

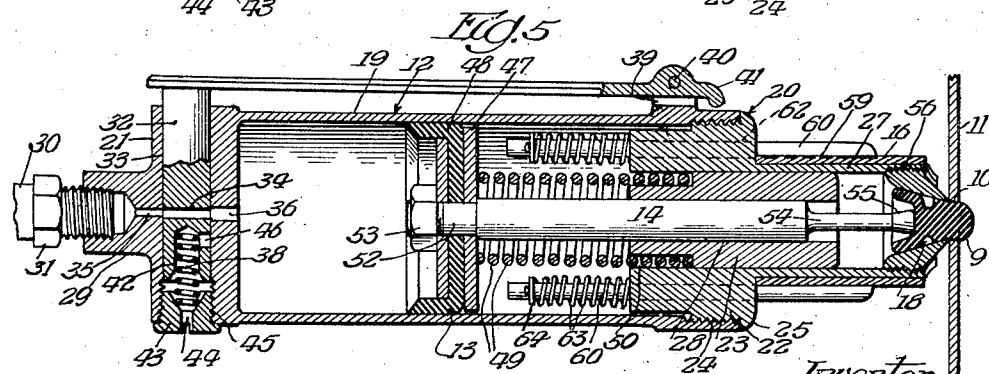
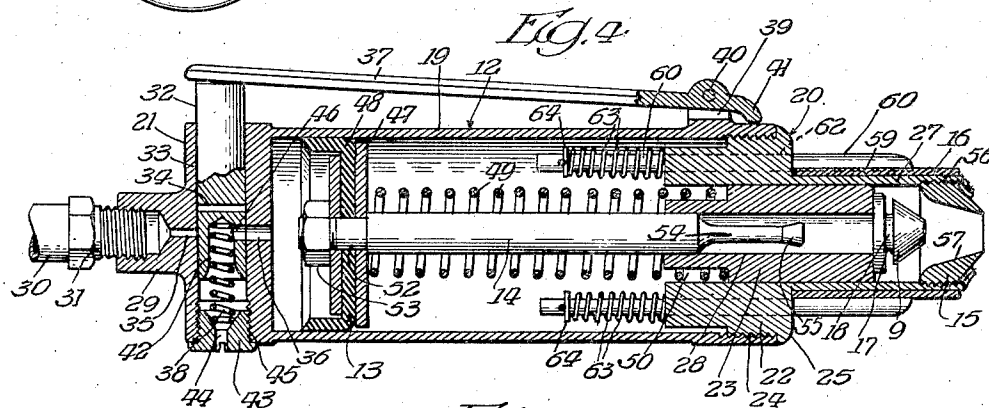
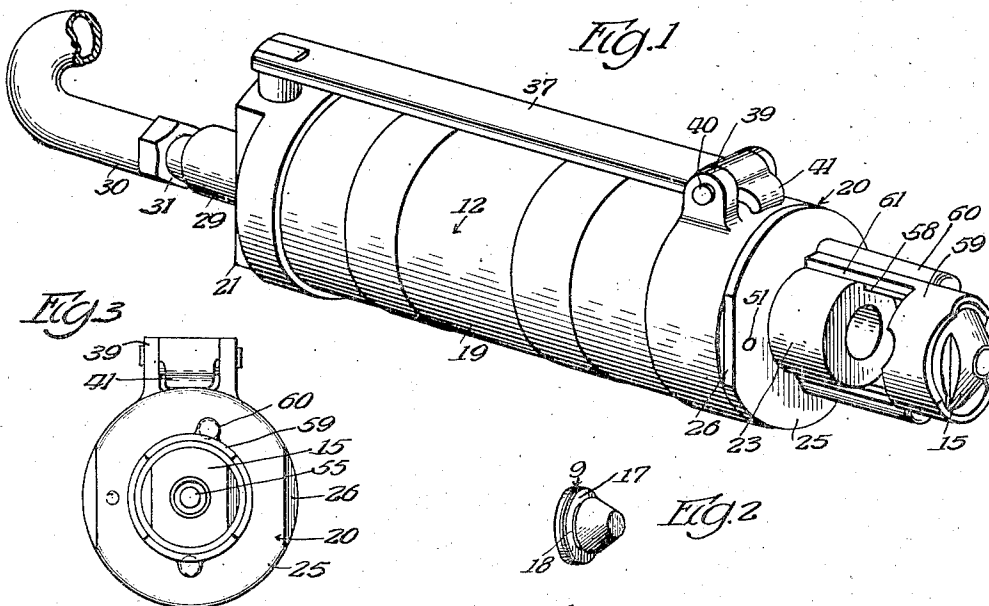
Jan. 4, 1949.

H. A. SMITH
FLUID PRESSURE OPERATED DEVICE
FOR INSERTING CUSHION PADS

2,457,930

Filed July 17, 1944

2 Sheets-Sheet 1



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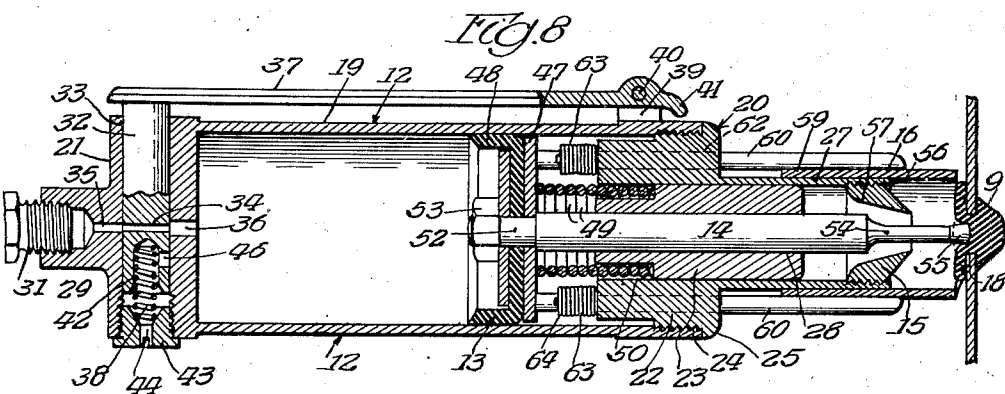
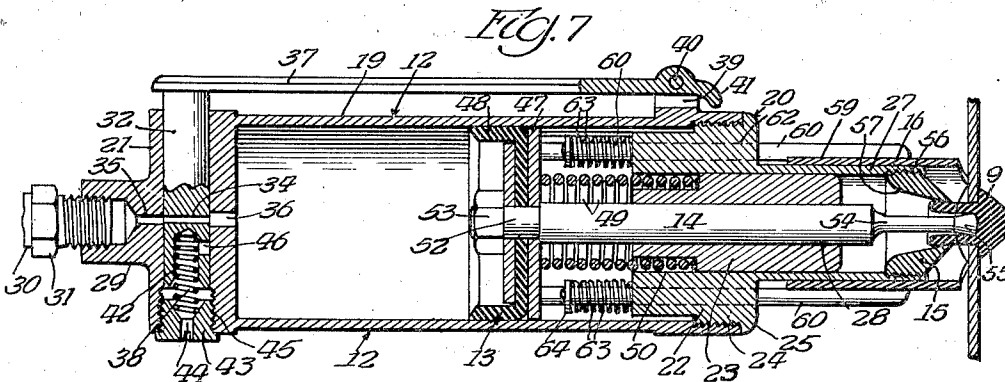
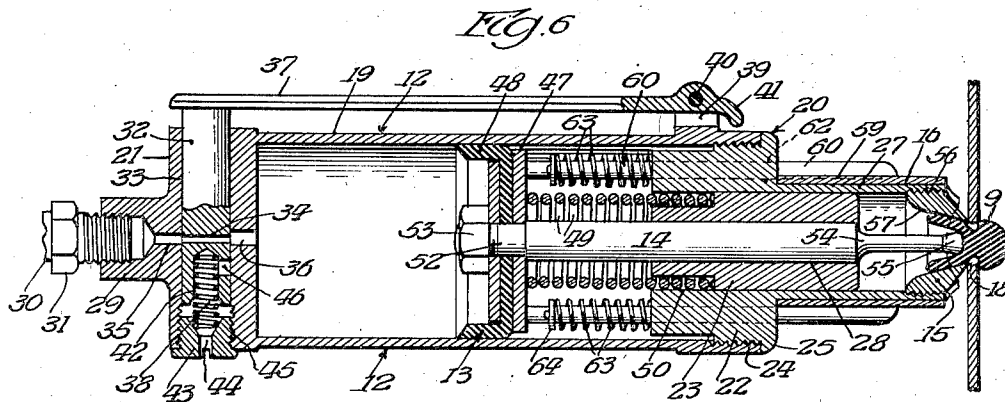
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,457,930

FLUID PRESSURE OPERATED DEVICE FOR
INSERTING CUSHION PADSHerbert A. Smith, Pasadena, Calif., assignor to
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Application July 17, 1944, Serial No. 545,376

4 Claims. (Cl. 29—235)

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The present invention relates generally to fluid pressure operated devices for inserting articles into apertures in parts of aircraft, automobiles, railway cars, refrigerators, stoves and similar products. More particularly the invention relates to that type of inserting device which is in the nature of a hand tool and comprises (1) a cylinder with end closures; (2) a piston which is mounted in the cylinder to slide back and forth between the end closures and embodies a rod extending slidably through a hole in the closure at one end of the cylinder and having a ram type head at its outer end; (3) valve controlled means for introducing fluid under pressure into the other end of the cylinder in order to cause the piston to slide in such directions as to move the ram type head outwards; and (4) spring means for retracting the piston after sliding thereof in response to introduction of fluid under pressure into said other end of the cylinder.

One object of the invention is to provide a fluid pressure operated inserting device of this type which is primarily adapted to insert into an apertured part a tapered resilient cushion pad having a comparatively deep continuous groove immediately inwards of its large end, and operates, when the ram type head of the piston rod is placed against the large end of the pad and fluid under pressure is introduced into the cylinder by way of the valve controlled means, to force and extrude the small end of the pad through the aperture in the part to the end that the aperture defining portion of the part is brought into seated relation with the pad groove.

Another object of the invention is to provide a cushion pad inserting device of the last mentioned character which effectively and efficiently fulfills its intended purpose and is so designed and constructed that it does not injure or in any way distort the apertured part into which the cushion pad is inserted into place in connection with use of the device.

Another object of the invention is to provide a fluid pressure operated cushion pad inserting device of the type and character under consideration which comprises in addition to the cylinder, piston and other parts heretofore mentioned, a nozzle which is positioned concentrically or in axial alignment with the cylinder end closure having the hole for the piston rod, is held in spaced apart and fixed relation with such end closure by way of a sleeve and is adapted in connection with a cushion pad inserting operation to have the small end of the pad extruded there-through by the ram type head on the outer end

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of the rod in order so to compress the small end of the pad that it is readily forced by the head through the aperture in the part.

Another object of the invention is to provide a cushion pad inserting device of the last mentioned character in which the sleeve is provided with a side opening whereby the cushion pad may be inserted into place between the nozzle and the hole equipped end closure of the cylinder preliminary or preparatory to a pad inserting operation.

A further object of the invention is to provide a fluid pressure operated cushion pad inserting device of the type and character under consideration which includes novel piston actuated means for shifting the nozzle and cylinder away from the apertured part after insertion of the pad into the aperture by the ram type head on the outer end of the piston rod.

A still further object of the invention is to provide a pad inserting device which is generally of new and improved construction, and not only is of such light weight that it may be used without tiring or fatiguing the user, but also is so designed and constructed that it may be produced at a comparatively low cost.

Other objects of the invention and the various advantages and characteristics of the present cushion pad inserting device will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective view of a device embodying the invention;

Figure 2 is a perspective view of a tapered groove equipped cushion pad of the type that is adapted to be inserted into place by the device;

Figure 3 is a front view of the device illustrating in detail the construction and design of the nozzle that is connected to the hole equipped end closure of the cylinder by way of the sleeve having the side opening through which the pad is inserted preparatory to a pad inserting operation;

Figure 4 is a longitudinal section of the device showing the piston in its retracted position and the pad disposed between the nozzle and the hole equipped end closure of the cylinder and in readi-

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ness to have the large end thereof engaged by the ram type head on the outer end of the piston rod;

Figure 5 is a longitudinal section showing the piston after it has been forced part way towards the hole equipped end closure into a position wherein the ram type head on the outer end of the rod effects partial extrusion of the small end of the pad through the nozzle and the aperture in the part;

Figure 6 is a longitudinal section showing such further movement on the part of the piston that the ram type head effects additional extrusion of the small end of the pad through the nozzle and the aperture in the part; and

Figures 7 and 8 are longitudinal sections illustrating in detail the manner in which the nozzle and cylinder are shifted by the retracting means away from the part after the small end of the pad has been inserted fully through the aperture in the part and the aperture defining portion of the part is in seated relation with the groove that is directly inwards of the large end of the pad.

The fluid pressure operated device which is shown in the drawings constitutes the preferred form or embodiment of the invention. It is primarily designed or adapted to insert a cushion pad 9 through an aperture 10 in a part 11 and as its principal or main components comprises a cylinder 12; a piston 13; a piston rod 14; a nozzle 15 and a retractor 16.

The cushion pad 9 is formed of rubber or other resilient material and, as shown in Figure 2, is circular in cross section and tapered. An annular groove 17 is formed in the pad directly inwards of the latter's large end. This groove has straight parallel sides and results in the small and large ends of the pad being spaced apart and joined together by a reduced stem-like part 18. The hole 10 in the part 11 is circular and is substantially the same in diameter as the stem-like part 18 of the pad. After the pad is inserted into place by the device as hereinafter described, the aperture defining portion of the part 11 is in seated relation with the groove 17 in the pad and the small and large ends of the pad are arranged in straddled relation with said aperture defining portion as shown in Figure 8. The part 11 having the aperture 10 may be a part of an airplane, or other structure to which a panel (not shown) is removably or otherwise secured. The large end of the pad, when the pad is in place, serves as a cushioning medium between the part 11 and the panel.

The cylinder 12 comprises an elongated circular side wall 19 and has a closure 20 at its front end and a closure 21 at its rear or other end. The inner periphery of the cylinder side wall 19 is of uniform bore or diameter from end to end and forms a slideway for the piston 13. The closure 20 at the front end of the cylinder is of composite character and comprises a ring shaped outer part 22 and a tubular inner part 23. The outer part is disposed for the most part in the front end of the circular side wall 19 of the cylinder and is removably secured thereto by way of a screw thread connection 24. The outer end of the outer part 22 is provided with an outwardly extending flange 25 and this is adapted when the end closure 20 is in place to lap the adjacent end edge of the cylinder side wall 19 and has diametrically opposite flats 26 whereby it may be gripped with a wrench or other turning tool in connection with attachment or removal of the ring shaped outer part 20 with respect to the cylinder. In addition to the flange 25 the outer part 22 of the end clo-

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sure 20 is provided with an integral outwardly extending sleeve 27. The latter is arranged in coaxial relation with the ring shaped part 22 of the end closure and has its inner periphery the same in diameter as the inner periphery of the part 22. The inner end of the tubular inner part 23 of the cylinder end closure 20 fits snugly within the inner periphery of the outer part 22 and is keyed or otherwise fixedly secured to said outer part. The outer end of the inner part 23 of the cylinder end closure 20 is disposed within the inner end of the sleeve 27 and terminates an appreciable distance inwards of the outer end of the sleeve. The inner periphery of the tubular inner part 23 is circular in cross section and defines a bore 28 which extends between and through the ends of the tubular inner part 23 of the end closure 20. The closure 21 at the rear end of the cylinder 12 extends across, is formed integrally with, the rear end of the circular side wall 19; and embodies a centrally disposed rearwardly projecting tubular nipple 29. A hose 30 which is connected to a source of air under pressure (not shown) is connected to the nipple 29 by a coupling 31 and serves to introduce air under pressure into the rear end of the cylinder 12 under control of a plunger type valve 32. Such valve extends transversely of the cylinder and is mounted for longitudinal sliding movement in an open ended bore 33 in the cylinder end closure 21. It is held against rotation by any suitable means, such as a key and keyway (not shown). The central portion of the valve 32 is provided with a cross port 34 and this is adapted when the valve is shifted inwards to register with, and effect communication between, a pair of aligned ports 35 and 36 in the central portion of the end closure 21. The port 35 leads rearwards from the rear central portion of the bore 33 and communicates with the inner end of the tubular nipple 29. The other port, i. e., the port 36, leads forwards from the inner central portion of the bore 33 and communicates with the rear end of the interior of the cylinder 12. When the valve 32 is shifted inwards so as to cause the cross port 34 to register with the ports 35 and 36 air under pressure is admitted into the rear end of the cylinder. When the plunger type valve 32 is shifted outwards so as to bring the cross port out of registry with the ports 35 and 36 the supply of air under pressure into the rear end of the cylinder ceases. The plunger type valve 32 is adapted to be shifted inwards into its open position by way of a hand lever 37 and is urged outwards into its closed position by way of a compression spring 38. The hand lever 37 is disposed directly outwards of, and in parallel relation with, the circular side wall 19 of the cylinder 12. The front end of the lever is disposed between a pair of laterally spaced outwardly extending lugs 39 on the front end of the side wall 19 and is pivotally supported by way of a pin 40 which extends through aligned holes in the lugs and said front end of the hand lever. The rear end of the lever abuts against the outer end of the plunger type valve 32. When the lever 37 is gripped by the user of the device and swung inwards the valve 32 is slid into its open position, as shown in Figures 5 to 8, inclusive. When the lever is released after a cushion pad inserting operation the valve is slid outwards into its closed position in response to the action of the compression spring 38. The front end of the lever 37 is provided with a forwardly and inwardly extending extension 41 and this, in connection with release of

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the hand lever 37, is adapted to engage the front end of the cylinder side wall 19 and limit outward movement of the hand lever and the plunger type valve. The compression spring 38 is disposed in the bore 33 and is located adjacent, and applied to, the inner end of the valve 32. The inner end of the spring is seated in a socket 42 in the inner end of the valve 32 and the outer end of the spring is in abutment with a plug 43 which has a centrally disposed longitudinally extending open ended duct 44 and is connected to the end closure 21 of the cylinder by a screw thread connection 45. The inner end of the valve 32 is provided with an inwardly extending vent port 46 and this leads from the inner end of the socket 42 and is so arranged that it registers with the port 36 when the valve is in its closed position. When the valve is in its closed position the air under pressure in the rear end of the cylinder 12 is permitted to escape to atmosphere via the port 36, the vent port 46, the socket 42 and the duct 44. As heretofore pointed out, the spring 38 serves to urge the valve 32 into its closed position. When it is desired to use the device the hand lever 37 is swung inwards in order to shift the valve inwards and effect opening thereof. As soon as the valve is in its open position air under pressure enters the rear end of the cylinder 12 and forces the piston 13 forwards. When, after a cushion pad inserting operation, the lever 37 is released by the user of the device the spring 38 shifts the valve 32 into its closed position wherein the supply of air under pressure to the rear end of the cylinder is cut off and the rear end of the cylinder is vented.

The piston 13 is mounted in the cylinder 19 to slide back and forth between the end closures 20 and 21. It comprises a pair of spaced apart discs 47 and a cup-shaped member 48 between the two discs. The side wall of the cup-shaped member projects in the direction of the end closure 21 and is in sliding engagement with the inner periphery of the cylinder side wall 19. When the valve 32 is shifted into its open position so as to effect admission of air under pressure into the rear end of the cylinder 12 the piston 13 is shifted forwards in the direction of the cylinder end closure 20. A compression spring 49 serves to retract the piston. As soon as the plunger type valve 32 is shifted into its closed position venting of the rear end of the cylinder resultantly takes place. The spring 49 is interposed between the cylinder end closure 20 and the piston. The front end of the spring is disposed in an annular groove 50 in the inner end of the tubular inner part 23 of the end closure 20. The rear end of the spring abuts against the disc 47 that is nearer said end closure 20. As shown in Figure 1, the front end of the cylinder 12 is vented by way of a vent duct 51 which is formed in, and extends through, the ring shaped outer part 22 of the front end closure 20.

The piston rod 14 is for the most part surrounded by the cylinder 12 and extends forwards from the central portion of the piston 13. The rear end of the rod is provided with a reduced stem 52 which extends through aligned holes in the central portions of the discs 47 and the cup shaped member 48 of the piston and embodies at its outer extremity a clamp nut 53 whereby the rear end of the rod is held in fixed or rigid relation with the piston. The front end of the piston rod is slidably mounted in the bore 28 in the tubular inner part 23 of the front end closure 20 and embodies a reduced stem 54 having a ram type

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head 55 at its outer end. The head 55 is adapted in connection with use of the device to engage the large end of the cushion pad 9 and operates in response to forward shift of the piston and rod to effect insertion of the pad through the aperture 10 in the part 11. As shown in the drawings, the front end of the ram type head 55 is flat and the side portion is rearwardly tapered and of materially less diameter than the large end of the pad 9. When the piston 13 is in its retracted position, as shown in Figure 4, the stem 54 and the ram type head 55 are disposed in the central portion of the bore 28. When the piston is shifted forwards to a point adjacent the central portion of the cylinder the head 55 is positioned outwards of the front end of the tubular inner part 23 of the front end closure 20 and within the inner end of the nozzle 15, as shown in Figure 5. Further forward movement on the part of the piston results in the head 55 being shifted to a point where it is disposed adjacent the outer end of the nozzle (see Figure 6).

The nozzle 15 is located in the outer end of the sleeve 27 and is connected thereto by a screw thread connection 56. It has a forwardly tapered outer end and a forwardly tapered axially disposed orifice 57 and is arranged in concentric relation with the ram type head 55. The front extremity of the nozzle 15 has substantially the same diameter as the aperture 10 in the part 11 and embodies diametrically opposite flats at the sides thereof in order that it may be gripped by a wrench in connection with turning of the nozzle into and out of place. The screw thread connection 56 permits axial adjustment of the nozzle relatively to the cylinder 12. The front end of the orifice 57 is of slightly less diameter than the aperture 10 with the result that the front end of the nozzle 15 is in the form of a comparatively sharp flat circular edge that extends transversely of the cylinder 12. The central and front portions of the orifice 57 are of less diameter than the large end and the central portion of the cushion pad with the result that when the cushion pad is extruded through the nozzle by the ram type head 55, as hereinafter described, the small end of the pad is compressed for passage through the aperture 10 in the part 11 and the large end is doubled back or folded around the head 55, as shown in Figures 6 and 7. The sleeve 27 is provided with a side opening 58 for permitting the pad to be inserted into a position wherein it is disposed between the nozzle and the front end of the tubular inner part 23 of the front end closure 20. It is contemplated that the pad, preliminary to insertion through the aperture 10 in the part 11, will be inserted into the sleeve 27 via the side opening 58 and positioned so that the small end thereof projects in the direction of the nozzle. After insertion of the cushion pad into place the front end of the nozzle is placed against the part 11 in centered relation with the aperture 10. Thereafter, while the cylinder 12 is held at right angles to the part 11 the plunger type valve 32 is held at right angles to the part 11, the plunger type valve 32 is shifted to its open position by swinging inwards the hand lever 37. As soon as the valve is opened the piston is shifted forwards in response to the introduction of air under pressure into the rear end of the cylinder 12 with the result that the ram type head 55 moves into abutment with the large end of the cushion pad and then forces the pad through the nozzle until the aperture defining portion of the part 11 is in seated relation with the annular

groove 17. At such point further forward movement of the head ceases, as hereinafter described, and the large end of the pad is folded around the head 55, as shown in Figure 7.

The retractor 16 is piston operated and serves automatically after the pad is inserted through the part 11 until the aperture defining portion of the part is in seated relation with the groove, to effect retraction of the cylinder and nozzle to the end that the folded large end of the pad snaps into its normal flat position and hence it is brought into abutment with the part 11. As shown in the drawings, the retractor comprises a tubular member 59 which surrounds, and is longitudinally slidable with respect to, the sleeve 27. It also comprises a pair of laterally spaced rods 60 which are arranged in parallel relation with the piston rod 14 and have the front ends thereof welded to the rear portion of the tubular member 59. As shown in Figure 1, said member 59 is provided with a side opening 61 which is in registry with the side opening 58 in the sleeve 27 and permits the cushion pad 9 to be inserted into place between the nozzle and the front end of the tubular inner part 23 of the front end closure 20 preliminary to insertion through the aperture 10 in the part 11. The central portions of the rods 60 extend through, and are slidably mounted in, bores 62 in the ring shaped outer part 22 of the front end closure 20. The rear extremities of the rods 60 project rearwards beyond the rear end of said ring shaped outer part and are surrounded by helical compression springs 63 which serve to urge the rods 60 and the tubular member 59 rearwards with respect to the cylinder. The front ends of the springs abut against the rear end of the ring shaped outer part 22 of the front end closure 20 and the rear ends of the springs abut against washers 64 which are secured on the rear extremities of the rods 60 by pins. The rods are positioned in the path of the piston 13 and are adapted to be shifted thereby directly before the piston reaches the end of its forward stroke. When the piston is in its retracted position the springs 63 operate through the medium of the rods 60 to hold the inner end of the tubular member 59 in abutment with the front end of the ring shaped outer part 22 of the front end closure 20, as shown in Figures 4, 5 and 6. The length of the member 59 is such that when the rear end thereof is in abutment with the front end of the outer part of the front end closure its front end is spaced slightly rearwards of the front end of the nozzle 15. The rods 60 are of such length that the rear ends thereof are engaged by the piston directly before the ram type head 55 causes the small end of the cushion pad 9 to be fully projected through the aperture 10 in the part 11. In connection with operation of the device, the piston directly before it reaches the end of its forward stroke, engages the rear extremities of the rods 60, as shown in Figure 6. Further forward movement on the part of the piston results in the rods 60 being shifted forwards relatively to the cylinder, thus causing the front end of the tubular member 59 of the retractor 16 to be brought into engagement with the adjacent portion of the part 11, and also causing the head 55 to force the small end of the cushion pad completely through the aperture 10 in the part 11. As soon as the front end of the tubular member 59 of the retractor is brought into engagement with the adjacent portion of the part 11 the cylinder and nozzle, due to the pressure of the air

in the rear end of the cylinder, are forced rearwards as shown in Figure 8. In connection with the rearward shift of the nozzle the large end of the cushion pad is released from the nozzle and expands from its folded position around the head into its normal position. When the plunger type valve 32 is closed by release of the hand lever 37 after a pad inserting operation the piston is retracted by the compression spring 49 and the compression springs 63 serve, through the medium of the rods 60, to retract the tubular member 59 of the retractor 16 into its inoperative position wherein the rear end thereof abuts against the front end of the ring shaped outer part 22 of the front end closure 20.

When it is desired to use the device the pad 9 is inserted into the sleeve 27 via the side openings in the sleeve and the tubular member 59 while positioned so that the small end thereof faces in the direction of the nozzle 15. Thereafter the device is manipulated so as to bring the front end of the nozzle into centered relation with the aperture defining portion of the part 11. As soon as the device is so manipulated the operator depresses or swings inwards the hand lever 37 so as to effect shift of the plunger type valve 32 into its open position wherein the cross port 34 thereof is in registry with the ports 35 and 36. As soon as the valve is in its open position air under pressure enters the rear end of the cylinder and causes the piston and piston rod to move forwards relatively to the cylinder. During forward movement of the piston the ram type head 55 on the front extremity of the reduced stem 54 of the piston rod moves into abutment with the central portion of the larger end of the cushion pad and forces the pad towards the nozzle. As shown in Figure 5, the head, before the piston is brought into engagement with the rear extremities of the rods 60 of the retractor, forces the small end of the pad through the front end of the nozzle and the latter operates to compress the small end of the pad so that it is shiftable through the aperture 10 in the part 11 in connection with continued movement of the head. When the piston is brought into engagement with the rear extremities of the rods 60 the head 55, as heretofore pointed out and as shown in Figure 6 reaches a position wherein it has effected substantially complete insertion of the small end of the pad through the aperture 10. In connection with further forward shift of the piston the head 55 effects complete insertion of the small end of the pad 9 through the aperture 10 and the tubular member 59 of the retractor is brought into abutment with the adjacent portion of the part 11. After the front end of the tubular member 59 has been brought into abutment with the adjacent portion of the part 11 movement of the piston and head with respect to the part 11 is arrested and the air under pressure in the rear end of the cylinder operates, as hereinbefore pointed out, to shift the cylinder and nozzle away from the part 11. As the nozzle shifts away from said part 11 the large end of the pad which, prior to raising of the head with respect to the part 11, is caused by the nozzle to assume a folded position around the head, is released from the nozzle and snaps outwards into lapped relation with the part 11. As soon as the pad is inserted into place with respect to the part 11 the device is withdrawn and the valve 32 is caused to slide into its closed position by release of the hand lever 37. As soon as the valve is shifted into its closed position in response to the action of the compression spring

38 the rear end of the cylinder is vented with the result that the piston 13 is retracted by the spring 49 and the springs 63 operate to retract the tubular member 59 of the retractor against the front end of the ring shaped outer part 22 of the front end closure 20.

The herein described pad inserting device effectively and efficiently fulfills its intended purpose and is automatic in operation, although under manual control. It is essentially simple in design and construction and hence may be produced at a comparatively low cost. By constructing the various parts of the device of aluminum or other metal that is light in weight the weight of the device as a whole may be so reduced that the device does not in use tire or fatigue the user. Due to the arrangement and construction of the parts the device does not in connection with use thereof in any way injure or distort the part into which the cushion pad is inserted. If the cushion pad is formed of rubber or like resilient material it is contemplated that it will be lubricated before it is positioned in the sleeve 27 in order to facilitate insertion thereof into the apertured part of the device.

Whereas the device has been described as being primarily adapted to insert a tapered and grooved equipped cushion pad like that shown in the drawings it is to be understood that it may be used to insert other forms or types of articles into apertured parts. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

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

1. A portable device adapted to insert an oversized resilient cushion pad or like article into an aperture in a structural part and comprising a cylinder with end closures, a nozzle connected fixedly to, and extending lengthwise of, the cylinder, disposed outwards of one of the end closures so as to define therebetween a pad receiving space, adapted to have the outer end thereof placed against the aperture defining portion of the structural part, and having a centrally disposed orifice the outer end of which is approximately the same in size as the aperture, a piston mounted in the cylinder to slide back and forth between the end closures, valve controlled means for introducing fluid under pressure into the end of the cylinder having the other end closure in order to force the piston towards said one end closure, a piston rod having one end thereof connected to the piston and its other end extending slidably through said one end closure and provided with a ram of less width than the orifice in the nozzle positioned in centered relation with said orifice and shaped and arranged so that after insertion of the pad into said space and placement of the outer end of the nozzle against said aperture defining portion of the part and in response to shift of the piston toward said one end closure and relatively to the cylinder, it operates to extrude the pad part way through the nozzle and into the aperture, and automatic piston actuated means whereby when the rod is slid by the piston to a position wherein the ram is disposed adjacent the outer end of the nozzle the piston, rod and ram are arrested and the nozzle and cylinder are caused to be shifted away from the structural part in order to extrude the remainder of the pad from said nozzle.

2. A portable device adapted to insert an oversized resilient cushion pad or like article into an aperture in a structural part and comprising a cylinder with end closures, a nozzle connected fixedly to, and extending lengthwise of, the cylinder, disposed outwards of one of the end closures so as to define therebetween a pad receiving space, adapted to have the outer end thereof placed against the aperture defining portion of the structural part, and having a centrally disposed outwardly tapered orifice the outer end of which is approximately the same in size as the aperture, a piston mounted in the cylinder to slide back and forth between the end closures, valve controlled means for introducing fluid under pressure into the end of the cylinder having the other end closure in order to force the piston towards said one end closure, spring means in the cylinder for retracting the piston upon closing of the valve of said valve controlled means, a piston rod having one end thereof connected to the piston and its other end extending slidably through said one end closure and provided with a ram of less width than the small end of the orifice in the nozzle, positioned in centered relation with said orifice and shaped and arranged so that after insertion of the pad into said space and placement of the outer end of the nozzle against said aperture defining portion of the part and in response to shift of the piston toward said one end closure and relatively to the cylinder, it operates to extrude the pad part way through the nozzle and into the aperture, and automatic means whereby when the rod is slid to a position wherein the ram is disposed adjacent the outer end of the nozzle the piston, rod and ram are arrested and the nozzle and cylinder are caused to be shifted away from the part in order to extrude the remainder of the pad from the nozzle, including a rod arranged in parallel relation with the cylinder, having the central portion thereof extending slidably through said one end closure and its inner end positioned in the path of the piston, and adapted during shift of the piston toward said one end closure to be shifted by the piston outwards into abutment with said part, and spring means for retracting the last mentioned rod when the piston is retracted by said first mentioned spring means.

3. A portable device adapted to insert an oversized resilient cushion pad or like article into an aperture in a structural part and comprising a cylinder with end closures, a nozzle connected fixedly to, and extending lengthwise of, the cylinder, disposed outwards of one of the end closures so as to define therebetween a pad receiving space, adapted to have the outer end thereof placed against the aperture defining portion of the part, and having a centrally disposed outwardly tapered orifice the outer end of which is approximately the same in size as the aperture, a piston mounted in the cylinder to slide back and forth between the end closures, valve controlled means for introducing fluid under pressure into the end of the cylinder having the other end closure in order to force the piston towards said one end closure, spring means in the cylinder for retracting the piston upon closing of the valve of said controlled valve means, a piston rod having one end thereof connected to the piston and its other end extending slidably through said one end closure and provided with a ram of less width than the small end of the orifice in the nozzle, positioned in centered relation with said orifice and shaped and arranged so that after in-

section of the pad into said space and placement of the outer end of the nozzle against said aperture defining portion of the part and in response to shift of the piston toward said one end closure and relatively to the cylinder, it operates to extrude the pad part way through the nozzle and into the aperture, automatic means whereby when the rod is slid by the piston to a position wherein the ram is disposed adjacent the outer end of the nozzle the piston, rod and ram are arrested and the nozzle and cylinder are caused to be shifted away from the part in order to extrude the remainder of the pad from the nozzle, embodying a tubular member extending around, and slidable longitudinally relatively to, the nozzle, and a rod disposed in parallel relation with the cylinder and having its central portion extending slidably through said one end closure, its outer end connected to the tubular member and its inner end positioned in the path of the piston, and adapted in connection with shift of the piston toward said one end closure to be engaged and shifted by the piston, and spring means for retracting the last mentioned rod and tubular member during retraction of the piston by said first mentioned spring means.

4. A portable device adapted to insert an oversized resilient cushion pad or like article into an aperture in a structural part and comprising a cylinder with end closures, a cylindrical sleeve disposed in coaxial relation with the cylinder, connected fixedly to and projecting outwards from, one of the end closures, and provided with a side opening whereby the pad may be inserted into it, a nozzle connected to the outer end of the sleeve, adapted to have the outer end thereof placed against the aperture defining portion of the part, and having a centrally disposed outwardly tapered orifice the outer end of which is approximately the same in size as the aperture, a piston mounted in the cylinder to slide back and forth between the end closures, valve-controlled means for introducing fluid under pressure into the end of the cylinder having the other end closure in order to force the piston towards said one end closure, a piston rod having one end

thereof connected to the piston and its other end extending slidably through said one end closure and provided with a ram of less width than the small end of the orifice in the nozzle, positioned in centered relation with said orifice and shaped and arranged so that after insertion of the pad into said sleeve and placement of the outer end of the nozzle against said aperture defining portion of the part and in response to shift of the piston toward said one end closure and relatively to the cylinder, it operates to extrude the pad part way through the nozzle and into the aperture, and automatic piston actuated means whereby when the rod is slid by the piston to a position wherein the ram is disposed adjacent the outer end of the nozzle the piston, rod and ram are arrested and the nozzle and cylinder are caused to be shifted away from the structural part in order to extrude the remainder of the pad from said nozzle, including a tubular member extending around, and slidable longitudinally with respect to, the sleeve and having a side opening in registry with the side opening in said sleeve.

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