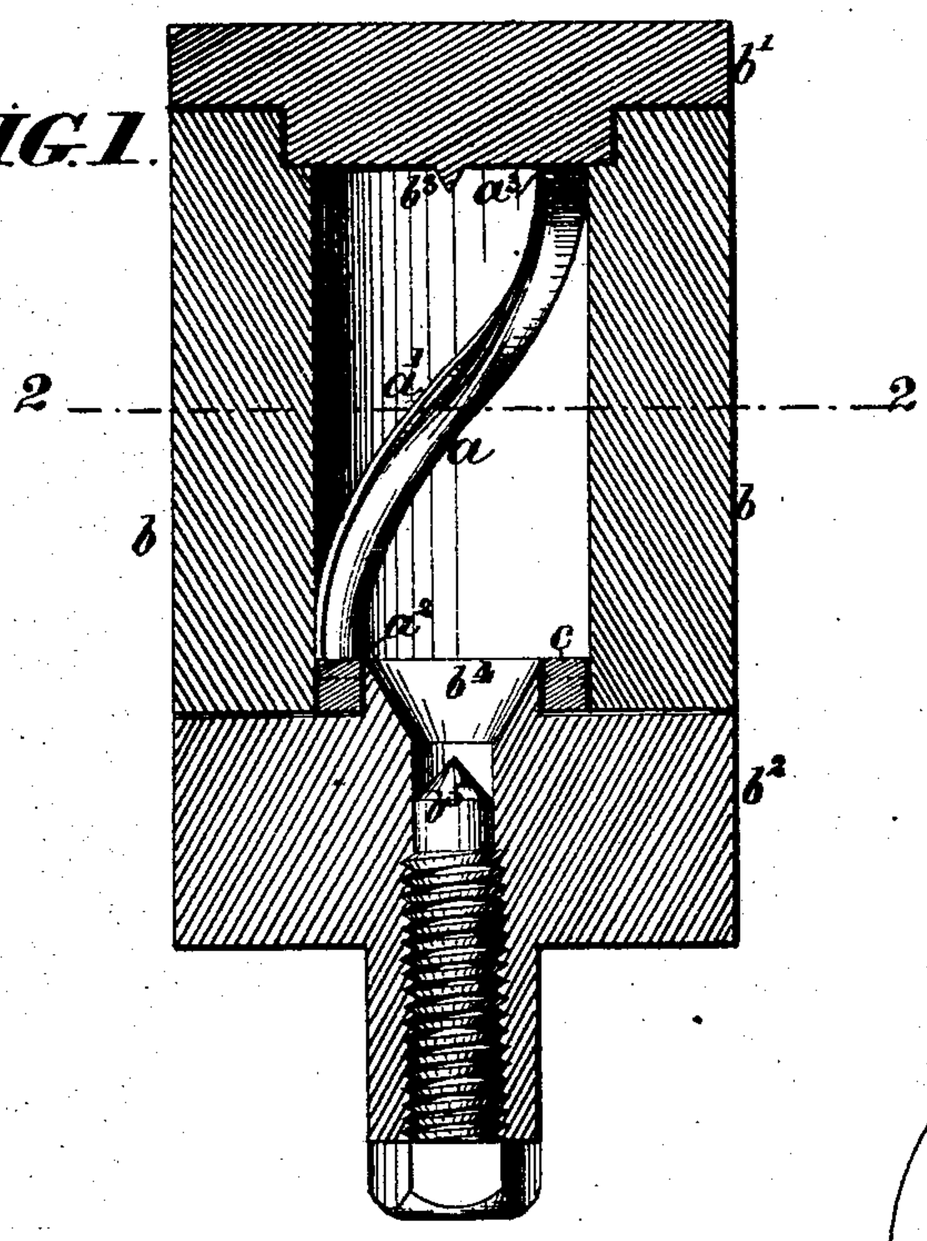


FIG. 4.

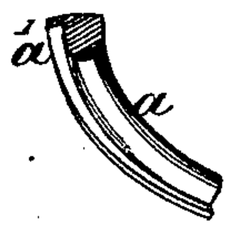


FIG. 5.

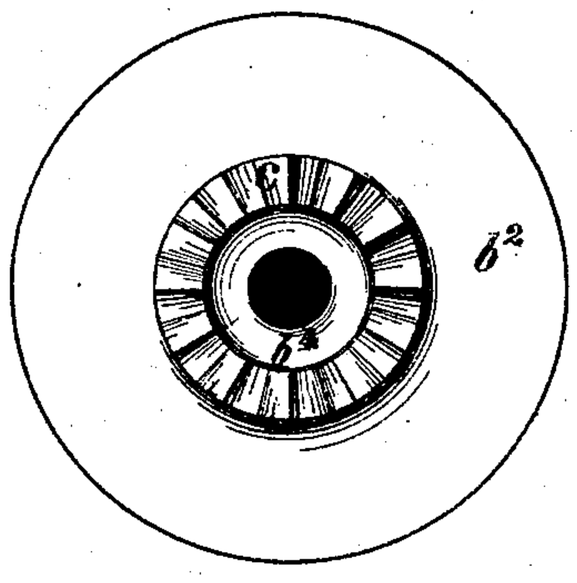


FIG. 2.

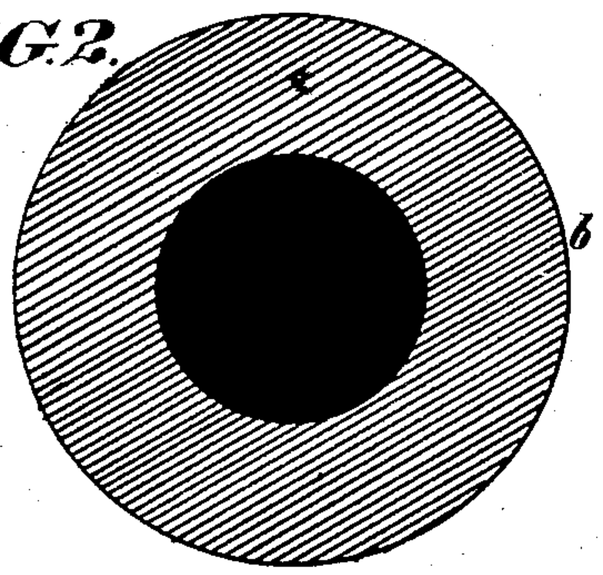


FIG. 6.

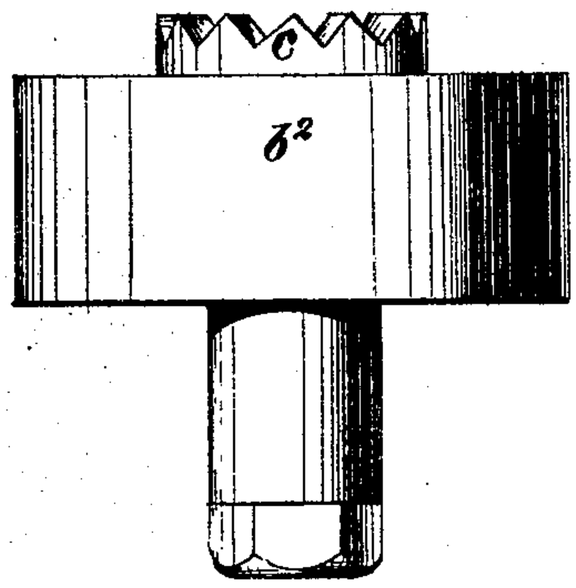
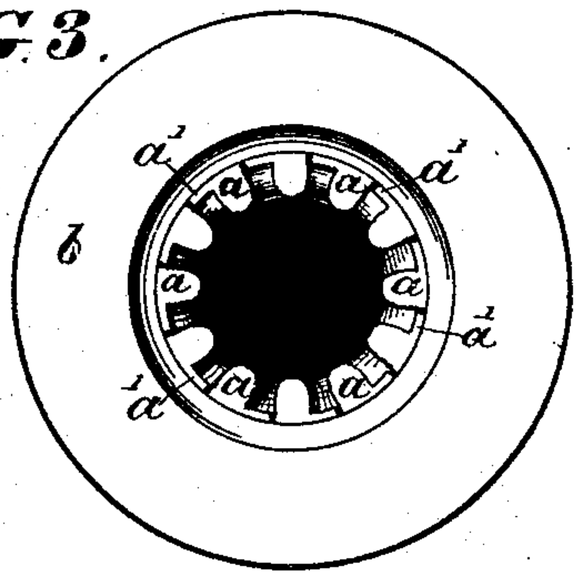


FIG. 3.



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UNITED STATES PATENT OFFICE.

GEORGE H. ROBERTS, OF BOW, ENGLAND.

IMPROVEMENT IN MOLDS FOR THE MANUFACTURE OF SCREWS FROM HARD CAOUTCHOUC.

Specification forming part of Letters Patent No. **160,235**, dated February 23, 1875; application filed December 16, 1874.

To all whom it may concern:

Be it known that I, GEORGE HENRY ROBERTS, of River street, Devon's road, Bow, in the county of Middlesex, England, have invented certain Improvements in Molds to be Employed in the Manufacture of Screws of Hard Caoutchouc, or other analogous materials, for liquid-meters, of which the following is a specification:

For this purpose I employ a mold formed of a number of spiral segments or cores of metal to form the threads of the screw, each spiral segment or core being in the form of the space between two adjacent threads or worms, as has heretofore been proposed; but instead of, as heretofore, forming such spiral segments to meet at each end and connecting them together by end pieces, through which a screw passes endwise into each spiral segment, and instead of forming screw-threads around such end pieces and around the outer parts of the segments at each end thereof, to enable the outer caps or shell of the mold to be screwed thereon to hold all the parts firmly together, I dispense with such parts and form each of the spiral segments of a like section from end to end, and without any holes therein, and I form thereon a projecting rim or web running along one of the outer edges thereof. These spiral segments or cores are cut off at one end at or about a right angle to the direction of the worms or threads, and at the other end at a right angle to the axis of the screw. These spiral segments or cores are arranged inside a plain cylindrical mold-box in such manner as to form a complete mold of the screw required. They fit against each other at their rims or flanges, and thus mutually support each other through their entire length. These spiral segments are received at their lower ends on a piece of metal shaped to fit. The top and bottom of the cylinder are formed in separate pieces from the cylinder, and are capable of being readily placed in position and removed therefrom, the junctions of the parts being formed with plain cylindrical surfaces, as shown. One end of the cylinder is formed with a projection to fit and pass a little way into the cylinder, and has formed in the center thereof a small projection, which serves to indicate the center of the desired screw, to assist in centering it in a lathe or otherwise working it. The other end of the cylinder is formed with an annular projection of the shape required for the boss, and with a projection from the center of the screw.

When the parts are all put together, with the exception of the top, the composition of caoutchouc or analogous composition to form the screw is placed in the mold in bulk sufficient to let it stand somewhat above the mold. The top of the cylinder is then placed on the top of the caoutchouc or other analogous material, when it is forced down by screw or hydraulic pressure, so as to force the caoutchouc or other material into the spaces between the spiral segments or cores, to form the screw. The mold, with the caoutchouc or other analogous material therein, is then submitted to heat for a sufficient time to cure the caoutchouc, after which the top and bottom of the cylinder are removed, and the screw, with the spiral segments or cores, pushed out of the mold, after which each separate spiral segment or core is drawn spirally out of the screw.

According to my invention, I form these spiral segments or cores of tin or other readily-fusible metal or alloy capable of withstanding the heat required to cure the screws, and these spiral segments or cores are cast in molds of the form required; but, if desired, they may be otherwise formed of other metal or alloy.

If a hollow screw is required, the mold may be filled with caoutchouc or other material, and then a central plunger may be caused to descend, which, in addition to forming the hollow required, also, at the same time, forces the material into the spaces of the mold.

And in order that the said invention may be more clearly understood and readily carried into effect, I will proceed, aided by the accompanying drawings, more fully to describe the same.

Figure 1 is a vertical section of a mold-box and parts connected therewith, constructed according to my invention, but showing only one of the spiral segments or cores in position. Fig. 2 is a section of the mold-box on the line 2 2 of Fig. 1, with all the spiral segments or cores removed therefrom. Fig. 3 is a plan of the mold-box with the cover re-

moved, but showing the spiral segments or cores in position. Fig. 4 is a cross-section of one of the spiral segments or cores, taken at right angles thereto; and Figs. 5 and 6 are, respectively, a plan and edge view of support for the spiral segments or cores.

a are the spiral segments or cores of metal, of which as many are employed as there are threads to the screw. These spiral segments or cores *a* are each formed of a corresponding shape to that of the space between two adjacent threads or worms, and they are each provided with a projecting rim, web, or flange, a^1, running along one side thereof. These spiral segments or cores are cut off at the end, a^2, at or about a right angle to the direction of the worms or threads, and at the other end a^3 at a right angle to the axis of the screw. These spiral segments or cores *a* are arranged inside a cylindrical mold-box, *b*, in such manner as to form a complete mold of the screw required. They fit against each other at their rims, webs, or flanges a^1, as shown in plan at Fig. 3, and are received at their lower ends on a piece of metal, *c*, shaped to fit. The top b^1 and bottom b^2 of the cylinder are formed in separate pieces to fit the cylinder with plain cylindrical surfaces, capable of being readily placed in position and taken apart from the cylinder. The top b^1 of the cylinder is formed with a projection to fit and pass a little way into the cylinder, and has formed at the center thereof a small projection, b^3, which serves to form a depression in the desired screw, and thereby indicate the center thereof, to assist in centering it in a lathe for drilling and otherwise working it. The bottom b^2 of the cylinder *b* is formed with an annular projection, b^4, of the shape required for the boss of the screw, and with a projection, b^5, to indicate the center of the screw. The piece *c* fits around the projection b^4, and occupies the space between it and the cylinder *b*. When the parts are all put together, with the exception of the top b^1, the composition of caoutchouc or other analogous composition to form the screw is placed in the mold in quantity sufficient to let it stand somewhat above the mold *b*. The top b^1 is then placed on the top of the composition of caoutchouc or other analogous material, when it is forced down, preferably by screw or hydraulic pressure, so as to force the material into the spaces between the spiral segments or cores *a* to form the screw. The mold, with the screw therein, is then submitted to heat for a sufficient time to "cure" the material forming the screw, after which the top b^1 and bottom b^2 are removed, and the screw, with the cores *a*, pushed out of the cylinder or mold-box, after which each separate core *a* is drawn spirally out of the screw.

The screw may then be finished and mounted on a stud or axis, as will be well understood.

According to my invention, I form the cores *a* of tin or other readily-fusible metal capable of withstanding the heat required to cure the screws, and these cores are cast in metal molds of the form required; but, if desired, the cores *a* may be otherwise made of other metal or alloy.

If a hollow screw is required, the mold may be filled with caoutchouc or other analogous composition, and then a central plunger may be caused to descend, which, in addition to forming the hollow required, also, at the same time, forces the material into the spaces of the mold.

Having thus described the nature of my said invention, and the mode in which I carry the same into effect, I would have it understood that what I claim is—

1. A mold consisting of a number of spiral segments or cores, *a*, formed with rims, webs, or flanges a^1, by which they mutually support each other, such spiral segments or cores *a* being carried by a piece of metal, *c*, shaped to receive them, and placed inside a mold-box, *b*, having a removable top, b^1, and bottom b^2, all constructed and arranged in manner substantially as herein shown and described.

2. The spiral segments or cores *a*, formed with rims, webs, or flanges a^1, and without screws or segments of screws formed thereon, but of a like section from end to end thereof, in manner and for the purpose substantially as herein shown and described.

3. The cast spiral segments *a*, constructed as described, in combination with the flask *b* b^1 b^2, as and for the purposes set forth.

GEO. H. ROBERTS.

Witnesses:
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B. J. B. MILLS.