

June 10, 1958

C. A. LANGE

2,838,082

MAGNETIC DRIVING TOOL

Filed June 18, 1956

FIG-1

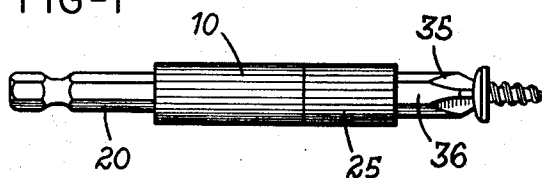


FIG-2

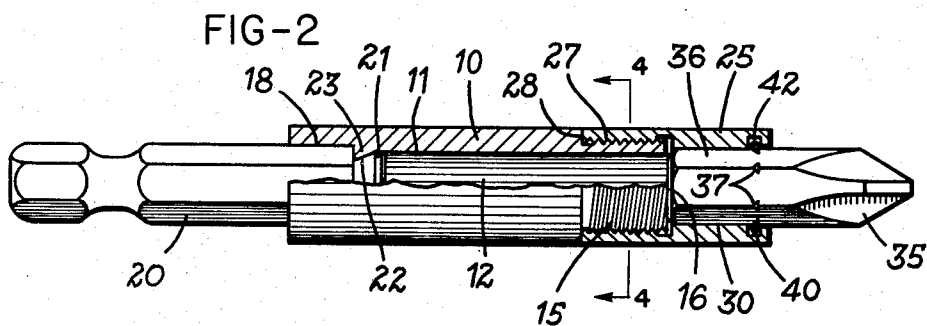


FIG-3

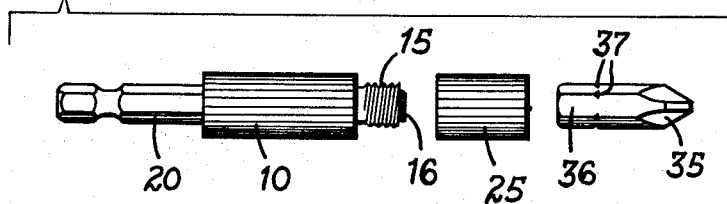
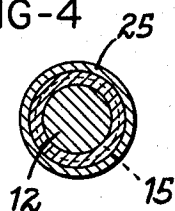


FIG-4



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2,838,082

MAGNETIC DRIVING TOOL

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Application June 18, 1956, Serial No. 591,881

1 Claim. (Cl. 145—50)

This application relates to magnetic tools, particularly to bit holders of the type which incorporate a permanent magnet for inducing magnetism in the bit to attract screws or other fastenings to be driven by the bit.

The primary object of the invention is to provide a novel construction for such a bit holder which is relatively simple and inexpensive to manufacture, which provides adequate protection for the magnet, and in which the parts subject to wear may be easily removed for replacement or repair.

A further object of the invention is to provide such a bit holder including a main body portion provided with a shank for driving, and including a permanent magnet substantially enclosed within the body portion, and wherein a bit carrying sleeve is arranged for removable attachment to the body portion and is adapted to support the bit in substantially direct magnetic flux transmitting relation with the magnet.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawing and the appended claim.

In the drawing—

Fig. 1 is a side elevational view of a magnetic tool constructed in accordance with the invention and with a fastening element illustrated as magnetically attracted to the bit;

Fig. 2 is a detail view similar to Fig. 1 showing the tool half in elevation and half in section;

Fig. 3 is a view similar to Fig. 2 with the bit carrying sleeve removed from the body portion of the tool; and

Fig. 4 is a section taken on line 4—4 of Fig. 2.

Referring to the drawing, which illustrates a preferred embodiment of the invention, the tool comprises a generally tubular body 10 including a central hollow portion 11 receiving a permanent magnet 12 in close fitting, preferably press fit, relation. Body 10 is made of material which is essentially non-magnetic, for example beryllium copper alloy, so that the flux from the permanent magnet follows the desired path into the bit and returns through the air, rather than being short-circuited through the holder. The magnet 12 may be any suitable type of permanent magnet, and is preferably a high coercive force type such as Alnico or the like. Such magnets are, however, relatively brittle and incapable of withstanding substantial force.

The forward end of body 10 is of reduced diameter and is provided with threads 15, and magnet 12 is so arranged within the body that the face portion 16 thereof extends slightly beyond the outward edge of the threaded end of the body. At the other end of body 10 there is a counterbore 18 into which a driving shank 20 of non-circular cross section, such as hexagonal, is press fitted to transmit a driving force from a handle or the like to the body 10. The inner end of shank 20 includes a pilot 21 having a surrounding tapered annular undercut 22 within which portions 23 of the body are curled when these parts are forced together, to lock the shank

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and body in assembled relation. This assembly is described in greater detail in the copending application of George B. Stillwagon, Jr., Serial No. 591,882, filed June 18, 1956.

Magnetic bit holders known previous to this invention, and such as shown in the patent to Clark 2,550,775 of May 1, 1951, have provided the driving socket for the bit in the main body of the tool, and thus when the socket becomes worn the entire body must be replaced. According to the present invention a bit carrying and positioning sleeve 25, preferably formed of the same non-magnetic material as body 10, is provided with an enlarged internally threaded end 27 for threading the sleeve onto the end of body 10, to provide a separable connection between the sleeve and the body. The dimensions of the parts are such that when the edge of the threaded end of sleeve 25 engages the seat 28 at the inner end of the threaded portion of body 10, the face portion 16 of the magnet is located at the end of the inner surface 30 of sleeve 25, which surface is of non-circular cross section for receiving a bit in driving relation.

The bit 35 includes a shank 36 of cross section corresponding to inner surface 30, and a series of small notches 37 are formed on the corners of shank 36, which is preferably hexagonal in cross section, to be engaged by a retainer ring 40 carried within an annular recess 42 adjacent the outer end of sleeve 25. The bit can thus be inserted and withdrawn from sleeve 25 by forcing the bit axially to cause the retainer ring to be lifted out of the notches, the ring however, being capable of developing sufficient force to hold the bit in place during all normal working operations. The drive between sleeve 25 and bit 35 is through the corresponding non-circular parts thereof and the retaining ring acts only to position and retain the bit on the tool, as shown and described in the patent to H. G. Fischer et al., 2,522,217 of September 12, 1950.

The dimensions of the parts are such that the end of shank 36 is retained in direct magnetic flux transmitting relation with face portion 16 of the magnet, and the magnetic flux travels from the magnet through the bit to a magnetic fastening element 40 to be operated on by the tool. The flux path then returns through the air to the opposite end of magnet 12 through driving shank 20, which is preferably made of magnetic material.

With such a construction when the inner non-circular surface 30 of the sleeve becomes worn, the sleeve may be replaced with a new one, thereby reconditioning the bit holder without the necessity of replacing the entire body of the holder and the magnet, this feature representing a considerable saving in cost to the user of such tools. The bit may readily be removed by merely withdrawing it from sleeve 25 and, therefore, as the driving points of the bit wear the bit may be removed for sharpening or may be replaced if necessary.

The bit is retained in direct flux transmitting relation with respect to the base portion of the magnet, thereby overcoming possible reluctance from an air gap at this point. The driving force from shank 20 to the bit is transmitted entirely through the body and sleeve, thereby relieving the magnet from transmitting the drive forces and protecting the relatively brittle material of the magnet. Further protection of the magnet is provided due to its complete enclosure within the body portion 10, guarding the magnet against striking forces during handling of the tool.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claim.

What is claimed is:

A magnetic tool for retaining magnetically attractable fastenings in driving relation with the bit of the tool, comprising the combination of a bit of magnetic material having a driving end for engaging fastening elements in torque-transmitting relation, a shank on said bit of non-circular cross section, a tubular sleeve of non-magnetic material having an inner surface of non-circular cross section corresponding to said bit shank and engaging said bit shank in torque-transmitting driving relation, a threaded end on said sleeve, a tubular body portion of non-magnetic material having a threaded end for mating with said threaded end of said sleeve, a permanent magnet supported within said body portion, one face of said magnet being positioned at the edge of said threaded end of said body portion, means in said sleeve for yieldably retaining said bit shank in said sleeve, the relative dimensions of said threaded ends and

the location of said retaining means being such that said bit shank is maintained in direct magnetic flux-transmitting relation with said face of said magnet, a driving shank of magnetic material, and means retaining a portion of said driving shank in torque-transmitting relation within said body portion and in magnetic flux-transmitting relation with the end of said magnet opposite said face.

References Cited in the file of this patent

UNITED STATES PATENTS

2,522,217	Fischer et al.	Sept. 12, 1950
2,550,775	Clark	May 1, 1951
2,718,806	Clark	Sept. 27, 1955

FOREIGN PATENTS

485,160	Canada	July 22, 1952
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