H. F. Read
Rubber Mold

No. 92,884. Patented Jul. 20, 1869.

Fig: 1.

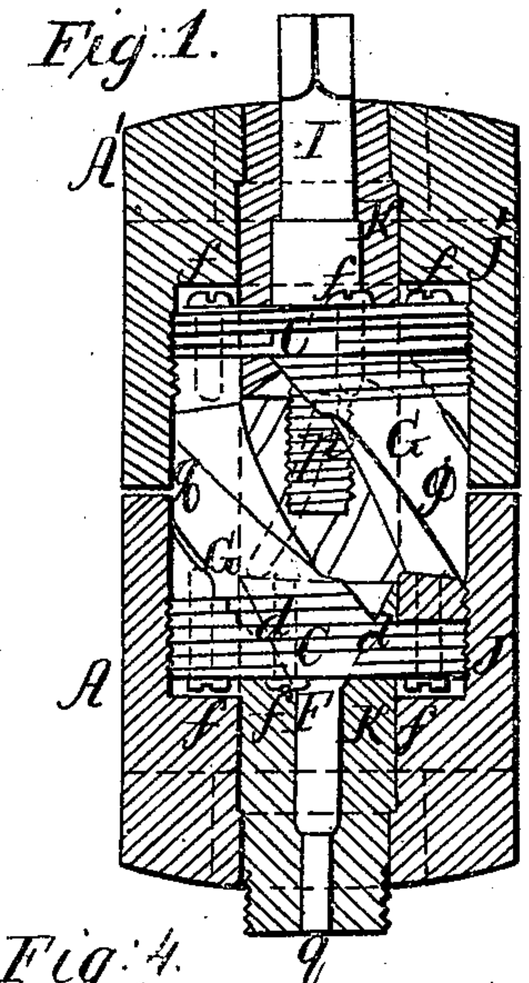


Fig: 5.

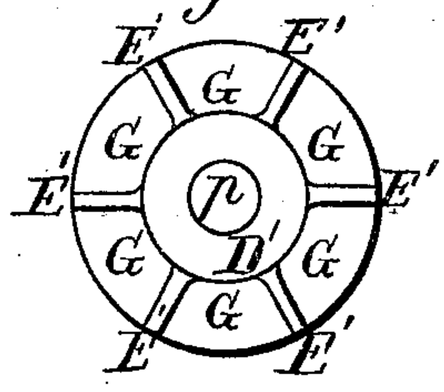


Fig: 3.

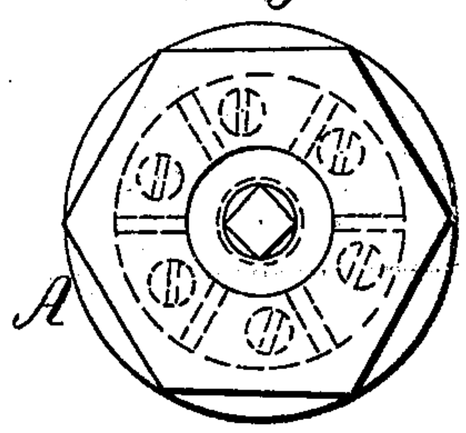


Fig: 4.

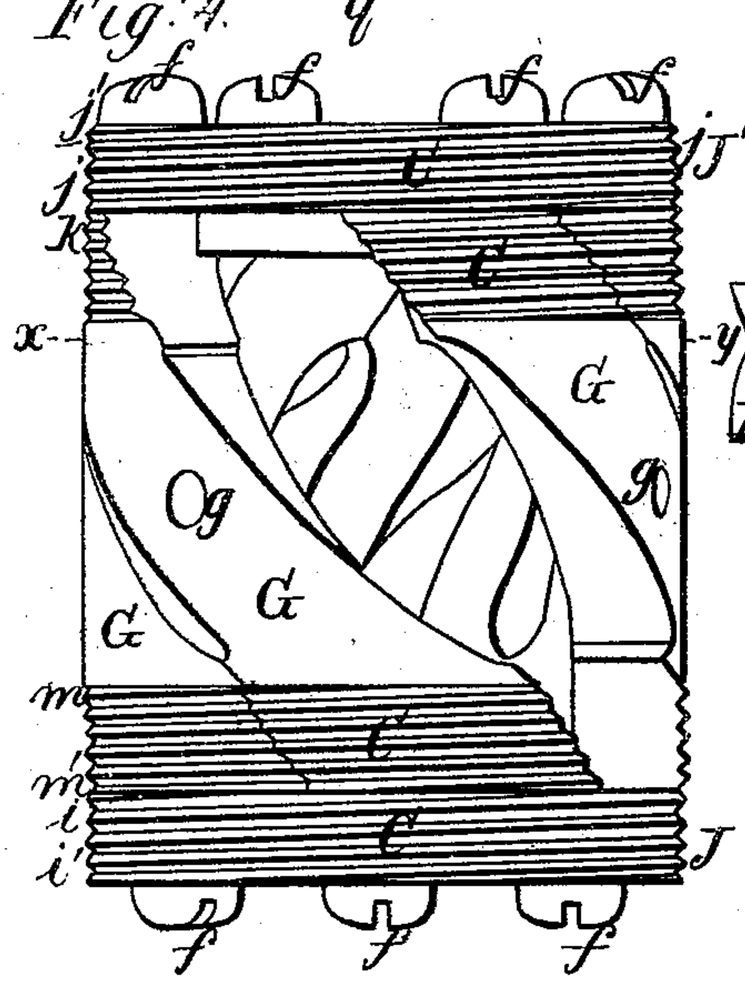


Fig: 6.

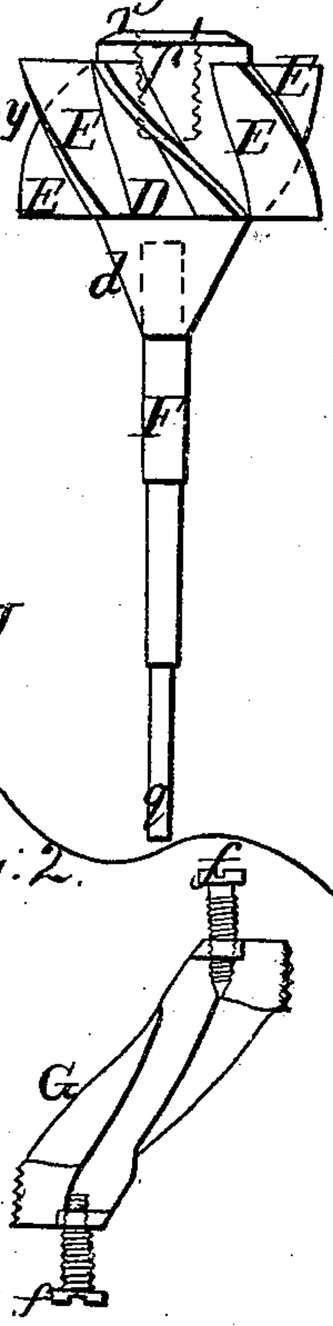


Fig: 7.

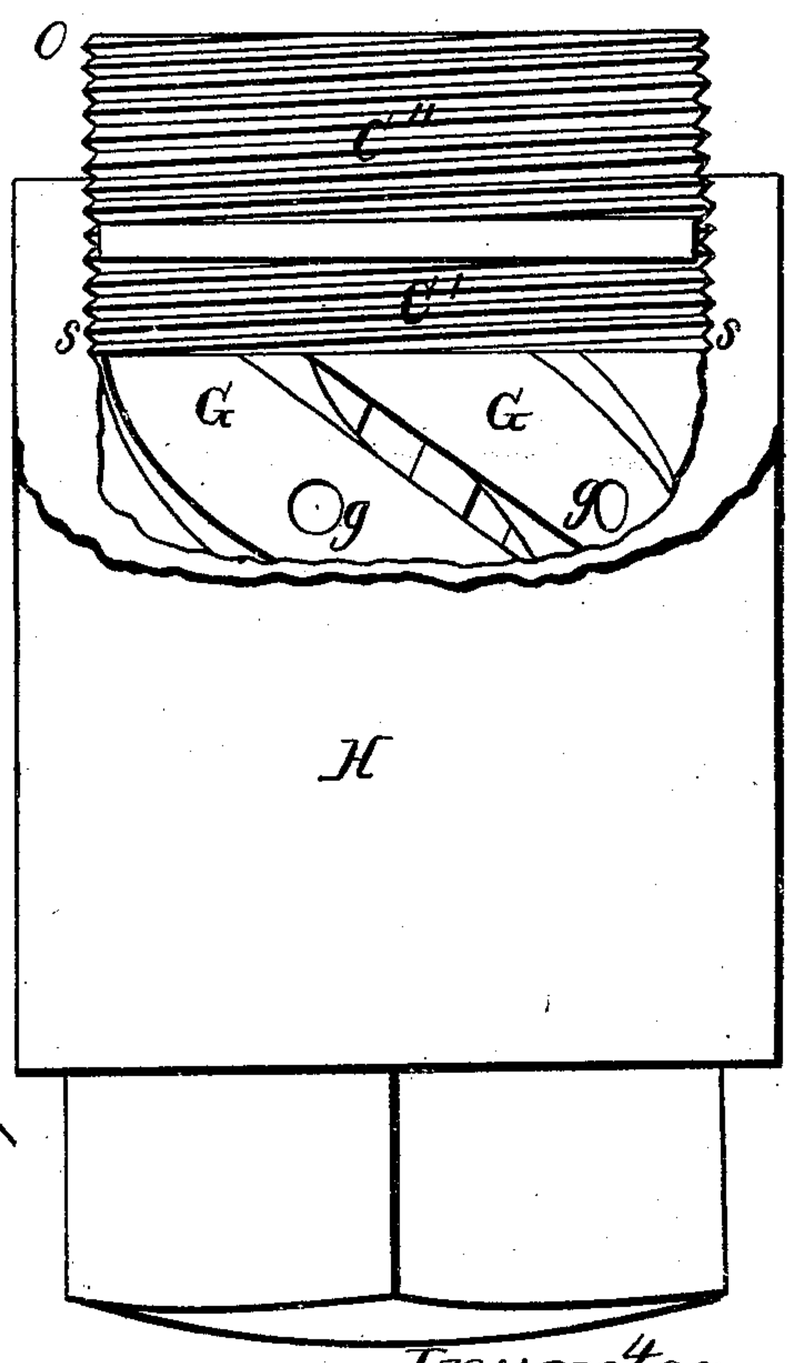
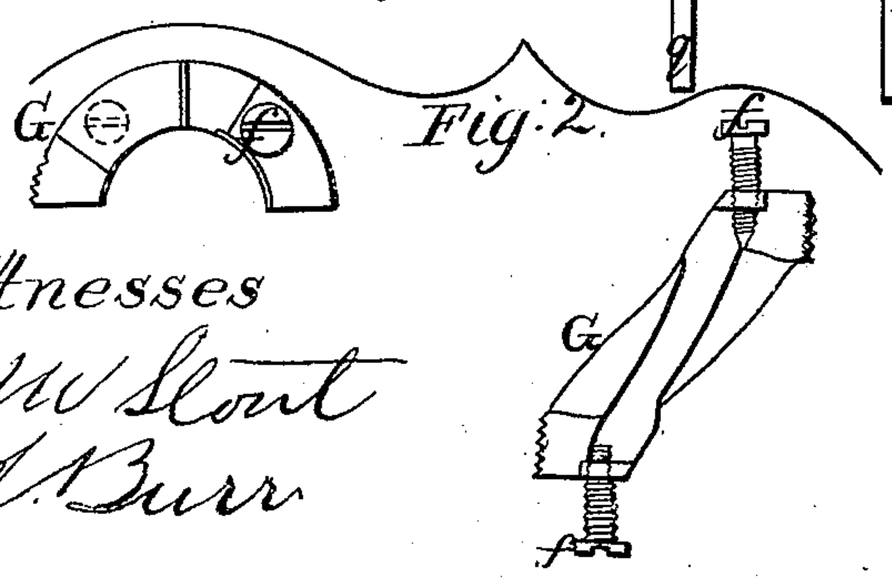


Fig: 2.



Witnesses
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Letters Patent No. 92,884, *dated July* 20, 1869.

IMPROVEMENT IN MOULDING PROPELLERS FOR WATER-METERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY F. READ, of the city of Brooklyn, in the county of Kings, and State of New York, have invented an Improved Mould for Casting Screw-Propellers for Meters; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in constructing a mould in such a manner that a screw-propeller for meters may be cast in it, of hard rubber or other suitable material, entire in one piece, at one operation, including a female screw in each end.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the drawings—

Figure 1 represents a vertical section of the caps A A′, embracing the mould, with one of the spiral segments removed, in order to expose the interior to view, and

Figure 2, two different views of a spiral segment detached, in order to display its peculiar form.

Figure 3 shows an end view of one of the caps A.

Figure 4 presents a side view, on a double scale, of the mould, with one of the spiral segments, G, removed, in order to present a better view of its peculiar form.

Figure 5 presents a cross-sectional view of the mould without the cap, taken through the line *x y*, fig. 4.

Figure 6 shows a perspective view of screw-propeller when cast.

Figure 7 shows a different construction of the mould, with a part of the cap broken away.

In fig. 4 is shown the body of the mould, with one of the spiral segments, G, removed.

Its interior hollow is uniform in size from one end to the other. Upon each end is cut a male screw, C C C C. It is composed of several different parts. The sections from *j* to *j′*, and from *i* to *i′*, are collars J and J′, which are made fast to the main body by means of the screws *f*. Each of these sections is made with a flange, *n*, extending inward from its inner edge, to act as a guide and support to the spiral segments while the screws are being screwed into them.

The form of these segments is shown in figs. 2 and 4.

Each one has a female screw in each end.

The holes *g* do not extend through, but only a sufficient depth for the insertion of a suitable tool by which to remove the segments when the cast is made.

The spiral slots E′ are formed by cutting away equal portions of adjacent segments, and all are to be as nearly of the same form and capacity as practicable, for these slots are to give form to the wings E of the screw-propeller, shown in fig. 6.

When these segments are fitted together upon the collars, and the screws *f* are driven home, it is ready for the caps A and A′, and the devices seated in them, respectively.

It will appear, from fig. 1, that the cap A′ is provided, in the interior of its main opening, with a female screw, to fit the male thread on the end of the mould, and that above the end of the mould the diameter of the opening is suddenly reduced, and after continuing at the reduced diameter, it is again reduced, and so continues to the end, and that the plunger K, from *j′* upward, has a corresponding formation, so that it may be moved downward, but not upward, and the part extends into the interior of the moulds, and its end is made concave, so as to give the convex form on the large end *r* of the body of the propeller, as shown in fig. 6, and its interior is recessed, to fit the shoulder on the steel mandrel I, so that the mandrel may move downward, but not upward, when once in position.

The lower end of the mandrel is provided with a male-screw thread, *p*, upon which is formed the female screw *p′*, in the large end of the screw-propeller.

When these parts are in position, the cap A is screwed upon the upper end of the mould.

The cap A is also provided with a female screw, so as to screw over the lower end of the mould, and its plunger is so formed that it will play upward, but not downward, and its lower end is formed with a male-screw thread, over which a nut is to be screwed, and the bore in the interior of the plunger has the form indicated by F′ in fig. 1, to fit over the steel shaft F in fig. 6, and at the upper end is gradually enlarged, as shown by the dotted lines *d′ d′*, fig. 1, forming a conical recess to mould the conical portion of the screw-propeller, as shown in fig. 6.

When the cap A is provided with the described parts, it is screwed upon the lower end of the mould, and ready for use.

The upper end of the shaft F may be provided with a male-screw thread, so that a female screw may be formed upon it, and the shaft screwed into the body of the propeller.

The female screw in the large end is made for the reception of a bushing, to hold in position an agate or other hard substance, to receive the pivot on which the propeller revolves.

When all the parts are complete, the cap A, with its plunger and mandrel, is removed, and a proper quantity of the prepared rubber inserted in the mould through the upper opening, and then the cap A′, with its parts before mentioned, is screwed down over the mould, and in so doing, the rubber is forced out into the slots E′, and into the conical portion of the lower plunger, and is cast in the form shown in fig. 6. It may be afterward hardened by any of the processes now in use.

In fig. 7, where a different construction is shown, the cap H encloses the entire mould.

The spiral segments G G are cut off at S S, corre-

sponding to the line *x y* in fig. 4, and C′ represents the female screw in the interior of cap H, while C″ is a collar with a male-screw thread upon it, to fit the female screw in the cap H, and contains the plunger and steel mandrel contained in the cap A′. When it is removed, the rubber is introduced into the mould, and then the collar C″ is screwed down, and the cast is made, after which it is screwed out, and the screw-propeller may be, by the requisite draught on the wings and body, forced out of the mould from below.

The manufacture of both body and wings of screw-propellers of rubber, and in one piece, by casting in a mould, is deemed an improvement of great value, since the rubber, when vulcanized, is very light and strong.

A propeller made of this material, because of its lightness, will revolve upon the slightest action of the passing fluid, and will thus indicate with the greatest accuracy.

The vulcanized rubber, while very strong, is yet slightly elastic, so that if sprung out of form by any extraordinary force, it will, when that pressure is removed, resume its original shape without breaking, as cast-metal would not do.

It is not acted upon chemically by water, so that it does not render the water impure, and retains its polish, so that it will not become loaded and clogged with dirt and sand, which would increase its weight, roughen its surface, and thus render its indications untrue.

Screw-propellers for meters have heretofore been constructed, generally, of metal, each wing and the body in separate pieces, and the wing soldered upon the body with some soft metal, and are much heavier than those made of rubber, and not, therefore, nearly so sensitive to the action of the fluid, and, of course, are liable to spring out of shape, and be torn off by centrifugal force, so that much labor and expense are necessary to keep them repaired and in true form.

What I claim as new, and desire to secure by Letters Patent, is—

1. The hollow cylindrical metallic mould, formed by spiral segments G G, and leaving spiral openings E′ E′ between said segments, constructed substantially as and for the purpose described.

2. The collars J and J′, in combination with the spiral segments G G and the screws *f f*, whereby said parts are securely fastened in position, constructed substantially as and for the purpose described.

3. The opening E′ E′ between the segments, in which the wings of the propeller are moulded, when constructed substantially as and for the purpose described.

4. The cap H, holding the body of the mould, and securely covering the several spiral segments and openings, constructed substantially as and for the purpose described.

5. So forming the mould for casting spiral propellers, that by removing the cap at one end, the thing cast may be drawn from the mould by being turned upon the same spiral pitch, as shown in fig. 7, substantially as described.

6. The caps A and A′, in combination with the plungers K and K′, for holding the mandrel and shaft in position, and forcing the material to be moulded into every part of the mould, constructed and arranged substantially as described.

7. The steel mandrel I, with its male-screw thread, upon which is formed the female screw *p′*, in the body of the propeller, in combination with the plungers K K′ and collars J J′, as set forth.

8. The screw-propeller, as shown in fig. 6, when made in metallic moulds, substantially as described, and for the purpose set forth, as a new article of manufacture.

H. F. READ.

Witnesses:
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