March 18, 1947. S. KOLLER 2,417,762

TOOL FOR MAGNETIC LIFTING

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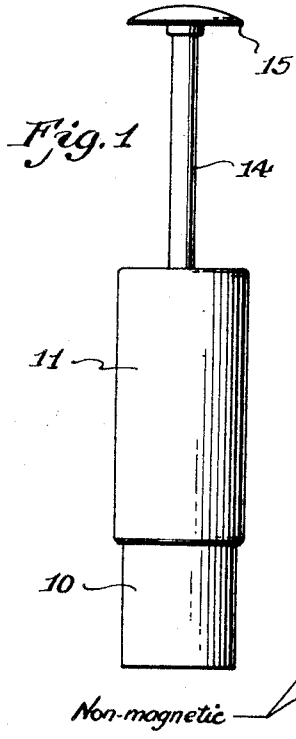


Fig. 1

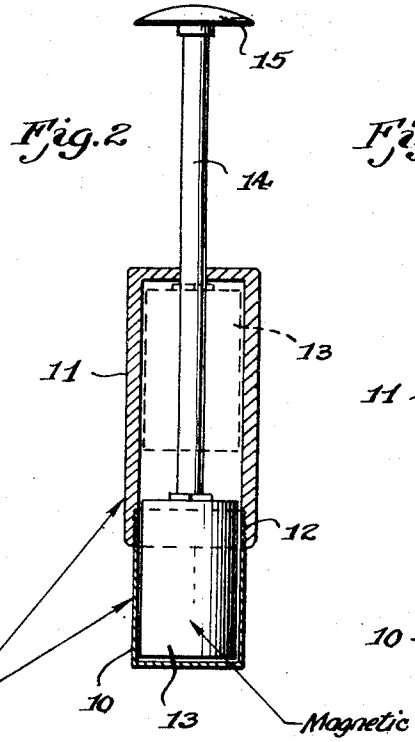


Fig. 2

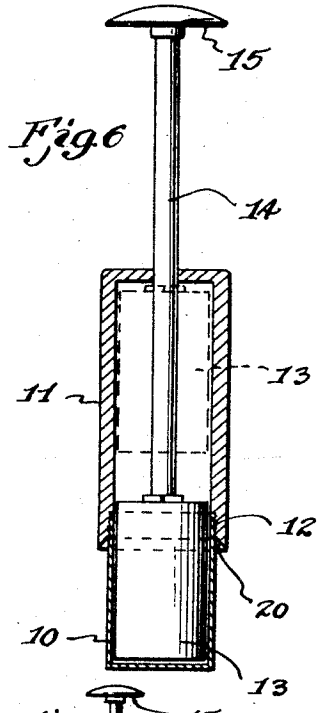


Fig. 6

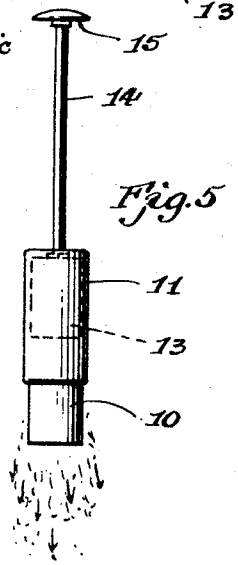


Fig. 5

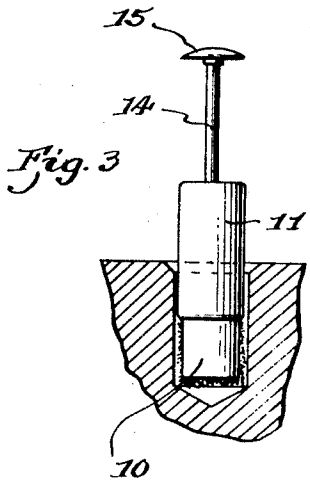


Fig. 3

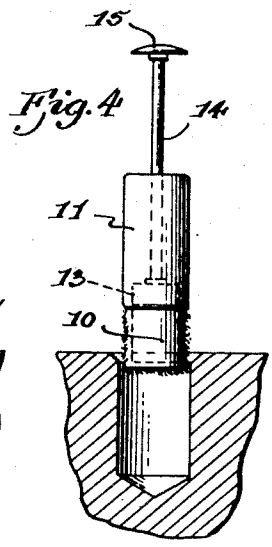


Fig. 4

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TOOL FOR MAGNETIC LIFTING

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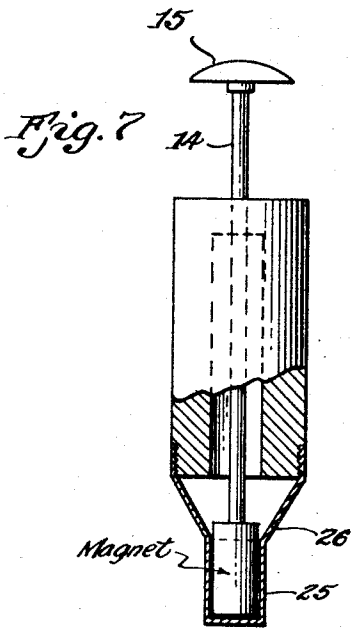


Fig. 7

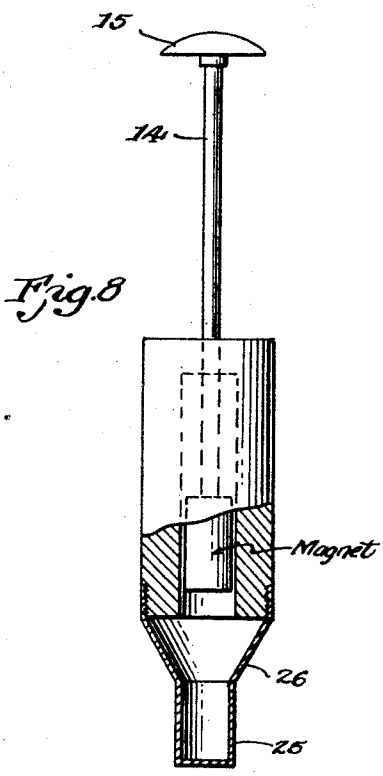


Fig. 8

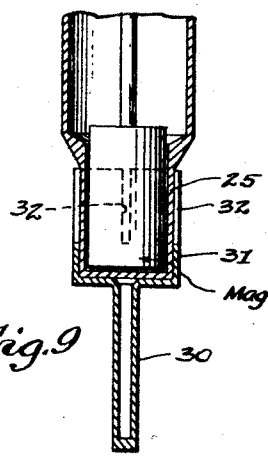


Fig. 9

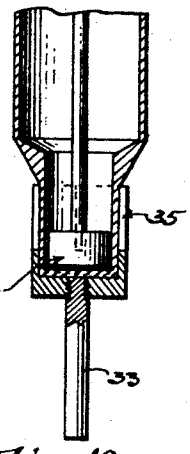


Fig. 10

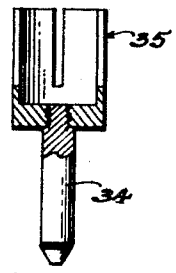


Fig. 11

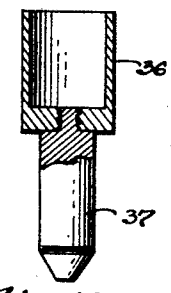


Fig. 12

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UNITED STATES PATENT OFFICE

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TOOL FOR MAGNETIC LIFTING

Steven Koller, Detroit, Mich.

Application April 14, 1944, Serial No. 531,007

1 Claim. (Cl. 294—65.5)

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This invention relates to a tool for magnetic lifting.

When holes are drilled in iron blocks in a manner that they do not pass entirely through the block, there is left in the holes iron shavings and cuttings. If it is desired to grind or finish these holes, it is necessary that these iron particles be removed. At present the only way they can be removed is by blowing them out or by inserting a small magnet in the hole to pick up the pieces. The pieces are then stripped from the magnet by the operator and the device is reinserted. If the magnet is of any strength at all it is extremely difficult in a time-consuming operation to strip these particles. Usually they move from one surface of a magnet to the other without leaving it. The present invention has as its object the provision of a simple device for removing these particles rapidly and obviates the necessity for the operator stripping the particles by hand.

In the drawings:

Fig. 1 is an illustration of the articles of manufacture to be described herein.

Fig. 2 is a sectional view of the same article.

Fig. 3 illustrates the manner in which the articles are inserted in a blind hole.

Fig. 4 illustrates the manner in which the article is removed from the hole.

Fig. 5 shows how the iron particles are released from the article.

Fig. 6 illustrates the modified form of the invention in which an undercut or sharp extension is provided to prevent upward movement of the particles on the non-magnetic shell.

Figs. 7 and 8 illustrate a modified custruction for insuring complete removal of iron particles.

Figs. 9, 10, 11 and 12 show another modification for use in very small holes.

In the drawings a non-magnetic shell is shown composed of two pieces 10 and 11 cylindrical in shape and joined together at 12. These pieces may take other shapes and forms depending on the particular use desired for them. They may be made of brass, plastic, hard rubber or other similar materials. In the shell is mounted a single magnet 13 or a plurality of magnets mounted together, whichever is desired to give the amount of magnetic force required. A rod 14 extends from the magnets upwardly through one end of the shell and has a handle 15.

In the use of the device for lifting small magnetic particles from blind holes, Fig. 3 illustrates the manner in which the device is inserted

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into the hole. The handle and the plunger 14 are left in the downward position. The device is removed with the handle in the same position (Fig. 4). After it is removed the handle 15 and the rod 14 are lifted upwardly to shift the magnet away from the casing 10 to the other end of the shell (Fig. 5). The removal of the magnet from this end of the shell causes all of the particles to fall freely away from the non-magnetic casing.

In Fig. 6 the shell 11 is shown with an undercut portion 20. This formation blocks the movement of any small particles that might travel upwardly along the shell when the magnet is moved relative to the shell. After the magnet reaches the position shown in dotted lines in Fig. 6 any particles that might adhere at the point 20 will drop away as have the other particles.

In Fig. 7 is shown a construction designed also to insure complete removal of the filings. The non-magnetic end 25 of the device flares outwardly at 26 so that as magnet 27 moves upwardly, the filings that might climb with it, hit the flare and rapidly leave the field of the magnet. They drop away immediately. The end 25 can be made as long as is convenient for adaptations to various jobs.

In Figs. 9 to 12 are shown attachments for use with small holes. In Fig. 9 at 30 is a piece of tubular soft iron enlarged at 31 and slotted at 32 to fit over the end 25 of the regular tool. In Figs. 10 and 11 the same device is shown with ends 33 and 34 threaded into a slotted retaining sleeve 35. In Fig. 12 the sleeve 36 is formed to have a slit fit over the tool with no slots. The projection 37 seals the hole in the sleeve so that with proper fitting it will not readily remove.

The iron used in the fittings of Figs. 9 to 12 should be soft so that it does not readily retain magnetism although it may transmit it. In these embodiments as in others, when the magnet is withdrawn in the casing, the iron filings or chips fall away from the inserted tool.

Other uses will be apparent from the above described device and the inventor claims as his invention all articles or methods that may be covered by the following paragraph.

I claim:

A tool for the removal of iron particles from cavities such as blind holes formed in iron work pieces which comprises, a closed shell, one end of the shell being of relatively thin non-magnetic material and adapted to be inserted into a cavity, a magnet within the shell arranged for shifting movement substantially from one end of the shell to the other, the shell and magnet being ar-

ranged so that when the magnet is in the end of the shell remote from the non-magnetic material the said material is substantially out of the field of flux of the magnet, and an operating piece connected to the magnet and extending through the shell for shifting the magnet in the shell whereby particles attracted magnetically against the said one end of the shell drop therefrom when the magnet is shifted substantially to the opposite end of the shell, the non-magnetic material forming the said one end of the shell having an outwardly extending formation which extends away from the magnet to facilitate magnetic release of particles.

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