June 23, 1936. J. O. ALMEN 2,045,556

COLLAPSIBLE MOLDING CORE

Filed Jan. 8, 1934

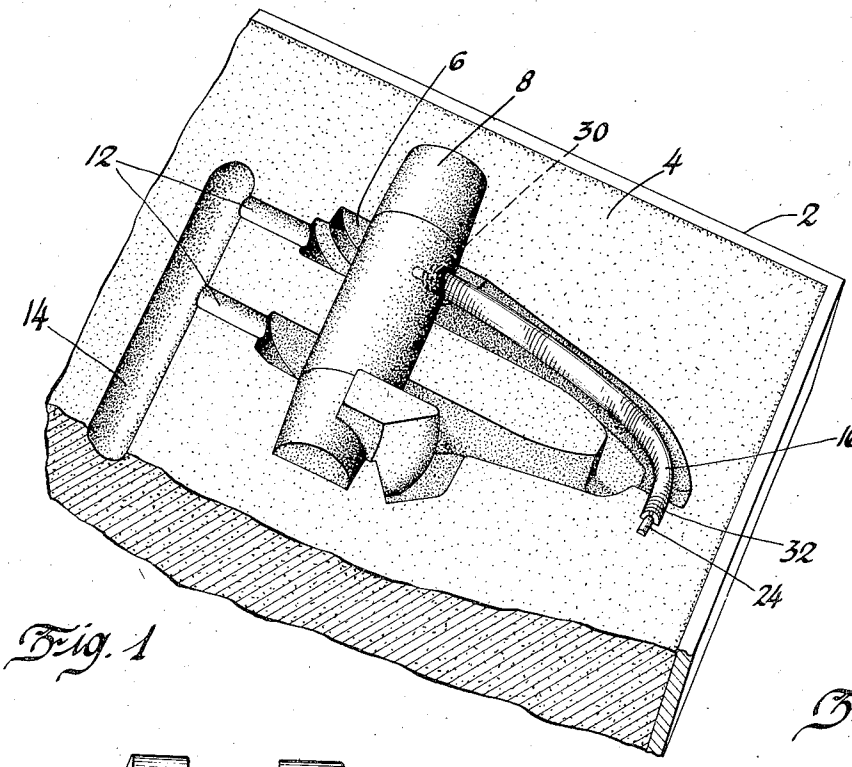


Fig. 1

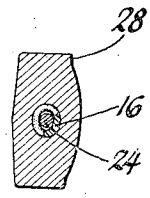


Fig. 2

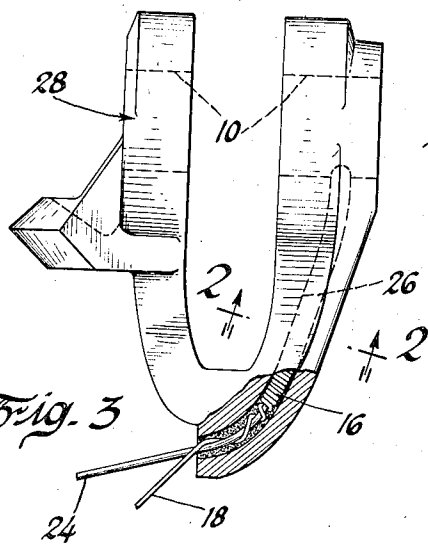


Fig. 3

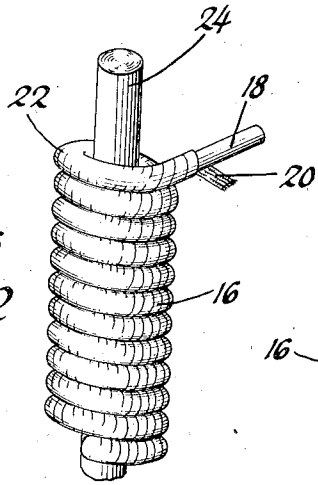


Fig. 4

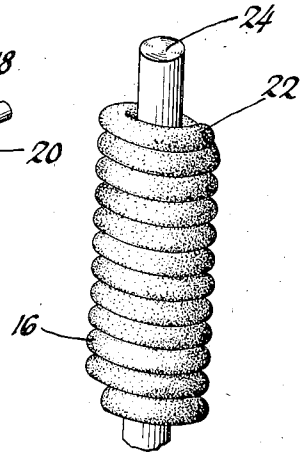


Fig. 5

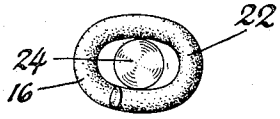


Fig. 6

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COLLAPSIBLE MOLDING CORE

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Application January 8, 1934, Serial No. 705,662

8 Claims. (Cl. 22—165)

This invention relates to the art of molding, and has particular reference to the use of a removable core to form small oil or other passages in articles where drilling is difficult.

In forming oil passages in small articles, the use of sand or other abrasives is objectionable for the reason that when the core is removed, some abrasive will stick to the metal and eventually reach the lubricated bearing, a condition which is undesirable. It is the object of the present invention to form a removable core which may be used to form small passages which are curved or have an angle therein and which are not easy to form by ordinary methods. In carrying out the invention, use is made of a soft iron wire which is wrapped with a fabric such as cotton impregnated with a suitable binder such as chromic acid. This wire is spirally wound. If desired, the spiral may be flattened to oval shape and the spiral then suitably bent or shaped to form the required passage. If desired, a center core wire may be used with the spiral wire loosely wound thereover. The formed core is suitably positioned in the conventional mold and as the hot metal is poured into the mold, the heat will burn or char the cotton and leave a small thickness between the wire and the poured metal. The purpose of the cotton is to prevent chilling of the metal when it is poured because if no cotton were used there would be a metal to metal contact between the poured metal and the wire of the core. After the cast article has cooled and is withdrawn from the mold, the core of the invention may be withdrawn by pulling on the end of the spiral wire to withdraw it from the finished article. The char formed by the cotton and the chromic acid binder is sufficiently soft to yield when the wire is pulled and readily allow the core to be pulled from the article.

After the core is removed, the remaining char from the cotton is easily flushed from the passage. If any char should remain and eventually reach the lubricated bearing when the article is put into use, no disadvantage will result for the reason that the char from the cotton is not injurious to the bearing.

On the drawing:

Figure 1 is a view of a shaped mold with the core removed.

Figure 2 is a sectional view through the finished article on the line 2—2 of Figure 3.

Figure 3 is a view in side elevation of the finished molded article with parts in section, and showing the manner in which the core is removed.

Figure 4 is an enlarged detailed section showing the winding of the outer cotton wrapped wire on the core wire, and showing how the cotton is wrapped on the wire.

Figure 5 is a view similar to Figure 4 of the completed core ready to be placed in the mold.

Figure 6 is a sectional view of the structure of Figure 4.

Referring to the drawing, the numeral 2 indicates the flask or box of the mold having therein the usual green sand 4 which has been suitably packed and shaped to the form indicated at 6 to shape the finished article. A core member 8, separately formed, is laid into the mold, the purpose of the core 8 being to form the journal openings 10 in the finished article. Suitable inlet passages 12 uniting with a common inlet 14 are provided to allow the metal to flow to all parts of the space or hollow 6 of the mold.

The removable core of the invention is indicated as a whole at 16. The core is formed of a wire 18 which has wrapped thereover a cotton strip 20 as best shown in Figure 4. After the cotton strip has been applied to the wire 18, the wire is formed into coil shape as shown at 22 and in this form may be used to form the core. Before or after being formed into coil shape, the cotton 20 is impregnated with a suitable binder, preferably chromic acid, the purpose of the binder being merely to keep the charred cotton in place after the molten metal has been poured into the mold.

Where the spiral 22 is of insufficient strength to support the metal when it is poured, a central or core wire 24 may be used and this wire is placed in the coil 22. The core wire 24 gives additional strength to the removable core 16.

As shown in Figure 1, the completed core is bent to the shape necessary to form the oil passage 26 in the U-shaped article 28, which is used to mount a roller on a shaft passing through the openings 10. One end of the removable core is positioned as at 30 in a recess formed in the core 8, while the other end 32 is positioned in a suitable space provided in the sand 4 of the mold. In the position shown in Figure 1, the removable core 16 is surrounded by the space 6 necessary to form the completed articles so that when the metal is poured, the metal will completely surround the core 16. When the finished article has cooled it is removed from the mold, and the end portion 32 will be found to project from the finished article. By now taking a pair of pincers or other suitable tool, and gripping the end of the wire 18 and pulling there-

on, the wire may be readily pulled from the finished article and leave the passage **26**.

As a result of the invention a passage **26** has been formed which would be difficult to drill, and as this passage is intended to carry oil to the bearings, no abrasive material has been left in the passage because no abrasive material was used in its formation.

In carrying out the invention, it was found that some sort of covering over the coil wire was necessary to prevent fusing between the coil wire and the casting and to give a clearance between the core and metal, otherwise the core could not be withdrawn. It was also found that the core could be more easily withdrawn when space was provided between the coil and the casting.

Another requirement for successful casting of cores is that the gases formed may escape freely through the core. This requires that the wires be separated by some porous material which will not impede the escape of gases but will prevent molten metal from flowing between the wire coils. All of these requirements are satisfactorily met when the spiraled wire core is made of cotton covered wire. The use of chromic acid is merely as a binder to keep the charred cotton in place. It is not believed that any important chemical action takes place. If no chromic acid binder were used, it is probable that the cotton covering, after being charred, would be washed off by the molten metal, and thus allow the metal to bond to the coiled wire. The chromic acid binder is not so dense as to prevent free escape of gases and is sufficiently soft that the outer covering crumples readily when the core is withdrawn.

It is obvious that the same results may be obtained without the use of cotton wrapped wire. For example, the wire core may be formed with bare wire about which may be wrapped a cotton bandage or similar material. The binder may also be something other than chromic acid, providing it fulfills the requirements.

Atlhough it is not considered essential that the spiral or helix be flattened as shown in Figure 6, nevertheless this flattening will allow an easier withdrawal of the wire.

I claim:

1. In a molding core, a metal center member, a metal coil around said center member, said coil having a covering of cotton impregnated with a binder.

2. In a molding core, a wire forming the center of the core, and a covered wire wound around said center wire, said wound wire being covered before being wound.

3. In a molding core, a wire forming the center of the core, and a wire covered with a porous covering wound around said center wire, said wound wire being covered before being wound.

4. In a molding core, a wire forming the center of the core, a wire covered with a porous substance impregnated with a binder, said covered wire being wound about said center wire after being covered.

5. In a molding core, a wire forming the center of the core, a wire covered with a porous substance impregnated with chromic acid, said covered wire being wound about said center wire after being covered.

6. In a molding core, a spiral cotton covered wire, said cotton impregnated with a binder.

7. In a molding core, a wire wound in spiral form and flattened, and a covering of cotton over said spiral.

8. In a molding core, a wire, a porous covering around said wire, said wire being wound in a spiral form and said covering being placed on the wire before being wound.

JOHN O. ALMEN.