United States Patent [19]

Holzer

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[54] **APPARATUS FOR DRIVING PEGS INTO PRE-BORED HOLES**

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May 16, 1973 Austria 4306/73

[52] **U.S. Cl.** **227/93;** 227/120; 227/149

[51] **Int. Cl.²** **B27F 4/00**

[58] **Field of Search** ..... 227/93, 95, 107, 120, 136, 227/139, 140, 149; 29/212 T

[56] **References Cited**

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[57] **ABSTRACT**

Apparatus for driving pegs into pre-bored holes, having a discharge channel which has a lateral feed location for feeding the pegs from a magazine, and a plunger driving the pegs, characterised in that in the terminal position of the driving stroke the frontal face of the plunger is disposed at a distance from the mouth of the driving channel which corresponds to the length of the peg minus a fraction thereof, that the length of the discharge channel from the lower margin of the feed location for the pegs to its mouth corresponds at least to the length of the peg minus a fraction of its length, and that means are provided for clamping the peg in the mouth of the discharge channel.

6 Claims, 6 Drawing Figures

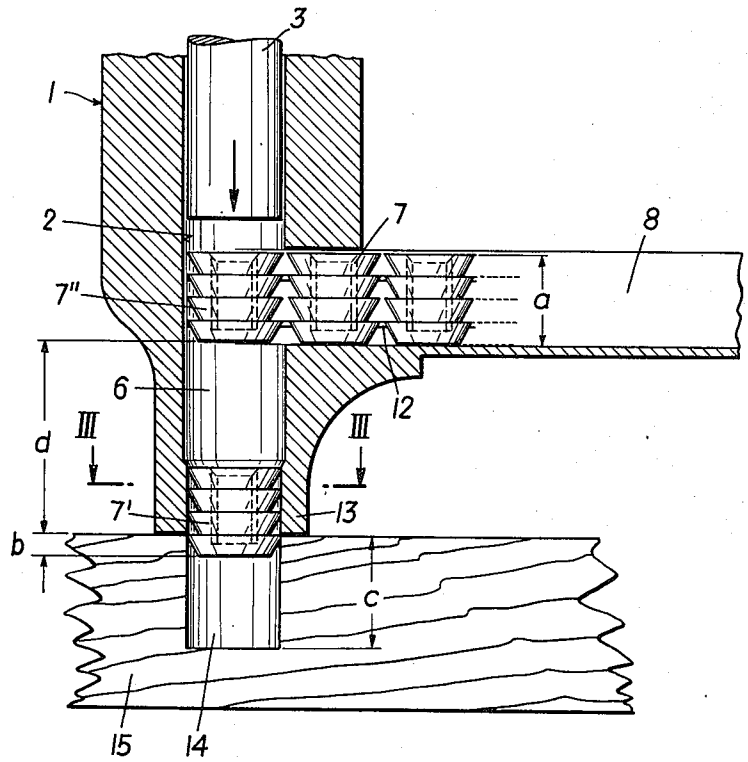


FIG. 1

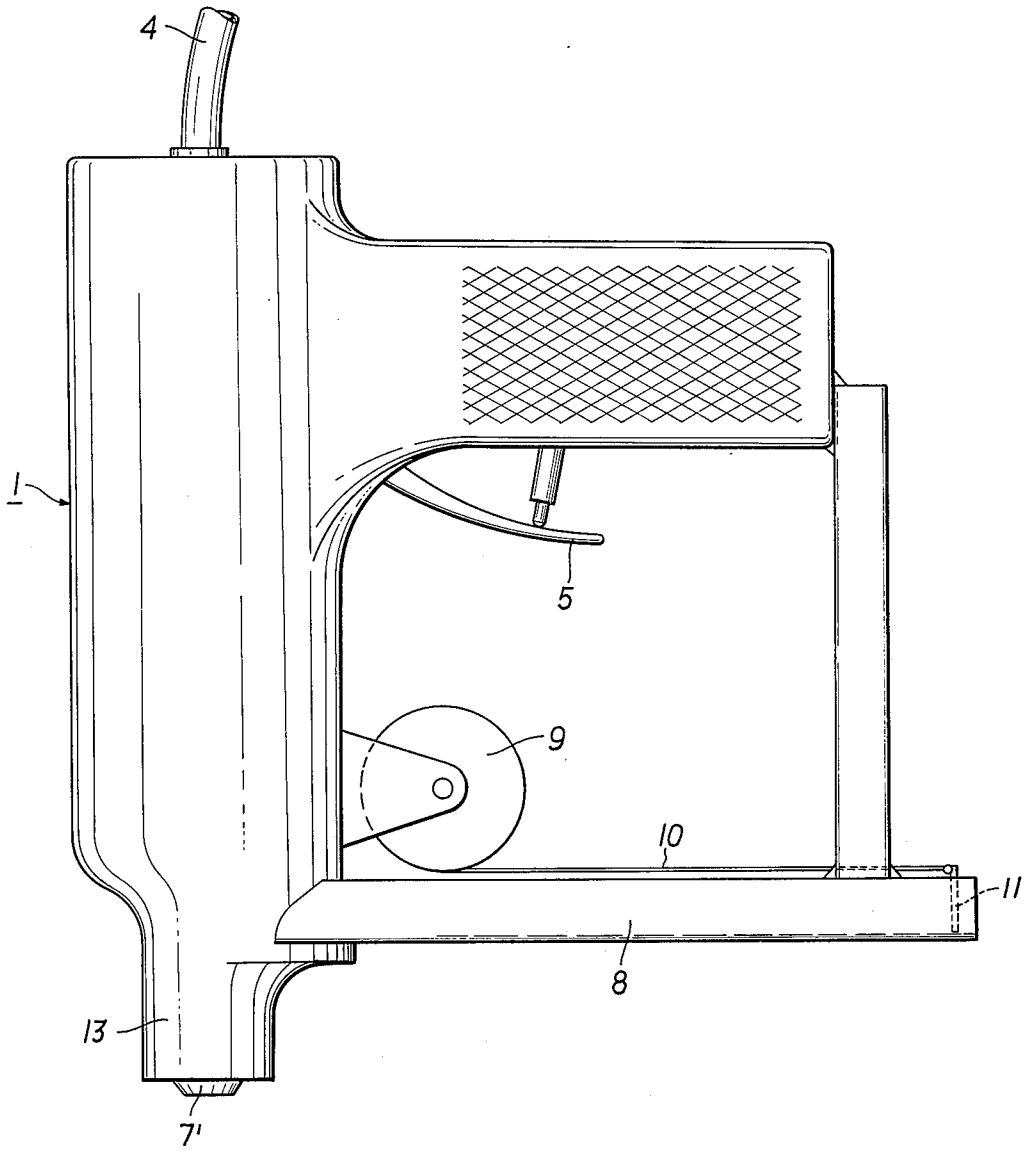


FIG. 2

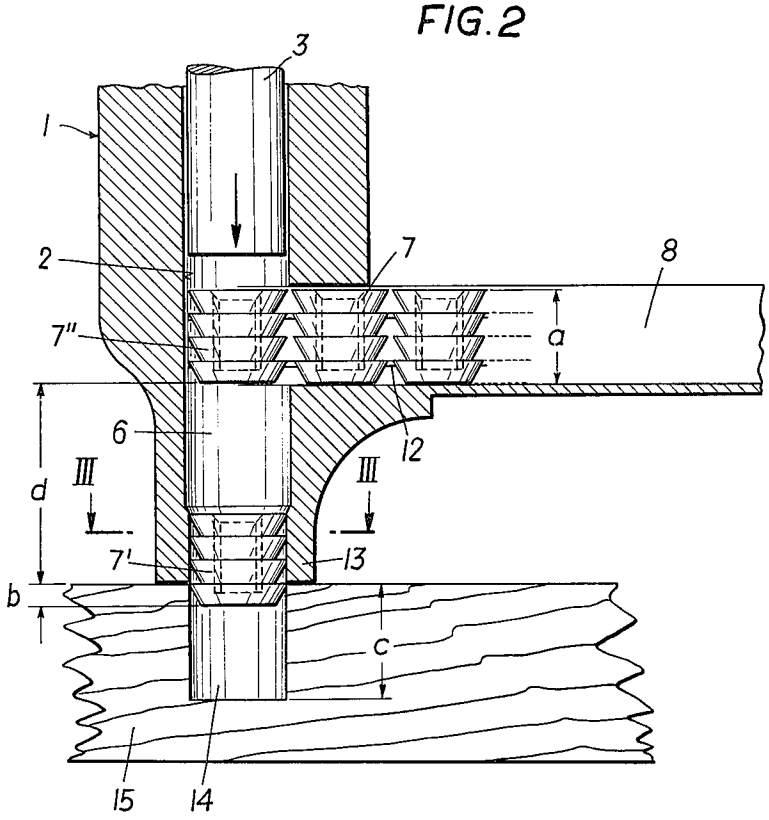


FIG. 4

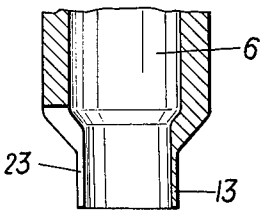


FIG. 3

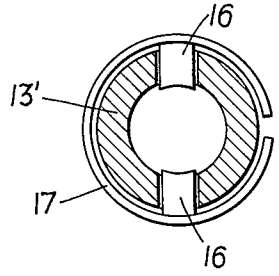


FIG. 5

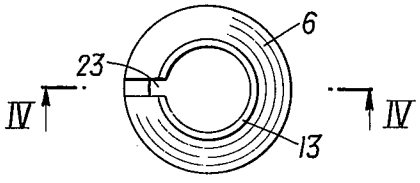
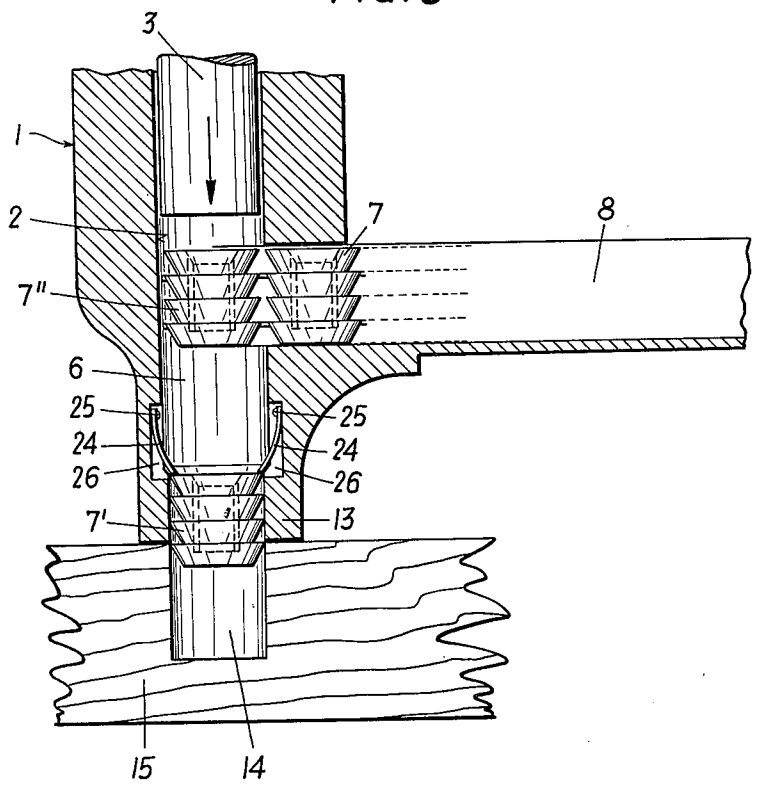


FIG. 6



APPARATUS FOR DRIVING PEGS INTO PRE-BORED HOLES

The invention relates to apparatus for driving pegs into pre-bored holes, having a discharge channel and a plunger driving the pegs, which can also be described as a ram. Such pegs may, for example, be in the form of screw-threaded sleeves having an internal screw thread and may serve for joining together individual parts of furniture. In the known forms of apparatus of this kind, the peg which is advanced from the side into the axis of the discharge channel from the magazine is acted upon by the plunger and driven directly into the pre-bored hole right up to its terminal position. Naturally the mouth of the discharge channel extends over the circumference of the peg by an amount equal to the thickness of the wall of the discharge channel and consequently covers the pre-bored hole, so that it is difficult and time consuming to apply the apparatus in such a way that the axis of the discharge channel coincides with the axis of the pre-bored hole. If the mouth of the discharge channel is not applied precisely concentrically with the pre-bored hole, the material surrounding the hole may be damaged, which is disadvantageous particularly where pegs for joining together parts of furniture are concerned. Usually the peg is of soft material such as for example plastics, and in that case there is a danger of the peg being damaged or squashed.

Now the invention relates to such apparatus for driving pegs into pre-bored holes, having a discharge channel which has a lateral feed location for feeding the pegs from a magazine, and a plunger driving the pegs, and has the aim of eliminating the disadvantages connected with the usual forms of such apparatus. The invention essentially consists in that in the terminal position of the driving stroke the frontal face of the plunger is disposed at a distance from the mouth of the driving channel which corresponds to the length of the peg minus a fraction thereof, that the length of the discharge channel from the lower margin of the feed location for the pegs to its mouth corresponds at least to the length of the peg minus a fraction of its length, and that means are provided for clamping the peg in the mouth of the discharge channel.

When the discharge channel is empty and the apparatus is used for the first time, the first peg, which is admitted from the magazine, is advanced only up to a position in which it protrudes from the mouth of the discharge channel, by reason of the fact that in the terminal position of the driving stroke the frontal face of the plunger is disposed at a distance from the mouth of the driving channel, which corresponds to the length of the peg minus a fraction thereof. Owing to the fact that means are provided for clamping the peg in the mouth of the discharge channel, the peg is held firmly in the mouth of the discharge channel and the correct position for applying the apparatus to the pre-bored hole can readily be determined and ascertained by engagement of the front end of the peg in the hole. Owing to the fact that the length of the discharge channel from the lower margin of the feed location for the pegs up to its mouth corresponds at least to the length of the peg minus this fraction of its length, the discharge channel is free in the region where the magazine is connected, as soon as the plunger has returned, for advancing the next peg into the discharge channel, when the

first peg is located in the mouth of the discharge channel and the plunger has returned. In the course of the next stroke or impact of the plunger the first peg is thus driven into the pre-bored hole with the second peg interposed, this second peg then remaining in and protruding from the mouth of the discharge channel. In this way each peg can be driven into the pre-bored hole by the plunger with the next succeeding peg interposed and in use of the apparatus a peg always protrudes from the mouth of the discharge channel, so that the application of the apparatus to the hole is facilitated. Eccentric application is made impossible and damage to the region of the board or the like surrounding the pre-bored hole and also damage or squashing of the peg are eliminated.

Clamping can be provided by making the discharge channel so narrow in the region of its mouth that the pegs are clamped. Such a construction is appropriate particularly where pegs of resilient material, e.g. plastics, are concerned. It is however also possible to provide spring clamping jaws known per se in the region of the mouth of the discharge channel. Furthermore, the discharge channel may also be slotted and resiliently expandable in the region of its mouth.

In accordance with the invention, the construction may also be such that a safety device for preventing the return of the peg is provided in the discharge channel at a distance from the mouth of the discharge channel which is less than the length of the peg. By the clamping means the peg which protrudes from the mouth can be prevented from dropping out, whilst retraction of the bolt is reliably prevented when the apparatus is applied too vehemently. This locking device may, in accordance with the invention, take the form of a pawl.

In nail-firing or impact devices it is known to insert the nail into the mouth of the firing channel from the front with the point of the nail protruding. In this arrangement, however, each nail has to be placed in position individually from the front. In such nail firing- or impact devices it is also known to feed the nails sideways from a magazine. None of these cases, however, relates to driving into a pre-bored hole and the bolt or nail is driven directly into its terminal position, and not with the next-succeeding bolt or nail interposed, so that the bolt or nail cannot automatically be brought into the position in which it protrudes from the discharge channel. In such nail-firing or impact devices it is also known to hold the bolt or nail, which has a head of larger diameter, in the discharge channel in its operative position by means of clamping jaws. In these known arrangements, however, the purpose of these clamping jaws is merely to hold the shank of the nail or bolt so as to retract in order to permit the head of larger diameter to pass therethrough.

In the drawing the invention is illustrated diagrammatically by way of example with reference to an embodiment thereof.

FIG. 1 shows the side view of a compressed-air operated apparatus.

FIG. 2 shows the mouth of the discharge channel in axial section, the apparatus being applied to a board with a pre-bored hole.

FIG. 3 shows the use of spring clamping jaws in the region of the mouth in the discharge channel.

FIGS. 4 and 5 show a further embodiment of the mouth of the discharge channel, FIG. 4 showing an axial section on the line IV—IV of FIG. 5 and FIG. 5

a view of FIG. 4 from below. FIG. 6 shows a modified embodiment of the discharge channel.

The apparatus 1 according to FIGS. 1 and 2 has, in a guide 2, a slidably displaceable plunger 3, which may also be described as a ram and which is operated by compressed air admitted via a connection 4. 5 is the operating lever, by means of which the compressed air valve (not shown) is opened. 6 is the discharge channel through which the pegs 7 are pushed out by impact of the plunger 3. 8 is a magazine which is connected laterally to the discharge channel 6, which is of U-shaped cross-section and in which a row of pegs 7 are arranged. By means of a spring roller 9 the pegs are serially fed to the discharge channel 6 via a conveyor band 10 and a follower 11. The pegs 7 are of plastics material and joined together into a chain by shearable bridges 12. The pegs 7 are, for example, in the form of screw-threaded sleeves with an internal thread and serve to receive screws, for example for assembling parts of furniture.

The first peg 7' is disposed in and protrudes from the mouth 13 of the discharge channel 6. In order to hold the peg firmly in this position, the mouth 13 of the discharge channel is made narrower, so that the peg is clamped in the position in which it protrudes from the mouth. As soon as the plunger 3 returns to its initial position shown in FIG. 2, the next succeeding peg 7 is introduced from the magazine 8 into the position 7''. By impact from the plunger 3 this peg 7'' is advanced and the bridges 12 are sheared off. The peg 7'' impinges on the peg 7' and drives the latter into the bore 14 in a board 15. The depth c of the bore 14 is larger than the length a of the peg by the amount b by which the peg is intended to protrude from the mouth 13, so that, when the peg 7 is driven in from the position 7' to the bottom of the bore 14, the next succeeding peg 7'', which now reaches the position 7', again protrudes by the amount *b* from the mouth 13. Thus the driving stroke of the plunger 3 extends only to the upper margin of the peg 7 located in the position 7'. The driving stroke of the plunger 3 may be limited by an abutment (not shown), but such an abutment is not absolutely necessary, since after all the peg 7 which has been hit by the plunger and which is disposed in the position 7'' can, in any event, only be advanced to the point at which the preceding peg has reached the bottom of the bore 14.

When the apparatus is applied to the next bore 14 the peg 7 which protrudes from the mouth 13 in the position 7' now engages this bore, so that faulty application of the apparatus is made impossible.

The length *d* of the discharge channel up to the mouth 13 thus must correspond at least to the length of the bolt or peg minus the portion of the bolt or peg which protrudes from the mouth, in order to make it possible for the next succeeding peg 7 to be pushed on into the position 7'', as soon as the plunger 3 has returned to its initial position shown in FIG. 2. In the embodiment shown in the drawing this length *d* is greater than the length of the bolt or peg minus the portion of the bolt or peg which protrudes from the mouth in order to increase the striking force. In the upper region, with reference to FIG. 2, the diameter of the discharge channel 6 is made sufficiently large for the peg 7 to encounter no resistance whilst it advances, whereas it is sufficient for the lower region at the mouth 13 only to be made narrow.

In the embodiment according to FIG. 3, which shows the mouth 13 in section on the line III—III of FIG. 2, clamping jaws 16 are provided, which are guided in the mouth 13' and biased radially inwardly by means of a spring ring 17 and in this way hold the pin 7 firmly in the position 7'. Such an embodiment will, for example, be beneficial where pegs or bolts of steel are concerned.

In the embodiment according to FIGS. 4 and 5 the mouth 13 of the discharge channel 6 is thin walled and of slotted construction by means of a slot 23. This slotted mouth now resiliently surrounds the peg 7 in the position 7' and the improved clamping action is thereby achieved.

If the peg 7 is merely clamped in the position 7', it would conceivably be possible, when the apparatus is vehemently applied to a substrate, for the peg to be pushed back from the position 7' into the mouth 13 of the discharge channel 6. In order to avoid this with certainty, two pawls 24 are provided in the embodiment according to FIG. 6, which engage behind the peg 7 which is disposed in the position 7'. A single such pawl 24 may suffice. The pawl 24 is secured by means of a rivet 25 in a recess 26 into which it can retract when the peg 7 is advanced from the position 7'' to the position 7'.

I claim:

1. Apparatus for driving pegs into pre-bored holes, having a discharge channel which has a lateral feed location for feeding the pegs from a magazine, and a plunger driving the pegs, characterised in that in the terminal position of the driving stroke the frontal face of the plunger (3) is disposed at a distance from the mouth (13) of the driving channel (6) which corresponds to the length of the peg (7) minus a fraction thereof, that the length of the discharge channel (6) from the lower margin of the feed location (8) for the pegs (7) to its mouth corresponds at least to the length of the peg (7) minus a fraction of its length, and that means are provided for clamping the peg(7') in the mouth (13) of the discharge channel (6).

2. Apparatus according to claim 1, charaterised in that in the region of its mouth (13) the discharge channel (6) is narrow so that the pegs are clamped.

3. Apparatus according to claim 1, characterised in that spring clamping jaws (16) are provided in the region of the mouth (13) of the discharge channel (6).

4. Apparatus according to claim 1, characterised in that in the region of its mouth (13) the discharge channel (6) is slotted (23) and resiliently expandable.

5. Apparatus according to any one of claims 1, characterised in that a safety device (24) for preventing the return of the peg (7') is provided in the discharge channel (6) at a distance from the mouth (13) of the discharge channel (6) which is less than the length of the peg (7).

6. Apparatus according to claim 5, characterised in that the safety device is in the form of a pawl (24).

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