United States Patent

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[72] Inventor **Richard A. Kuhlman**
Forest Park, Ill.

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[73] Assignee **Spotnails, Inc.**
Long Island City, N.Y.

[54] **MALLET DRIVE FASTENER DRIVING MACHINE**
2 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **227/120**
[51] **Int. Cl.** **B25c 1/00**
[50] **Field of Search** 227/120, 121, 126, 127, 129, 147, 132

[56] **References Cited**

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Primary Examiner—Granville Y. Custer, Jr.
Attorney—I. Walton Bader

ABSTRACT: A mallet drive stapling machine is shown which includes a housing, a magazine, a piston raceway and a drive channel within the housing. A follower is movable within the magazine to sequentially propel fasteners contained therewithin into operative relationship with the drive channel. A piston having an enlarged upper portion, an outwardly projecting intermediate portion, and a lower portion is movable within the piston raceway. A driver blade is secured to the lower portion of the piston and is selectively movable within the drive channel to drive fasteners contained therein into work. The lower portion of the piston is substantially circular and between the lower portion and the enlarged upper portion is an intermediate portion which is formed with four projecting portions, each two of these portions are oppositely extending with respect to one another and each pair of said oppositely extending portions are perpendicular with respect to one another.

A coil spring is retained within said piston raceway and surrounds the piston, with the piston raceway having an inwardly extending portion to retain the spring. A resilient bumper is selectively abuttable with the base portion of the piston when the piston is moved downwardly.

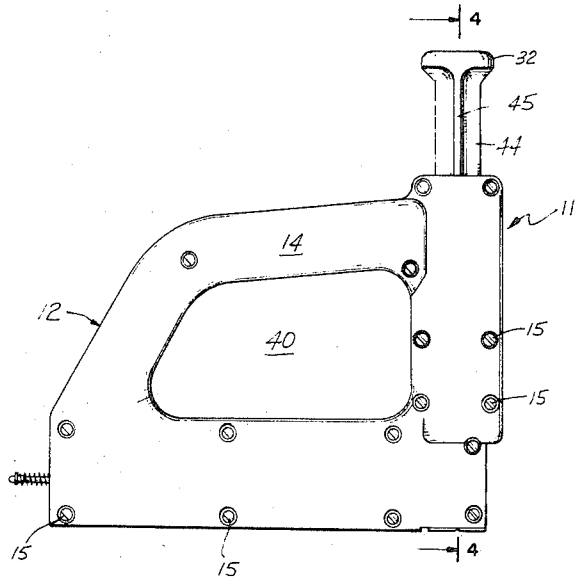


FIG. 1

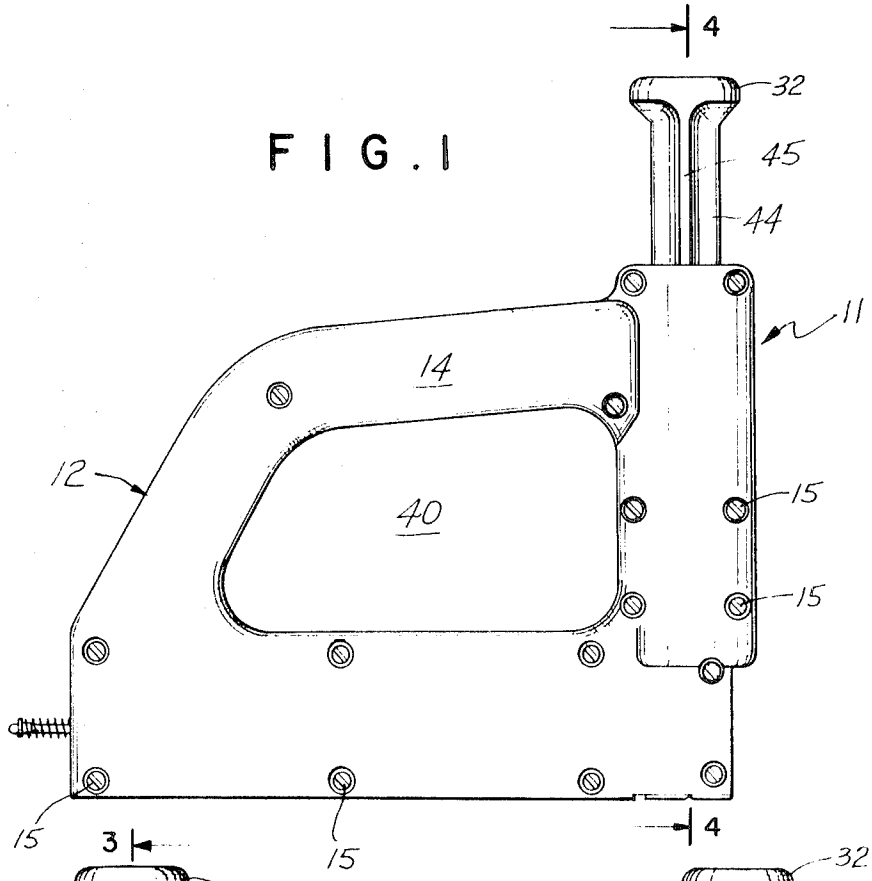


FIG. 2

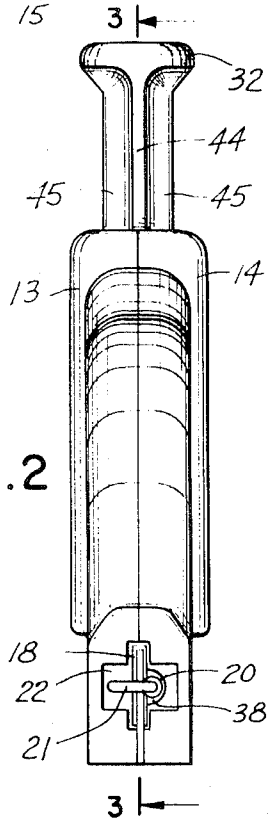
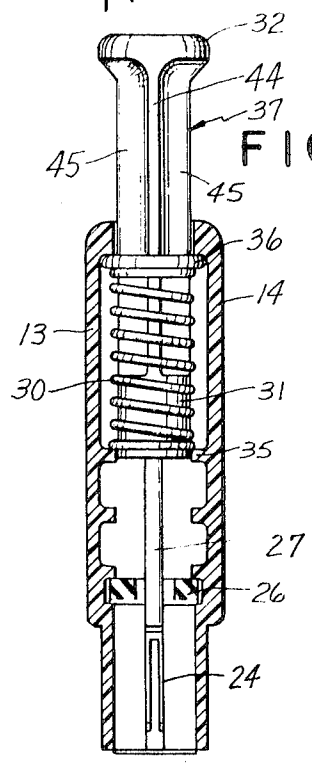


FIG. 4



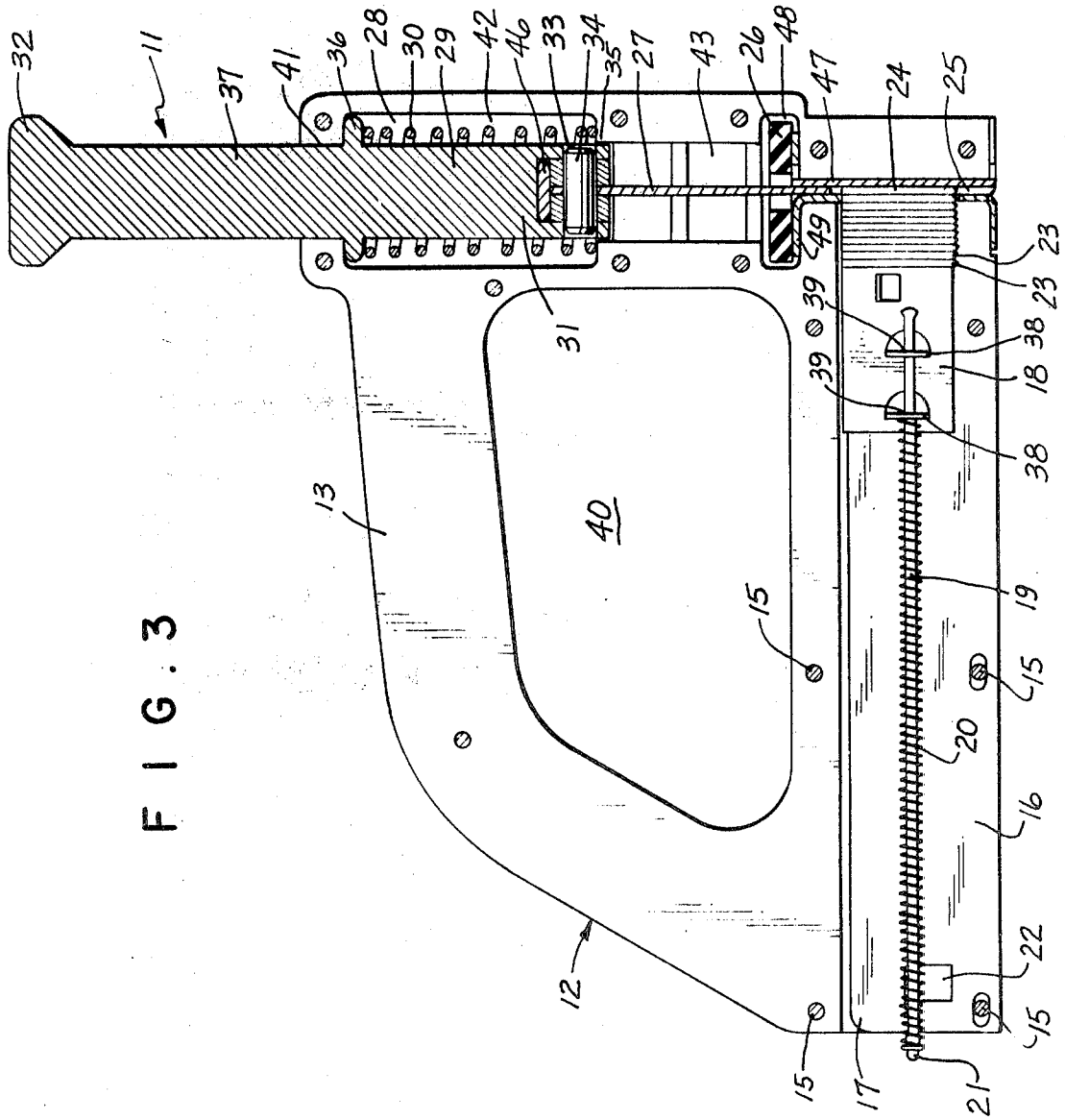

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FIG. 3

MALLET DRIVE FASTENER DRIVING MACHINE

DESCRIPTION OF THE INVENTION

This invention relates to a Mallet Drive Fastener Driving Machine which is used to drive various types of fasteners, such as staples, nails and the like, into various types of work.

In various operations such as the nailing of floors, installation of linoleum, installing lead wires for telephones, television antennaes, radio applications and the like, and various other applications of similar type where a fastener is to be driven into work at various sequential points and where the type of operation or cost factors militate against the use of power driven tools but where conventional hand-nailing or fastening is impractical, a tool of this type finds utilization.

Such mallet drive machines, generally, include a downwardly movable piston which is actuated by the blow of a mallet, a driver blade operatively connected to the piston, a bumper abuttable with the piston at the end of the driving stroke and a magazine within which the fasteners are contained in laterally aligned relationship. Follower means are provided within the magazine to sequentially propel the leading fastener into abutting relationship with the driver blade.

Conventional Mallet Drive Fastener Driving machines have been relatively costly to manufacture and, as a result, these machines have only been available to "professionals" who could afford the cost of purchasing one of these devices. The price charged for prior devices was completely beyond the reach of a "do it yourselfer," his wife, or a similar "amateur" workman.

I have produced a Mallet Drive Fastener Driving Machine which is a relatively inexpensive tool and is well within the budget capabilities of users of the latter type.

The construction of the tool, while rugged, is quite inexpensive. Plastic molded parts are extensively used in the device and the construction is such that the number of parts to be assembled to produce the completed machine is kept to a minimum.

The construction of the tool of this invention is likewise simple and rugged so that the possibility of failure of parts is kept to a minimum.

In brief, the Mallet Drive Fastener Driving Machine of this invention includes a housing which is preferably made of moldable plastic and preferably in two separate sections which are secured to one another by screws or similar fasteners. A magazine is included within the housing to contain a plurality of fasteners such as staples and nails in laterally aligned relationship. A follower is forwardly biased within the magazine and is adapted to propel the leading fastener into driving relationship. A piston raceway is provided within the magazine within which a piston is disposed, a driver blade is operatively connected to the piston and is adapted to abut the leading fastener and to drive it into work, and spring means are operatively connected with the piston in order to return the piston to its normal position.

The above sets forth a brief description of this invention and the principal objects and advantages thereof. Other objects and advantages of this invention will become apparent to the reader of this specification as this description proceeds.

The invention will be further described by reference to the accompanying drawings which are made a part of this specification.

FIG. 1 is a side elevational view of a Fastener Driving Machine made in accordance with this invention.

FIG. 2 is a rear elevational view of the form of invention shown in FIG. 1.

FIG. 3 is a cross-sectional view taken along lines 3—3 of FIG. 2.

FIG. 4 is a cross-sectional view taken along lines 4—4 of FIG. 1.

The invention will now be further described by reference to the specific form thereof as shown in the accompanying drawings. In this connection, however, the reader is cautioned to note that such specific form of this invention is merely for illustrative purposes and for purposes of example only. Various changes and modifications could obviously be made within the spirit and scope of this invention.

Now referring to the specific form of this invention as shown in the accompanying drawings, the Fastener Driving Machine of this invention is formed with a housing **12** which is preferably made of an impact-resistant plastic such as high-impact styrene, polycarbonate resin or the like. Housing **12** is formed of a pair of complementary sections **13** and **14** which are held together by screws **15**. Within housing **12** is a magazine **16** having a rail **17** therewithin. A follower **18** is operatively connected with rail **17** and is secured to rod **19** through a pair of upstanding portions **38** which are provided with recesses **39**. Rod **19** is offset at its rear portion **21** and the offset rear portion is disposable within a recess **22** which is cut out of magazine **16**. A spring **20** is retained between one of the offset portions **38** of follower **18** and the offset portion **21** of rod **19**.

A plurality of fasteners **23** such as nails, staples or the like, is operatively connected to rail **17**. Follower **18** normally urges fastener strip **23** forwardly so that the leading fastener **24** of the strip is disposed within drive channel **25** provided within housing **12**.

Housing **12** is also provided with a handgrip recess **40** therewithin.

A piston raceway **28** is also provided within housing **12** and a piston **29** is disposable within this raceway. Piston raceway **12** is formed with a narrow upper portion **41**, a widened intermediate portion **42** and a narrow lower portion **43**. Piston **29** bears an enlarged top portion **32**, a substantially cylindrical lower portion **31** and an intermediate portion **37**. A plurality of projecting guide portions **44** and **45** are also provided. The opposite members of portions **44** and of portions **45** are vertically aligned with one another and are oppositely extending while portions **44** and **45** are perpendicular to one another. This permits a substantial reduction of the frictional force between the piston and the piston raceway as will be subsequently explained.

Piston **29** also bears an enlarged portion **36** which is carried by intermediate portion **37** and which acts as a stop limiting the upward travel of the piston. An inwardly projecting retainer **35** is likewise provided within the intermediate portion **42** of the piston raceway. A spring **30** is likewise provided which, in the preferred modification, is a coil spring and is retained between elements **35** and **36**.

A bumper **26** is likewise provided below portion **43** of piston raceway **28**. Bumper **26** is retained above drive channel support member **47** which also defines drive channel **25**. A plastic member **48** preferably made of polycarbonate resin is disposed above bumper **26** and serves to transmit the piston impact to bumper **26**. Bumper **26** is, of course, made of a resilient material such as natural or synthetic rubber.

A driver blade **27** is secured to piston **29** by means of pin **34** which is disposed within recess **33** provided in piston **29**. A tongue **46** may optionally be provided in order to improve the securing of driver blade **27** to piston **29**. Piston **29** is likewise made of plastic such as polycarbonate or high-impact styrene.

With the above description, the operation of this invention can now be explained.

In the factory, the fastener driving machine is assembled by placing the internal components within one side of housing **12** and the opposite side of housing **12** is then secured into place. The fastener strip **23** is then placed in operative relationship with rail **17** and follower **18** with its attached rod **19** put in position behind strip **23**. The rear portion **21** of rod **19** is then secured into position within recess **22** so that spring **20** normally will urge follower **18** forwardly. The machine is then aligned in juxtaposition with work so that drive channel **25** is aligned with the portion of the work in which the lead fastener **24** is to be driven. It is noted that, in this position, piston **32** is urged upwardly by coil spring **30** and is retained in its most upward position by portion **36**.

Portion 32 of piston 29 is then given a smart blow with a mallet. This blow drives piston 29 downwardly against tension of spring 30 and moves drive blade 27 into drive channel 25 and against the leading fastener 24, thereby driving the fastener 24 into the work. The lower portion of piston 29 will eventually abut plastic member 48 which overlies bumper 26 and will tend to deform this plastic member and in turn deform bumper 26. Bumper 26 will transmit the shock to the support 47 which defines drive channel 25 and this shock will be dissipated, to a great degree by the offset portions 49 of member 47.

When the downward force is no longer present against piston 29, the spring 30 will return the piston to the normal position shown in FIG. 3. This will remove driver blade 27 from drive channel 25 and will thus permit follower 18 to position the next leading fastener 24 into drive channel 25 so that the process can be repeated.

It is noted that piston 29 is movable within piston raceway 28. It is noted that piston 29 abuts piston raceway 28 only where projecting portions 44 and 45 are present. As a result, the frictional force between portions 44 and 45 and piston raceway 28 is considerably reduced over what these forces would be if piston 29 would be of the conventional rounded configuration and would abut piston raceway 28 around its entire perimeter.

The foregoing sets forth the manner in which the objects of this invention are achieved.

I claim:

1. A mallet driven fastener driving machine comprising, in combination, a housing having a magazine, a piston raceway, and a drive channel therewithin, said piston raceway having a pair of spaced inturned portions therewithin, a follower within said magazine adapted to sequentially propel fasteners into operative relationship with said drive channel, a piston reciprocatingly movable within said piston raceway formed with a plurality of outwardly extending lateral flutes, an upper portion adapted to be selectively struck by a mallet, and an enlarged laterally projecting stop portion beneath said flutes, said flutes having a total cross-sectional area substantially less than the total cross-sectional area of said piston, said stop portion being larger than said inturned portions of said piston raceway, said flutes being the sole portions of said piston abutting said piston raceway above said stop portions, and a coil spring disposed about said piston between said inturned portions biasing said piston into an upward position.

2. A mallet driven fastener driving machine as described in claim 1 said flutes being four in number, each two of said flutes being oppositely extending with respect to one another and each pair of oppositely extending portions being perpendicular to one another.