

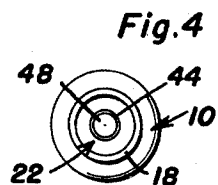
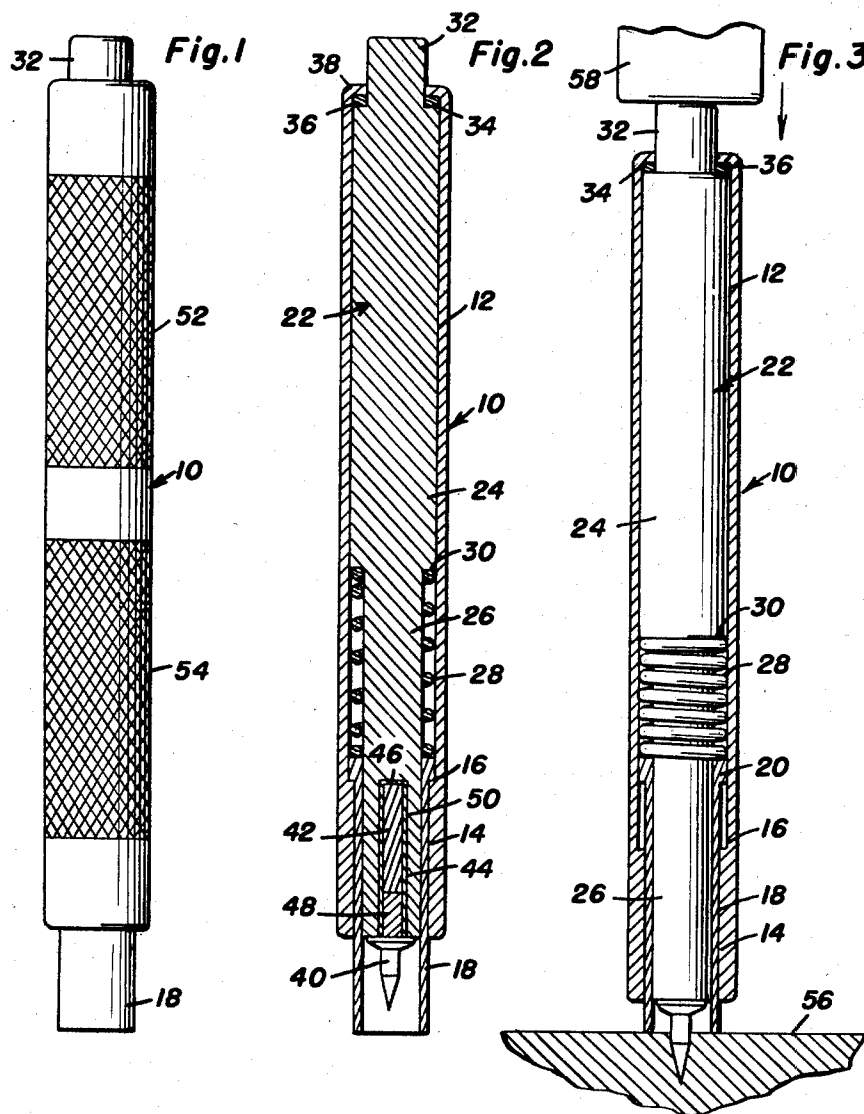
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NAIL DRIVER

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NAIL DRIVER

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3 Claims. (Cl. 1-47)

1

This invention relates generally to a nail driver, and more particularly to a nail driver for driving nails into steel, concrete, brick or other hard building materials.

The primary object of this invention is to provide an improved nail driving and setting device which is especially designed for driving hard steel nails into hard building materials such as concrete, brick and steel.

Another object of this invention is to provide an improved nail driving and setting tool which includes a hardened sleeve slidably mounted within the body of the tool, said hardened sleeve enclosing the nail during the driving operation whereby the worker using the tool is protected from injury through the nail flying out of the driving tool.

Another object of this invention is to provide an improved tool for driving and setting nails into hard building materials, said tool including a hardened sleeve adapted to telescope within the tool during the driving process.

Another object of this invention is to provide an improved tool for driving and setting nails, said tool being of simple and compact construction whereby it may be easily held in one hand of the user while the other hand is free to drive on the end of same with a conventional hammer.

Another object of this invention is to provide an improved nail driving and setting tool which is of simple and compact construction whereby it may be economically manufactured.

Another object of this invention is to provide a tool for driving nails, said tool including a nail engaging shaft which has mounted in its nail engaging end a permanent magnet for retaining a nail on the end of the driving shaft.

Another object of this invention is to provide an improved nail driving shaft which has a central longitudinally extending bore in its nail engaging end, said bore having a permanent magnet disposed therein for retaining a nail on the end of the driving shaft.

A further object of this invention is to provide an improved nail driving and setting device which includes a body having slidably mounted therein a nail driving shaft, said nail driving shaft having mounted in its nail engaging end a permanent magnet, said magnet being insulated from the nail driving shaft and the other magnetic attractive forces of the nail driving and setting tool.

With these objects definitely in view, this invention resides in certain novel features of con-

2

struction, combination and arrangement of elements and portions as will be hereinafter described in detail in the specification, particularly pointed out in the appended claims, and illustrated in the accompanying drawings which form a material part of this application and in which:

Figure 1 is an elevational view of the nail driving and setting tool, which is the subject of this invention, and showing the general characteristics thereof;

Figure 2 is a longitudinal vertical sectional view through the center of the tool of Figure 1 and showing the internal construction thereof;

Figure 3 is a longitudinal vertical sectional view through the body and sleeve portion of the nail driving and setting tool of Figures 1 and 2, and showing the tool in the process of driving a nail into a hard building surface; and,

Figure 4 is a bottom end view of the nail driving and setting tool of Figure 1, the nail being omitted.

Similar characters of reference designate similar or identical elements and portions throughout the specification and throughout the different views of the drawings.

Referring now to the drawings in detail, the nail driving and setting tool includes a tubular body portion 10 having an enlarged internal bore 12 throughout the major portion thereof and a reduced internal bore 14 adjacent the lower end thereof. The transition from the enlarged internal bore 12 to the reduced internal bore 14 results in an annular shoulder 16 adjacent the lower end of the body 10.

Mounted within the body 10 is a sleeve 18. The sleeve 18 has an external diameter equal to substantially the diameter of the reduced bore 14 and is mounted in the lower portion of the body 10 for sliding movement with respect thereto. The upper end of the sleeve 18 is provided with an enlarged, outwardly extending flange portion 20 having a diameter substantially equal to the diameter of the enlarged internal bore 12. The enlarged portion 20 is disposed within the enlarged internal bore 12 and slidably engages the wall thereof.

It is intended that the sleeve 18 be normally disposed within the body 10 with the lower end portion thereof projecting downwardly and outwardly of said body. However, the downward movement of the sleeve 18 with respect to the body 10 is limited by the engagement of the lower portion of the enlarged flange portion 20 with the annular shoulder 16.

Slidably mounted within the body portion 10

3

is a nail driving shaft 22 having an enlarged upper portion 24 of a diameter substantially equal to the diameter of the enlarged internal bore 12. The nail driving shaft 22 is also provided with a reduced lower portion 26 having a diameter substantially equal to the internal diameter of the sleeve 18 and having the extreme lower end thereof slidably mounted within the sleeve 18.

Mounted within the enlarged internal bore 12 of the body 10 is a coil spring 28 which is mounted over the reduced portion 26 of the nail driving shaft 22. The upper end of the coil spring 28 engages an annular shoulder 30 on the nail driving shaft 22 formed by the reduction in diameter of the shaft. The lower end of the coil spring 28 is disposed against the upper surface of the enlarged flange portion 20 of the sleeve 18 and compressibly urges the enlarged flange portion 20 into engagement with the annular shoulder 16.

The nail driving shaft 22 is provided with a reduced upper portion 32 which projects outwardly and upwardly from the body portion 10. The driving shaft 22 is provided with an annular shoulder 34 formed by the reducing end thereof to form the reduced upper portion 32. Mounted over the reduced upper end 32 and engaging the annular shoulder 34 is a washer 36. The washer 36 is retained on the driving shaft 22 and the driving shaft is retained within the body 10 by an interned annular flange 38 integral with the upper end of the body 10.

In order that a nail, referred to in general by the reference numeral 40, may be retained in engagement with the nail driving shaft 22 for the purpose of driving the same into a hard building material, the nail driving shaft 22 is provided with a permanent magnet 42. While any suitable permanent magnet may be utilized, it is preferred that the magnet 42 be of a hypermagnetic ferrous alloy. The magnet 42 is in the form of a cylindrical core and is received within a non-magnetic sleeve 44 having a closed upper end 46. While it has been found that copper is suitable for forming the sleeve 44 and its closed upper end 46, it is not intended to so limit the invention as other suitable non-magnetic metals and alloys may be used. The magnet 42 is retained within the sleeve 44 by a hardened metal core 48 whose lower end is flush with the lower end of the sleeve 44. It has been found that hard nickel is very satisfactory, but other magnetic attractive metals and alloys which are sufficiently hard and do not become permanently magnetized will be satisfactory. The sleeve 44 and its associated magnet 42 and hard metal core 48 are mounted within a centrally located longitudinally extending bore 50 in the lower end of the driving shaft 22.

It will be noted that the exterior of the body portion 10 is knurled at 52 and 54 to form a suitable hand gripping surface. However, the knurling shown is merely one suggestive design and it is not intended to limit the invention to such an arrangement.

Referring now to Figure 3 in particular, it will be seen that the nail 40 is retained within the lower portion of the sleeve 18 at all times during the nail driving process whereby the danger of the nail flying out from under the tool and striking the user of the tool is eliminated. When the nail 40 is to be driven into a hard building material, which is illustrated in Figure 3 and referred to by the reference numeral 56, the lower

4

end of the sleeve 18 is placed on the surface of the building material 56 in the desired position. The body portion 10 is then urged towards the building material 56 by the pressure of the hand in which it is held and at the same time the upper end 32 of the nail driving shaft 22 is struck by a conventional hammer 58. When the upper end 32 of the nail driving shaft 22 is struck by the hammer 58, the sleeve 18 telescopes within the body portion 10 and the nail driving shaft 22, the body portion 10 and the nail 40 move downwardly until the point of the nail 40 engages the surface of the hard building material 56. Due to the additional force exerted thereon and the hardness of the pointed end, the nail 40 penetrates the surface of the hardened building material 56. Since the sleeve 18 cannot move, the nail driving shaft 22 and the body portion 10 move downwardly and the sleeve continues to telescope within the body portion 10 and presses the coil spring 28. After the nail 40 has been driven into the building material 56, pressure is released on the body portion 10 and the sleeve 18 is projected downwardly from the lower end of the body portion by the compression of the coil spring 28 to resume the position illustrated in Figure 2.

It will be understood that the nail 40 is a special hardened nail which is designed specifically for driving into hard building materials such as concrete, brick and steel. The nail 40 is a nail which is commercially sold on the market at the present and is no part of this invention other than the fact that it is used with the improved nail driving and setting device, which is the subject of this invention.

The operation of this device will be understood from the foregoing description of the details thereof, taken in connection with the above recited objects and drawings. Further description would appear to be unnecessary.

Minor modification of the device, varying in minor details from the embodiment of the device illustrated and described here, may be resorted to without departure from the spirit and scope of this invention, as defined in the appended claims.

Having described the invention, what is claimed as new is:

1. A nail driving and setting device comprising an elongated tubular body, a sleeve slidably mounted within said body, a driving shaft slidably mounted within said tubular body and said sleeve, means carried by said driving shaft for retaining nails in engagement therewith, said nail retaining means being a magnet disposed within the lower end of driving shaft, said magnet being seated within a sleeve of non-magnetic material mounted within a bore in the driving shaft, said magnet being retained within said sleeve by a hardened core of magnetic attractive material.

2. A nail driving shaft having a hammer engaging end and a nail engaging end, the nail engaging end having a centrally located longitudinal bore therein, a magnetic core disposed within said bore and retained therein by a hardened core of magnetic attractive material, said magnetic core and said hardened core being mounted within a sleeve of non-magnetic material.

3. A nail driving and setting device comprising an elongated tubular body, a sleeve slidably mounted within said body, a driving shaft slidably mounted within said tubular body and said sleeve, means carried by said driving shaft for retaining nails in engagement therewith, said

5

nail retaining means being a magnet disposed within the lower end of driving shaft, said magnet being seated within a sleeve of non-magnetic material mounted within a bore in the driving shaft, said magnet being retained within said sleeve by a hardened core of magnetic attractive material, the upper portion of the driving shaft closely engaging the interior of the tubular body, said driving shaft having a reduced lower portion closely engaging the interior of said sleeve, 10 the upper end of the tubular body being inwardly flanged to retain said driving shaft therein, the driving shaft having a reduced upper end pro-

6

jecting beyond the upper end of the tubular body for engagement by a hammer.

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