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 [33] **Germany**
 [31] **P 16 53 026.0**

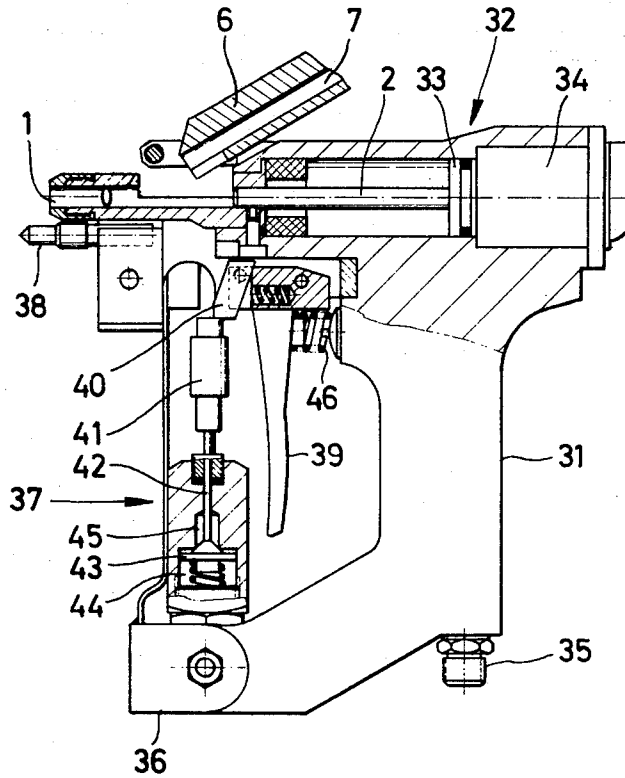
[50] Field of Search..... 227/14,
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Primary Examiner—Granville Y. Custer, Jr.
Attorney—Craig, Antonelli, Stewart & Hill

[54] **PORTABLE DEVICE FOR DRIVING IN DOWELS**
5 Claims, 7 Drawing Figs.

[52] U.S. Cl..... 227/118,
 227/14
 [51] Int. Cl..... B25c 1/04

ABSTRACT: A portable device for driving in dowels comprises a pistollike grip, a barrel having a slidable striker for ejecting a dowel therein, and dowel feed means associated with the barrel through which the dowels can pass into the ready-for-firing position, the feed means being movable axially of the barrel so that the device can accommodate dowels of differing lengths.



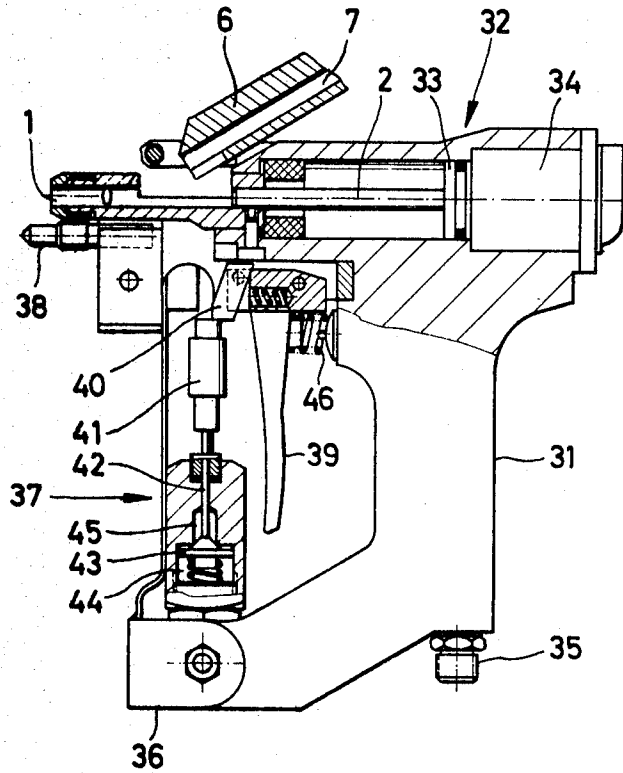


FIG. 1

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FIG. 2

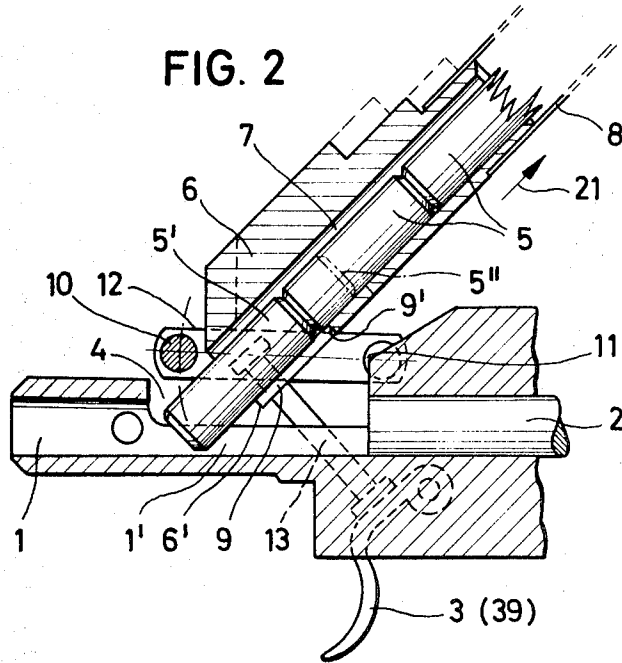
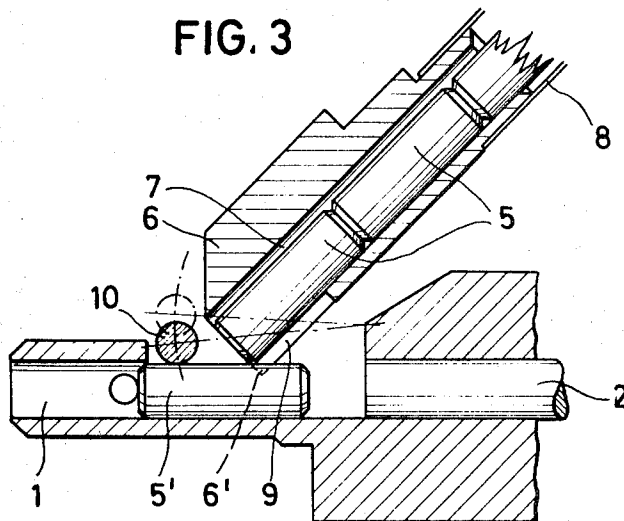


FIG. 3



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FIG. 4

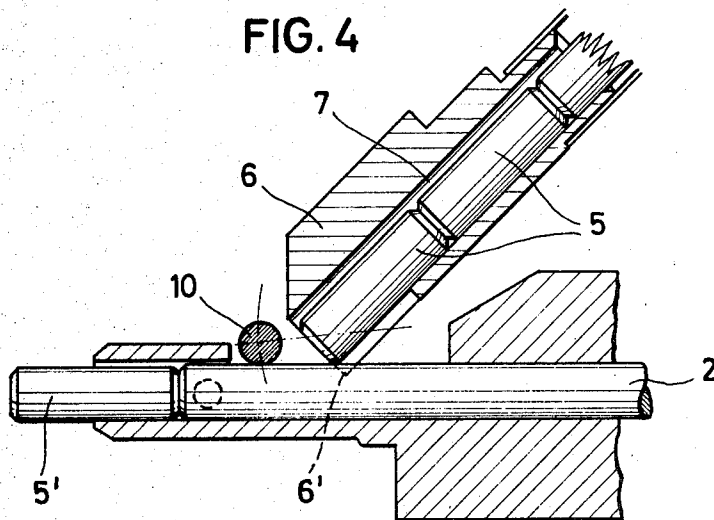


FIG. 5

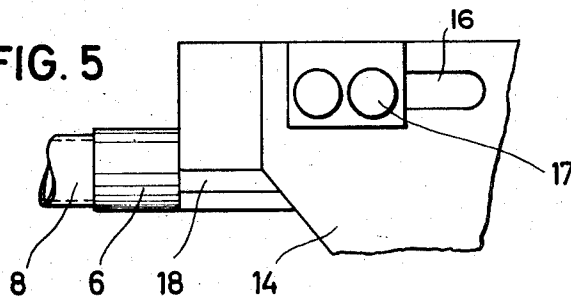
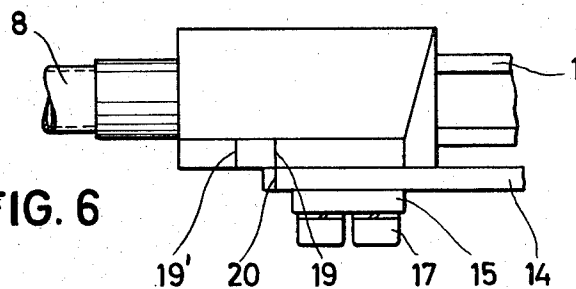


FIG. 6



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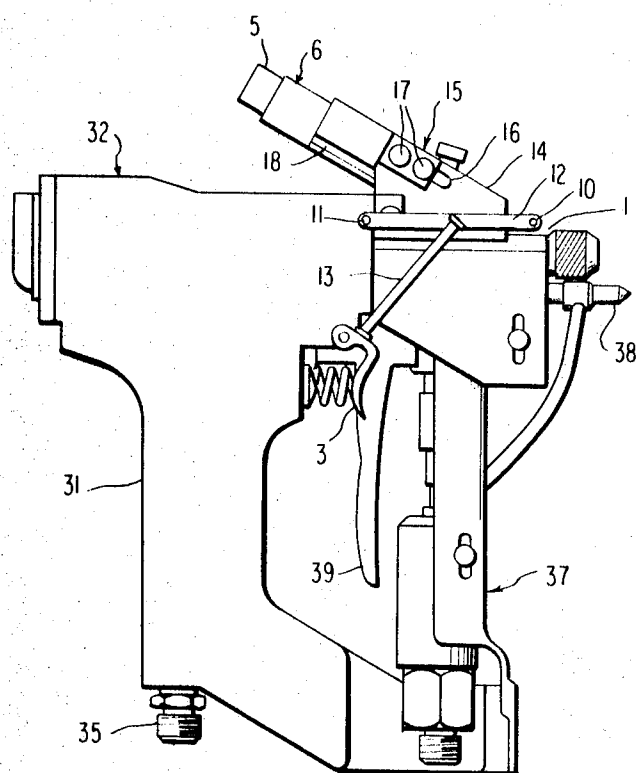


FIG. 7

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PORTABLE DEVICE FOR DRIVING IN DOWELS

The invention concerns a portable pneumatic device for driving in dowels.

In known devices of this kind, the dowels are held, one above the other in a container which is parallel with the barrel and disposed vertically above an aperture in the barrel. The dimensions of the aperture are matched with the cross section of the interior of the container and parallel with the axis of the barrel. The aperture can be machined in the barrel in such a manner that a length corresponding to the length of the dowel is removed from the upper half of the barrel above its axial plane, the remaining dishlike lower half of the barrel forming the bottom of the container. The dowel that is ready for firing rests upon this bottom in the path of the striker which, in its inoperative position, is located a short distance in front of that end of the dowel facing away from the direction of firing. After firing, the striker first occupies the position of the driven-in dowel, the striker is then returned to the inoperative position, so that the next dowel be positioned in the barrel. This occurs due to gravity and without the intervention of any external force.

Experience gained in the operation of firing devices of the above-discussed kind has shown that it is necessary to provide adjusting devices to prevent the use of dowels that exceed a length suited to the particular application, and accordingly it is an object of the present invention to provide means enabling such adjustment to be made.

According to the invention a portable device for driving in dowels comprises a pistollike grip, a barrel adapted to receive a dowel and in which a striker is slidable for ejecting the dowel, a feed means for the dowels which is disposed above the barrel and is provided with a cutaway portion in the bottom thereof through which the dowels can pass into the ready-for-firing position in the barrel, the feed means being displaceable parallel with the axis of the dowels held in its interior in such manner that the length of the space bounded by the cutaway portion and through which the dowels pass on their way to the barrel can be set to suit different lengths of dowels.

In a preferred embodiment of the invention, the feed means for the dowels comprises a housing having a longitudinal bore adapted to receive a series of dowels whose end-faces abut against each other, which housing is axially displaceable for selectively setting the length of the opening through which the dowels are to pass, and which can be fixed in the selected position of displacement. In contrast to the known containers for feeding the dowels, wherein the latter are held one above the other, the housing accepts only the foremost units of the row of dowels, which row continues in an armored flexible pipe connected to the housing and moves forward as required towards the firing device, the row of dowels being driven by devices that do not form part of the invention and are therefore not described, and being supplemented by dowels contained in a storage unit.

As a result of the method of construction in accordance with the invention, the housing forming the feed means is considerably smaller than the corresponding containers of the earlier form of construction, and the device is therefore much lighter and much more handy than the known devices. A particular advantage is that the objects which are located in front of the barrel and into which the dowels are to be fired, are covered to a considerably smaller extent by the housing than by the bulky container used in earlier arrangements and can therefore be more easily seen by the operator.

The external form of such a device can be shaped in a still more useful and handy manner if, in accordance with a further feature of the invention, a form of construction is used wherein the longitudinal axis of the longitudinal bore, which bisects the aperture in the barrel corresponds in width approximately to the diameter of the barrel, and intersects the axis of the barrel at an acute angle having its apex facing the direction of firing, the wall of the longitudinal bore contains a cutaway portion corresponding in width to at least the diameter of the dowel and facing the aperture in the barrel, which portion is

open at that end-face of the housing facing the apex of the acute angle. Here, the maximum length of dowel associated with a given position, to which the housing is moved, is somewhat smaller than the distance measured from the end of the cutaway portion parallel with the axis of the housing, that is opposite the said end-wall of the housing, to the point of intersection of said axis with the inner circumference of the barrel-wall opposite the aperture, but is greater than the distance, measured in the same manner, but ending at the surface of the dowel inserted in the barrel near the aperture.

The inclined position of the housing has the considerable advantage that the flexible tube, accommodating the row of dowels, can be directed, without any sharp bends, to the unit from which the dowels are fed.

Since the foremost dowel in the row, after return of the striker to the inoperative position, cannot immediately fall freely through the aperture into the barrel since it is prevented from doing this by the adjacent dowel bearing against its rear end-face, there is provided, in the invention, an insertion pin, linked to the trigger arm, which pin, upon operation of the trigger arm, presses downwards on to the forward portion of the dowel projecting obliquely from the longitudinal bore into the aperture and brings it into a position coaxial with the barrel.

For the purpose of rapidly adjusting the device to the various maximum lengths of dowel, a scale can be provided on the outside of the housing, and a guide arm displaceably supporting the housing and fitted to the grip of the device can carry a mark which is brought into register with the divisions of the scale when the housing is displaced and which indicates the positions of the housing corresponding to the various maximum lengths of plug.

One embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 shows a general view of the device for driving in wall plugs;

FIGS. 2 to 4 show portions of the guide means for the plugs shown in FIG. 1, before and after insertion of the plug in the barrel and immediately after the plug has been fired;

FIG. 5 is a fragmentary side elevation of a device supporting the displaceable means for feeding the plugs;

FIG. 6 is a plan view of the device illustrated in FIG. 5; and

FIG. 7 shows a general view of the opposite side of the device shown in FIG. 1.

The device for driving in dowels illustrated in FIG. 1 and FIG. 7 is designed as a pistol and incorporates a grip 31 at the top of which is fitted the dowel-firing device indicated generally by the numeral 32. This device comprises a barrel 1 into which a movable striker 2 extends for firing the plugs. The striker 2 is connected to a piston 33 of a compressed air cylinder 34. The compressed air required for driving the piston 33 is fed to the pistollike grip by way of a union 35 and is passed through the grip to the compressed-air cylinder 34.

Mounted on the lower projecting end 36 of the grip 31 is a glue-dispensing valve, generally indicated by the numeral 37, by means of which valve glue is injected through nozzle 38 into the prebored hole for the dowel, so as to secure the dowel after it has been fired into a hole. The mode of operation of the device is as follows:

When a trigger arm 39 is actuated, a detent 40 swings back, thereby depressing valve plunger 41 and valve rod 42. A valve member 43 is thereby moved away from its seat, so that the glue under pressure in chamber 44 moves into chamber 45 and is thence passed through a flexible pipe, not illustrated, to the glue nozzle 38. There, the glue under pressure enters the hole for the dowel, in front of which the glue nozzle has been positioned. The glue nozzle 38 is vertically adjustable, so that the nozzle itself, for instance, is positioned in front of the hole for a dowel, while the barrel 1 is disposed in front of a hole which has previously been filled with glue.

Upon further rearward movement of the trigger arm 39, valve 46 is actuated and this passes compressed air to the

cylinder 34, thereby forcing forward the piston 33 which in turn moves the striker 2.

During this movement of the striker, a wooden dowel 5' (FIG. 2) inserted in the barrel 1; is pushed forward from the at-rest position illustrated in FIG. 3. Under the action of compressed air or a helical spring, not illustrated, the striker 2 returns to the inoperative position as soon as the action of the compressed air thereon ceases.

An aperture 4 is cut out of the barrel 1, through which dowels 5 must pass during loading of the device before they can be deposited on a lower dished half 1' of the barrel. Located above the aperture 4 is an inclined housing 6, forming the dowel feed means, which housing has a longitudinal bore 7, in which is held a row of dowels 5, whose end-faces abut against each other. An armored flexible tube is connected to the housing 6, which tube leads to the above-mentioned device for feeding the dowels.

The foremost dowel 5' rests on the dished inner surface of the barrel-half 1'. The longitudinal bore 7 of the housing 6 has a cutaway portion 9, which is open at end-face 6' and, measured at right angles to the plane of the drawing, is of a width such that a dowel can pass through it. Since the cutaway portion terminates at edge 9' which, seen in the direction of the feed of the dowels, is positioned in back of the rear end of the foremost dowel 5', this dowel could fall into the barrel if it were not prevented from falling freely by the following dowels which apply load to its rear-end face.

In order to bring the foremost dowel 5' in front of the striker 2 (see FIG. 2), there is provided an insertion pin 10, which rests on a rocker arm 12 movable about a pivot 11. The rocker arm is connected to the trigger 3 by means of pull rod 13 in such manner that actuation of the trigger swings the insertion pin into the position shown in FIG. 3.

The housing 6 is supported by a guide arm 14 (FIGS. 5 and 6) attached to the device, to which arm it is clamped by the screws 17 passing through one guide slot 16, with the help of the locking element 15. The overall cooperation of the portions with the device shown in FIGS. 5 and 6 is shown in FIG. 7.

Ribbed guide 18 provided on the housing and engaging in a complementary groove (not visible) in guide arm 14, ensures that the housing 6 is guided along a straight line when the screws 17 are loosened, so that the housing can be displaced in the direction of its longitudinal axis by a distance corresponding to the free length of the guide slot. This distance corresponds to the distance of the first scale-mark 19 the mark being indicated by the numeral 19'. Mark 20 on the guide 14 is positioned opposite the scale-marks 19 and 19' carried on the edge of the housing, this mark 20, upon displacement of the housing, being brought selectively into register either with the scale-mark 19 or 19' or one of the scale-marks occurring therebetween.

When dowels are to be fired that are longer than the dowel 5', for instance dowels whose rear ends 5'', indicated by the dash-dot line in FIG. 2, extend farther into the longitudinal bore 7, the housing must be pushed so far rearward in the direction of the arrow 21 (FIG. 2), as is shown by the dashed line position of housing 6 after the screws 17 have been loosened, that the end edge 9' of the cutaway portion 9 gives passage to at least the entire length of the longer dowel, since otherwise the latter, because it extends from its point of sup-

port on the surface of the barrel to the end-face indicated by the numeral 5'', cannot be swung by the insertion pin into the ready-for-firing position, and the consequence of this is that the trigger 3 cannot be pulled far enough and the shot is not released.

It can be seen from FIG. 3 that the dowels can only slide into the longitudinal bore if the striker has returned to the inoperative position after firing, since the foremost dowel 5', which is ejected from the barrel during the firing operation, is replaced by the striker 2 that has moved forward.

The trigger 3 can also be combined with the trigger arm 39, so that only one actuating member is present. In this arrangement, the actuating member would first act upon the pull rod 13, during the first part of its travel, and thus upon the insertion pin 10.

What I claim is:

1. A portable device for driving in dowels comprising a pistonlike grip, a barrel adapted to receive a dowel, a striker slidable in said barrel for ejecting said dowel, feed means for the dowels, which means is disposed above said barrel and is provided with a cutaway portion in the bottom thereof through which said dowels can pass into the ready-for-firing position in said barrel, said feed means being displaceable parallel with the axis of the dowels held in it interior in such manner that the lengths of said cutaway portion through which said dowels pass on their way to the barrel can be set to suit different lengths of dowels.

2. A device according to claim 1, wherein said feed means is a housing which has a longitudinal bore adapted to receive a series of dowels, said dowels having end-faces of which abut against each other, said housing being axially displaceable for selectively setting said length of the cutaway portion and fixable in the selected position to which it is displaced.

3. A device according to claim 2, wherein the longitudinal axis of said longitudinal bore bisects an aperture in said barrel and corresponds in width approximately to the diameter of said barrel, said axis intersecting the axis of said barrel at an acute angle having its apex facing the direction of firing, said longitudinal bore having a wall in which is provided a cutaway portion corresponding in width to at least the diameter of a dowel and facing said aperture in said barrel, which portion is open at the end-face of said housing facing said apex of the acute angle, the maximum length of dowel associated with a given position to which said housing is moved being smaller than a distance measured from that end of said cutaway portion parallel with said axis of the housing to the point of intersection of said axis with the inner circumference of the barrel-wall opposite said aperture, but being greater than a distance, measured in the same manner, but ending at the surface of the dowel inserted in said barrel near said aperture.

4. A device according to claim 1, wherein an insertion pin is linked to a trigger, which pin, upon operation of said trigger, depresses a forward portion of a dowel projecting obliquely into said aperture from said longitudinal bore and brings it into a position coaxial with said barrel.

5. A device according to claim 1, wherein a scale is provided on the outside of the housing, and a mark is provided on a guide arm which displaceably supports said housing and is fitted to the grip of the device, which mark indicates the positions of said housing corresponding to the various maximum lengths of dowel.