

Dec. 29, 1959

A. J. SMITH
DIMPLING AND DEPTH CONTROLLING ATTACHMENT
FOR FASTENING MEMBER DRIVING TOOLS

2,918,675

Filed Aug. 11, 1958

3 Sheets-Sheet 1

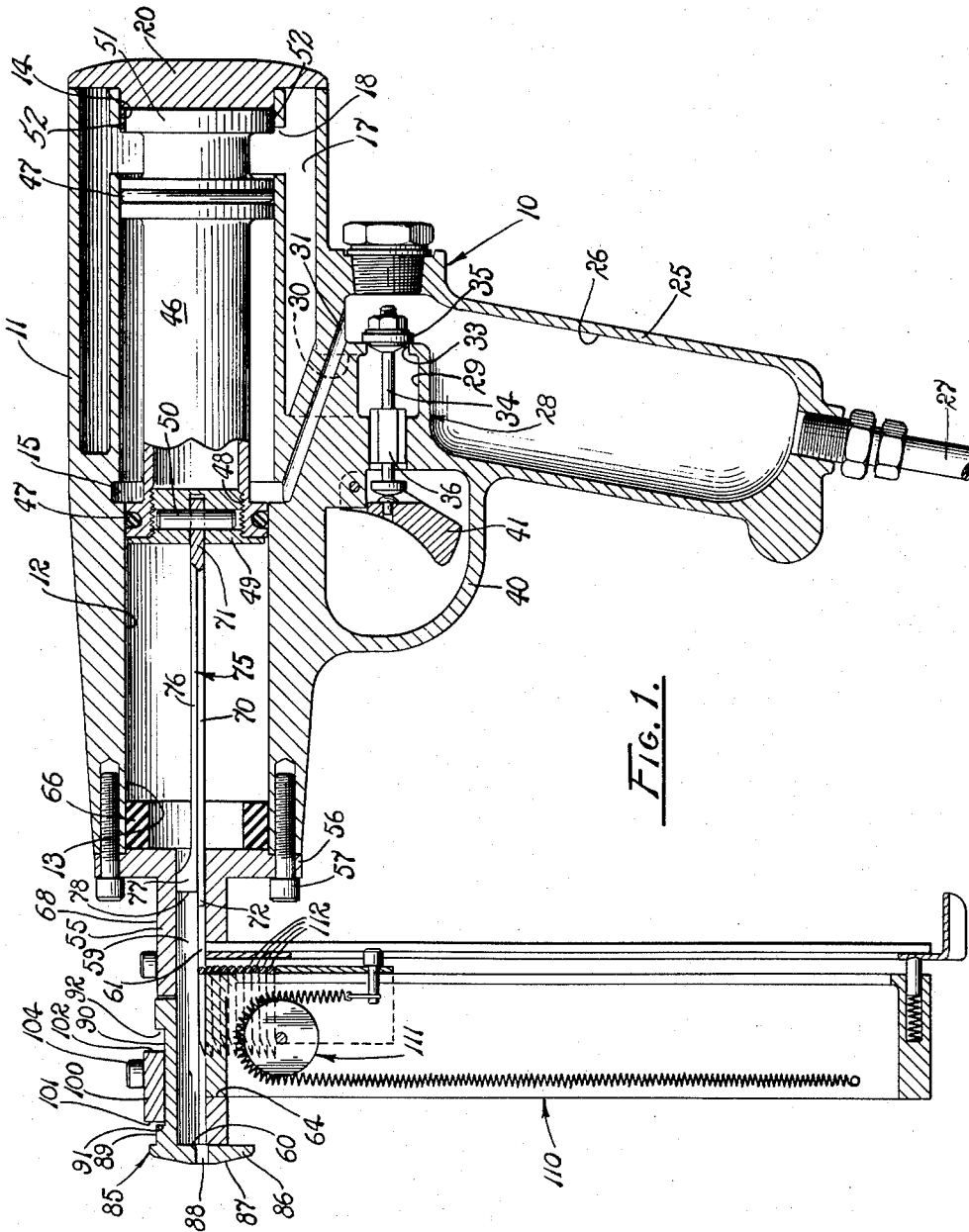


FIG. 1.

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3 Sheets-Sheet 2

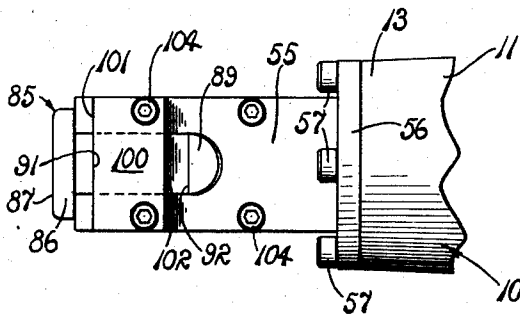


FIG. 2.

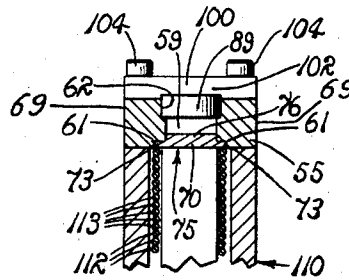


FIG. 4.

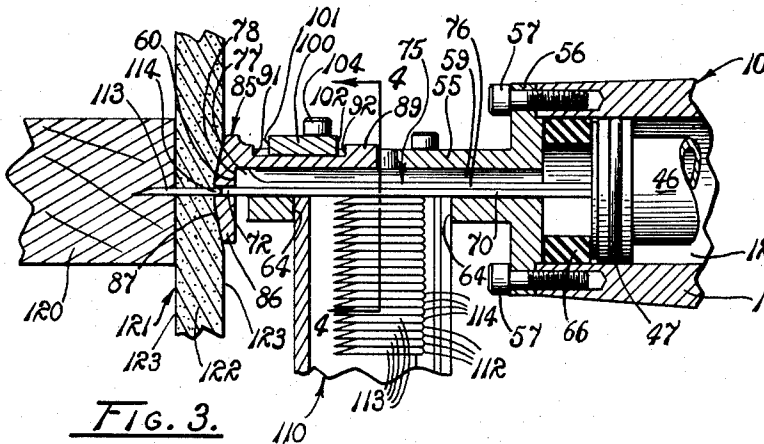


FIG. 3.

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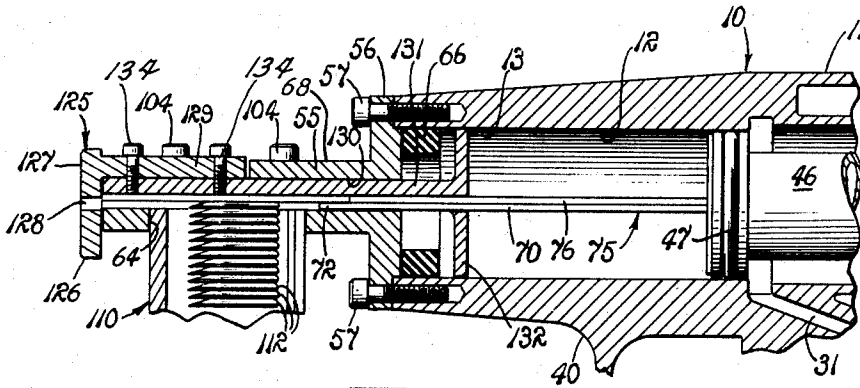


FIG. 5.

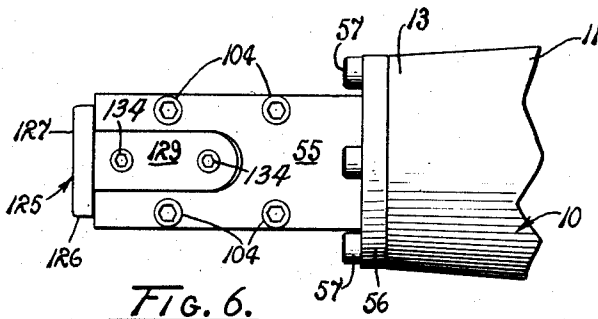


FIG. 6.

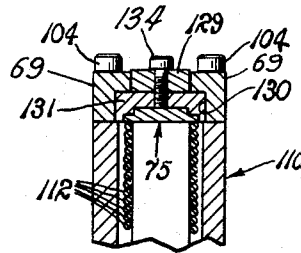


FIG. 8.

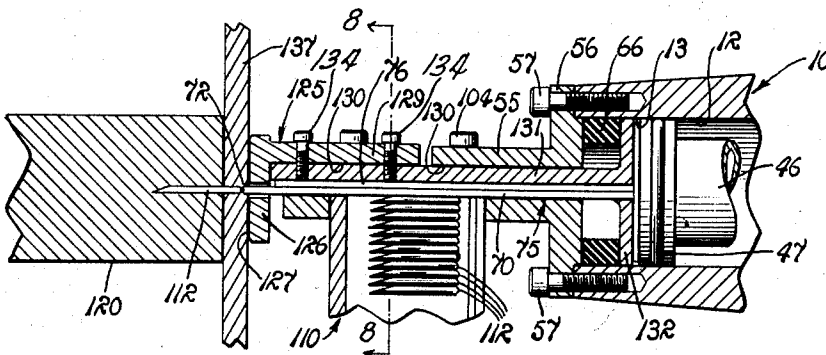


FIG. 7.

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DIMPLING AND DEPTH CONTROLLING ATTACHMENT FOR FASTENING MEMBER DRIVING TOOLS

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Application August 11, 1958, Serial No. 754,188

5 Claims. (Cl. 1—44.4)

The present invention relates to a depth controlling attachment for fastening member driving tools and more particularly to such an attachment for powered tools utilized in the mounting of wallboard, shingles, plastic sheathing, paper, and like workpieces on suitable supports therefor, which attachment enables precise driving control and the attainment of a driving effect similar to the final blow of a manually employed hammer in driving home a nail, staple or like fastener forcibly to secure the workpiece in place and optionally to dimple the same.

Conventional power driven staple and nail driving tools are known to recoil at the instant of actuation and thus by the time the driving members or hammers thereof reach the ends of their driving strokes, their tools are to some extent in a recoil position. It is thus the practice to construct such tools so that their driving members protrude approximately one-eighth of an inch at the ends of their driving strokes so as to compensate for the recoil. While such protrusion has been required in the prior art, it has led to certain difficulties. For example, when nails or staples are driven into gypsum lath, wallboard, or the like, the depth of embedment varies somewhat. Such materials frequently include relatively thick core layers of gypsum or other material having opposite surfaces sheathed with paper. If the staples or nails are not driven sufficiently deeply, their heads or crowns protrude from the surface and the boards are not held tightly against their supports. On the other hand, if they are driven too deeply, the sheathing is ruptured. Since the core layers of such lath or wallboard are frequently of gypsum or other material of little strength, the rupturing of the paper frequently precludes proper and dependable mounting.

The inherent inaccuracy in the driving depth of such known driving tools has severely limited their utility. For example, they are conventionally used to fasten gypsum lath and the like to vertical studding or horizontal ceiling joists since the subsequent covering of the lath with plaster conceals insufficiently embedded staples and nails as well as any rupturing of the surface sheathing. However, such driving inaccuracies are intolerable in dry wall construction where the dry wallboards are not plastered but only painted, papered, or otherwise thinly covered, the painting, papering or other thin coating failing to conceal insufficiently driven staples or nails and ruptured sheathing.

Further, it is well-known that such conventional staple and nail driving tools lack the attribute of dependably forcing a workpiece against its supporting studs, joists or the like in the manner of the final blow with the manually employed hammer. Such final blow normally contacts the workpiece and drives it tightly against its support as well as concurrently securing the staple or nail properly in place.

In dry wall construction, it is normally necessary to dimple the surfaces of the wallboard being mounted so that the heads or crowns of the nails or staples can

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properly be concealed with a thin surface deposit of a material subsequently placed in the dimples. Previous fastener driving tools have made no provision for, and have been incapable of, dimpling the wallboards in the manner desired.

Accordingly, it is an object of the present invention to provide an attachment for a tool adapted to insert a driven member into a workpiece in such a manner as precisely to limit the extent of penetration of the driven member into the workpiece.

Another object is to provide in a power driven fastening tool for the functional equivalent to the final blow of a manually employed hammer in driving a nail, staple or the like into place.

Another object is to prevent or minimize tearing of the relatively thin sheathing of wallboard or the like by a staple, or other fastening member, driven therein.

Another object is to provide a power driven tool for fastening a wallboard or the like tightly to a support in an expeditious and dependable manner.

Another object is to provide a power driven fastening tool adapted to force wallboard, shingles, plastic sheathing, paper and the like against a support therefor while fastening the same to the support.

Another object is to provide a pneumatically operated tool for driving staples and other fasteners into such a workpiece including a relatively thin sheathing, and to dimple the workpiece so that the staples are inserted a predetermined distance into the workpiece, all without fracturing the sheathing with the crowns, or heads, of the staples or other fasteners.

Another object is to provide an attachment for a powered fastener driving device adapted to dimple workpieces, into which the fasteners are driven by the device, concurrently with the driving thereof.

Another object is to provide a device for fastening relatively thin material, such as thin plastics, paper and the like, to a support without tearing the material.

Another object is to provide improved means for compensating for recoil in fastener driving tools.

A further object is to provide such an attachment which automatically regulates the depth of fastener driving in relation to a driving head provided for the purpose so that the staple is embedded to a depth having predetermined relation to the surface of the material receiving the fastener whether it is dimpled or not.

These, together with other objects, will become more fully apparent upon reference to the following description and accompanying drawings.

In the drawings:

Fig. 1 is a longitudinal section taken through a tool including the attachment of the present invention.

Fig. 2 is a fragmentary top plan view of a portion of the tool of Fig. 1 showing the subject attachment in particular.

Fig. 3 is a view of a portion of the tool similar to that shown in Fig. 1 but with the tool in a driving position immediately following insertion of a staple through a wallboard into a stud therebehind.

Fig. 4 is a transverse section taken on a plane at a position represented by line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 1 but showing a fragmentary portion of the driving tool having a second form of attachment of the present invention mounted thereon.

Fig. 6 is a fragmentary top plan view similar to Fig. 2 but of a portion of the tool of Fig. 5.

Fig. 7 is a view similar to Fig. 3 but showing the second form of the invention.

Fig. 8 is a transverse section taken on a plane at a position represented by the line 8—8 in Fig. 7.

Referring more particularly to the drawings, a stapling device of well-known form is illustrated as including a

body 10 having an elongated substantially cylindrical housing 11 providing an internal cylinder 12 having open opposite forward and rearward ends 13 and 14, respectively. The housing has an inwardly disposed annular groove 15 intermediate the opposite ends thereof. Also, the housing includes an elongated manifold 17 circumscribing the cylinder adjacent to the rearward end thereof. The manifold communicates with the cylinder through a port 18. A cap 20 is attached to the housing over the rearward open end thereof in closing relation thereto. As will be noted, the forward end of the cylinder is of a smaller diameter than the rearward end thereof.

An elongated downwardly extended handle 25 is integrally connected to the housing 11 and encloses a reservoir 26 adapted for connection to a source of air under pressure, not shown, by means of an air hose 27. Also, the handle encloses a valve 28 including a valve chamber 29 connected to the chamber 17 by means of an air duct 30. The housing provides an elongated bore 31 interconnecting the groove 15 and the reservoir 26. An annular valve seat 33 is provided between the valve chamber and the reservoir, and an elongated valve stem 34 is mounted in the body 10 for longitudinal reciprocal movement. A valve head 35 is connected to the stem for movement between a position in contact with the seat for closing the valve and preventing flow of air from the reservoir to the valve chamber, as shown in Fig. 1, and a position in spaced relation to the valve seat for opening the valve. The stem 34 also mounts a slide valve 36 which opens upon closing of the head 35 to exhaust air from the rear end 14 of the cylinder.

An arcuate trigger guard 40 is extended from the housing 11 to the handle 25, and a trigger 41 is pivotally connected to the body 10 and operatively associated with the valve stem 34 for longitudinally reciprocating the stem to open and to close the valve 28.

An elongated tubular piston 46 is mounted in the cylinder 12 for longitudinal reciprocal movement between the forward and rearward ends 13 and 14 thereof. A pair of longitudinally spaced front and rear O-rings 47 are mounted in circumscribing relation to the piston for slidable sealing engagement with the housing 11 in its portions of different diameters. The piston has an open, internally threaded forwardly disposed female socket 48, and a plug 49 is screw-threaded into the socket. A coupling pin 50 is journaled in the plug and is extended substantially diametrically of the cylinder 12. It is to be noted that the piston has a rear head 51 in opposed relation to the cap 20 and that there is a fluid leakage path 52 in circumscribing relation to the head and the circumscribing housing.

The body 10 also includes an elongated generally rectangular nose or barrel portion or channel member 55 having a circumscribing flange 56 fitted against the open forward end 13 of the cylinder 12 and connected to the housing 11 by means of a plurality of bolts 57 extended through the flange and into the housing. The nose portion provides an elongated, transversely generally rectangular passageway or channel 59 having a longitudinal center line extended substantially coaxially forwardly of the cylinder 12 and terminating in an open forward end 60. As best seen in Fig. 4, the nose portion also provides a pair of lower laterally outwardly extended flangeways 61, an upper open notch 62 slightly wider than the passageway and opening downwardly of the nose portion, and a substantially rectangular window 64 downwardly opening from the passageway on the opposite side of the nose portion from the notch. An annular resiliently compressible shock absorbing bumper cushion 66 is concentrically fitted in the cylinder 12 against the flange for engagement by the piston 46 during extension thereof. It is also to be noted that the nose portion has a central wall 68 and a pair of spaced side walls 69 laterally extended from the central wall on opposite sides of the channel or passageway.

An elongated driving blade 70 provides a rear coupling end 71 extended through a diametrically extended slot in the plug 49 and connected to the coupling pin 50. The blade has a forward driving end 72 fitted in the passageway 59, and includes a pair of lower laterally outwardly extended flanges 73 individually slidably fitted in the flangeways 61 for guided movement of the blade longitudinally in the passageway. It will be evident that upon reciprocal movement of the piston 46 in the cylinder 12, the blade is reciprocally moved in the passageway. With the exception of the notch 62 in the nose portion 55, the structure described to this point is conventional and forms a suitable environment for the present invention. It will be evident that the blade 70 and piston 46 constitute a driving assembly for workpieces engaged by the blade.

The subject invention provides an elongated pusher bar 75 including a shank 76 of substantially rectangular cross section preferably integrally connected to the driving blade 70 and having a pusher head 77 larger than the shank and fitted in the passageway 59 for movement therein with the blade. The head has a forward abutting surface 78 which is spaced axially inwardly from the terminal end 72 of the driving blade, as best seen in Figs. 1 and 3.

The present invention also provides a depth control head 85 including a substantially circular disk, plate, or simulated hammer head 86, having a forwardly disposed convex workpiece engaging surface 87 and a diametrically extended slot 88. The head includes a substantially rectangular tongue or mounting portion 89 perpendicularly extended from the disk and fitted in the notch 62 of the nose portion 55 for slidable movement longitudinally of the nose portion. When mounted in this manner, the disk is disposed transversely of the nose portion forwardly of the open end 60 thereof with the slot in alignment with the driving blade 70. The tongue has an upwardly disposed central recess 90 having abutment shoulders 91 and 92 at the forward and rearward ends thereof, respectively. As will be apparent, the head can be employed to attain a dimpling function and when so to be employed preferably has the convex surface 87. When to be used for depth control purposes without dimpling, the surface 87 is preferably flat.

A retainer block or male member 100 is connected to the upper surface of the nose portion 55 in spanning relation to the notch 62 and in overlaying slidable engagement with the tongue 89. More specifically, the retainer block is fitted in the recess 90 of the tongue and provides front and rear edges 101 and 102 adjacent to the shoulders 91 and 92, respectively. Shoulder 92 engages the rear edge 102 to limit forward longitudinal slidable movement of the tongue. The retainer block is connected to the nose portion by means of bolts 104 extended through the block.

Conventionally a staple magazine 110 is fitted in the window 64 of the nose portion 55 and connected to the nose by the bolts 104 extended through the nose portion into the magazine. The magazine includes a mechanism, generally indicated by the numeral 111, for feeding staples 112 successively into the passageway into alignment with the slot 88 in the disk 86 and the driving blade 70. Each of the staples includes a pair of spaced parallel penetrating legs 113 interconnected by a crown 114. Inasmuch as the details of the magazine and the feeding mechanism thereof are conventional and form no specific part of the subject invention, further discussion thereof is believed unnecessary. It is to be understood, however, that the feeding mechanism delivers the staples, one by one, into the passageway so that the legs of the staples are received in the flange ways 61, and so that the crowns thereof extend transversely of the passageway in the path of travel of the blade whereby the staples are driven longitudinally forwardly in the nose portion by the blade.

Operation

The operation of the described embodiment of the subject invention is believed to be readily apparent and is briefly summarized at this point. In connection with the operation of the subject invention, reference is conveniently made to a stud 120 of a building, and to a wallboard 121 adapted for connection to the stud and including a relatively thick core layer 122 of gypsum or the like covered on opposite sides by relatively thin tearable sheathing 123 of paper.

With the tool in the condition shown in Fig. 1 and with the handle 25 grasped in the hand of the operator, the surface 87 of the disk 86 is placed against the wallboard 121 with the slot 88 over the desired location of the staple 112. The surface 87 may be pressed against the board by pressing inwardly on the handle and/or the butt of the housing 11 to hold the board against the stud 120. Since the valve head 35 is seated, the manifold 17 is vented to the atmosphere through the slide valve 36. Since the space between the O-rings 47 is connected to the reservoir 26 by means of the bore 31, line pressure exists in said space and against the forward and intermediate enlargements of the piston circumscribed by the O-rings. When the trigger 41 is squeezed, the valve head 35 is unseated to admit line pressure to the manifold 17. Air pressure is applied against the rear face of the rear enlargement 51 by way of the leakage path 52. Since the effective area of this rear face against which air pressure is exerted is greater than the effective forwardly disposed surface of the intermediate enlargement of the piston, the piston is shoved forwardly in the cylinder and moves the driving blade 70 forwardly in the passageway 59. The driving end 72 of the blade engages a staple 112, in a position to be driven in the passageway, and slides the staple forwardly through the slot 88 in the disk 86. The force of the blade also drives the staple into the wallboard 121 and the stud 120 therebehind.

Immediately following entry of the driving end 72 of the blade 70 into the slot 88, the pusher head 77 engages the disk 86 and slides the tongue 89 forwardly in the notch 62. This forces the surface 87 of the disk inwardly against the sheathing 123 and the backing portion 122 for substantially concentrically dimpling or depressing the area circumscribing the location of the staple 112. Driving movement of the disk is limited by engagement of the piston 46 with the cushion 66.

Furthermore, the location of the pushing head 77 in relation to the driving end 72 of the blade 70 limits penetration of the staple 112 into the wallboard 121. Thus, it will be noted that when the pusher head 77 engages the disk, the driving end of the blade is axially spaced inwardly of the outer surface 87 of the disk. Thus, the driving blade 70 cannot force the crown 114 of the staple through the sheathing 123 regardless of the air pressure or the extent of compression of the cushion 66. As long as the disk is held against the wallboard during the complete driving stroke, the staple penetrates the predetermined amount. This prevents tearing or fracturing of the sheathing and limits movement of the staple relatively inwardly of the wallboard to a position which firmly holds the sheathing against the backing portion of the wallboard and dependably draws the wallboard against the stud 120. Still further, the parts are so related that the crown 114 of the staple is disposed inwardly of the non-dimpled outer surface of the wallboard and in contact with the sheathing, as best illustrated in Fig. 3. As discussed above, the dimpled area is preferably filled with a plaster type of material, not shown, to conceal the indentation made in the wallboard and to cover the crown of the staple.

When the trigger 41 is released, the air rearward of the piston is exhausted to the atmosphere through the valve 36 and the piston is retracted by the air pressure in the portion of the chamber between the O-rings and

thus withdraws the blade 70 rearwardly in the passageway 59 so that it is ready for a subsequent driving operation. The dimpling disk 86 is moved to retracted position simply by pressing the disk against another area of the wallboard into which it is desired to drive a staple 112.

It will be recalled that when the trigger 41 is actuated, the tool tends to recoil incident to movement of the piston 46, even before the staple is driven from the tool. However, it will be evident that when the disk 86 is in engagement with a workpiece at the instant of trigger actuation, it either continues in workpiece engagement in spite of the recoil or immediately returns to workpiece engagement as soon as it is struck by the head 77. Thus, the described attachment automatically compensates for such recoil and obviates the previous necessity of utilizing a blade capable of excessive extension from the tool to compensate for recoil.

The preferred relationship of the extended end 72 of the blade for the mounting of dry wallboard is shown in Figs. 1 and 3. If no dimpling is desired, a disk 86 is employed providing a flat face at 87, as shown in a second form of the invention soon to be described.

In certain instances, such as in finish work, it is desirable to countersink the staple, nail or other fastener. In such event, the blade 70 is employed of such length that the extended end 72 thereof protrudes from the face 87 upon completion of its driving stroke. An extension of approximately one-sixteenth of an inch is usually appropriate for such countersinking.

If the outer end of the fastener is intended to be flush with the outer surface of a workpiece, a blade 70 is employed of such a length that its outer end 72 is flush with the outer surface of the disk 86 at the end of the full driving stroke.

Second form

The second form of the invention is illustrated in Figs. 5 through 8 in which the conventional portions of the driving tool are designated by the same numerals as previously employed and described.

A depth control head is indicated generally at 125 having a substantially circular disk, plate, or simulated hammer head 126 providing a forwardly disposed substantially flat workpiece engaging surface 127. The disk has a diametrically extended slot 128 therethrough. As before, a convex surface may be utilized at 127, if dimpling is desired. The flat face is employed for the described countersinking, flush nailing, and protruded nailing or stapling previously described. The head includes a tongue or mounting member 129 constituting an abutment, perpendicularly extended from the disk and fitted in the notch 62 of the nose portion 55 for slidable movement longitudinally of the nose portion. Such mounting disposes the disk transversely of the nose portion forwardly of the open end 60 with the slot 128 in alignment with the driving blade 70.

As best shown in Figs. 7 and 8, the nose portion 55 is formed with an enlarged channel 130 along the blade 70. A plunger or mounting portion 131 is slidably fitted to the channel 130 and extends through the nose portion for reciprocal movement therein. The plunger provides an enlarged abutment head 132 within the cylinder 12 of the tool and slidably fitted to said cylinder for driving engagement by the piston 46 and motion arresting engagement with the cushion 66. It will be evident that the head 132 and tongue 129 define a recess therebetween into which the central wall 68 extends.

The plunger 131, the tongue 129, and its disk 126 are interconnected for unitary reciprocal movement by cap screws 134 extended through the tongue and screw-threadably engaged in the plunger.

As best shown in Fig. 8, the lower surface of the plunger 131 is milled or otherwise formed to provide an elongated cavity of generally U-shaped transverse cross-section which receive the blade 70 for reciprocal move-

ment independently of the plunger. The cavity has spaced sides interconnected by a central portion. As before, the blade has a thin extended end portion 72 of a thickness substantially that of the staple but rearwardly thereof is thickened for purposes of rigidity. As described, the relationship of the extended end of the blade at the end of its driving stroke to the workpiece engaging surface 127 of the disk 126 determines whether the staple or other fastening member driven thereby is countersunk, flush with the surface of a workpiece into which it is driven, or protrudes. In the form shown in Figs. 5 through 8, the blade is of sufficient length to extend beyond the disk 127 so as to countersink the fastener.

In the second form of the invention, actuation of the cylinder 46 forces the driving blade forwardly to pick up the uppermost staple 112. When the piston strikes the enlarged head 132 it forces the plunger 131 and the depth control head 125 forwardly with the blade. As before, the depth control head compensates for recoil and engages against the surface of a workpiece 137 into which it is desired to drive the staple to secure the workpiece against the stud 120. As the blade 70 drives the staple or other fastener into the workpiece and stud, the disk is vigorously thrust against the workpiece to insure its tight engagement against the stud, thus achieving a simulated final hammer blow in insuring proper workpiece engagement with the stud and proper fastener setting. The device not only has the advantages incident to powered actuation and retains the described effect of the final hammer blow but, by the provision of a blade having a length in proper relation to the overall length of the unitary assembly of the disk 126, tongue 129, plunger 131, and enlarged head 132, dependably drives the staple or other fastener to the desired predetermined depth with respect to the outer surface of the workpiece engaged by the surface 127 of the depth control head.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an apparatus for driving a U-shaped staple having a pair of penetrating prongs interconnected by a crown into a penetrable workpiece including a core layer covered by a flexible tearable sheathing thereby to hold the sheathing tightly against the backing portion without tearing the sheathing with the crown of the staple, a body including an elongated nose portion providing an elongated channel longitudinally thereof terminating in an open end, an elongated mounting notch extended inwardly from said open end and communicating with the channel, and a lateral staple feeding window opening into a channel and spaced inwardly from said open end; a workpiece dimpler including a dimpling plate disposed transversely endwardly of the nose portion including a staple receiving slot aligned with the channel and an elongated tongue connected to the plate and longitudinally slidably fitted in the notch for movement between a dimpling position with the plate endwardly spaced from the nose portion in compressible engagement with the workpiece against the sheathing and a retracted position with the plate engaging the nose portion over said open end; a retainer connected to the nose portion in bridging relation to the notch and overlaying the tongue for engagement therewith in said dimpling position to limit movement of the plate outwardly of the nose portion; means connected to the nose portion for feeding staples into the channel through the window and into alignment with the slot in the plate; an elongated staple driving blade having a staple engaging end and an opposite cou-

pling end mounted in the channel for longitudinal reciprocal movement therein from a position retracted inwardly past the window to a staple driving position extended into the slot in the plate to bring the engaging end into contact with the staple thereby to slide the staple through the channel and the slot and into the workpiece within the area thereof compressed by the plate; a pusher head secured to the blade in longitudinally inwardly spaced relation to the staple engaging end and movable therewith in the channel for engagement with the dimpling plate to move the plate into said dimpling position subsequent to initial movement of a staple through the slot by the blade; and powered means in the body connected to the coupling end of the blade for reciprocating the blade in the channel.

2. In a tool for forcing a driven member into a workpiece; an elongated body having forward and rearward end portions and including a housing providing a cylinder, and a channel member connected to the housing and forwardly extended therefrom to an end edge in forwardly spaced relation to the housing, the channel member providing an elongated channel communicating with the cylinder and in longitudinal alignment therewith; a depth control head including an elongated mounting portion slidably fitted in the channel and a workpiece engaging plate connected to the mounting portion and extended transversely of the end edge of the channel member, the plate having a slot aligned with the channel, the mounting portion providing a longitudinally extended recess defined by longitudinally spaced forward and rearward abutments rigidly interconnected in fixed spaced relation; a male member accessible exteriorly of the body including means releasably screw-threadably connected in longitudinally fixed relation to the channel member and extended into said recess between the forward and rearward abutments; means connected to the channel member for feeding driven members into the channel into alignment with the slot in the plate; and powered means mounted in the cylinder and the channel for longitudinal reciprocal movement therein having a driving stroke for pushing a driven member in the channel longitudinally thereof through the slot into a workpiece engaged by said plate, and a retraction stroke movable rearwardly behind a successive driven member in the channel, said powered means being engageable with the depth control head during said driving stroke to move the depth control head unitarily forwardly with said powered means thereby to limit forward movement of the powered means with respect to the head and the slot in the plate, the forward and rearward abutments being respectively engageable with said male member during said retraction and driving strokes to limit movement of the head relative to the body.

3. In a tool for driving a U-shaped staple into a workpiece, an elongated body having a forward end edge and an elongated channel having a transverse polygonal cross-section; a depth control head including an elongated mounting portion having a transverse polygonal cross-section corresponding to that of the channel and longitudinally slidably fitted in the channel, the mounting portion also providing a longitudinally extended cavity substantially coextensive with the channel and of generally U-shaped transverse cross-section having spaced sides and a central portion connecting the sides, the head further having a workpiece engaging plate connected to the mounting portion and extended transversely of the end edge of the body and the cavity, the plate providing a rectangular slot of generally the same shape as said cavity and in registration therewith, the polygonally fitted relationship of the channel and mounting portion constraining the mounting portion to said movement longitudinally of the channel; means connected to the body for feeding a staple into the cavity against the central portion thereof and in longitudinal alignment with and rearwardly of the slot; and an elongated driving blade having a

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rectangular cross-section similar to but smaller than the slot and being longitudinally slidably fitted in the cavity for movement between a driving position extended into the slot and a retracted position spaced rearwardly from the slot, the blade having a driving stroke movable from retracted to extended position into engagement with a staple in the cavity to push the same outwardly through the slot and into a workpiece engaged by the plate.

4. In a powered tool for controllably driving an elongated fastener into a workpiece, a housing having a cylinder therein; powered means axially reciprocally movable in the cylinder; an elongated nose portion releasably connected to the housing and including a substantially rectangular central wall endwardly outwardly extended from the housing and terminating in an edge, and spaced side walls transversely extended from the central wall, said walls defining an elongated channel therebetween in longitudinal alignment and communicating with the cylinder, the channel having an open end adjacent to said end edge, said central wall having a notch extended inwardly therein from said end edge and communicating with the channel; an elongated plunger fitted in the channel for longitudinal reciprocal movement therein having an outer end portion adjacent to the notch and an inner end portion within the cylinder; a depth control head including a tongue slidably fitted in the notch and connected to said outer end portion of the plunger for movement therewith, the head also including a workpiece engaging plate connected to the tongue and extended therefrom transversely of the open end of the channel, the plate being movable into and out of engagement with said end edge

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incident to reciprocation of the plunger and having a slot aligned with the channel; means connected to the nose portion for feeding such fasteners into the channel rearwardly of the slot and in alignment therewith; and a driving blade slidably fitted in the channel and against the plunger, in alignment with the slot and for reciprocation in the channel and relative to the plunger between a retracted position rearwardly of a fastener in the channel and an extended position engageable with such fastener for forcing the same through said slot into a workpiece engaged by the plate, said powered means engaging the blade for moving the same from retracted to extended position, said powered means also engaging the inner end portion of the plunger during movement of the blade toward extended position for unitarily moving the blade and plunger toward extended position and thereby to limit the extent of travel of the blade through said slot.

5. The tool of claim 4 wherein the powered means is a fluid operated ram having a piston providing a substantially flat abutment surface extended transversely of the cylinder in opposed relation to the flange; wherein the inner end portion of the plunger has a flat abutment surface in opposed relation to said abutment surface of the piston and engageable thereby during extending movement of said plunger to enable said unitary movement; and wherein the blade is connected to the piston.

References Cited in the file of this patent

UNITED STATES PATENTS

2,679,044

Bacon ----- May 25, 1944