

[54] FOOT ACTUATED PRESS

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[58] Field of Search 29/226, 227, 238, , 244,
29/267, 283; 269/158, 159; 100/293

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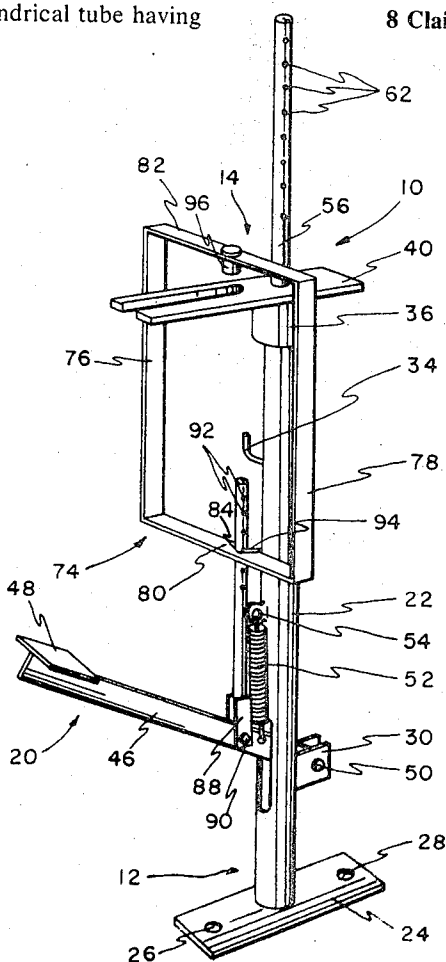
[57] ABSTRACT

The present invention relates to a foot actuated press assembly for engaging a pressable portion of a work piece, such as a retainer ring of a clutch assembly, and exerting a pressing force thereagainst. Structurally, the foot actuated press assembly of the present invention comprises an upright generally cylindrical tube having

a horizontal work piece support mounted thereon. A plunger rod is disposed interiorly of said cylindrical tube and is connected about the lower end thereof to a pivotally mounted foot pedal which is spring biased to assume an upper position. The upper end of the plunger rod extends through an opening in said horizontal work piece support and is adapted to extend through an opening in a particular work piece that is supported upon said horizontal work piece support. A detachable work piece engager is operatively connected to an upper portion of the plunger rod above the work piece supported by the horizontal work piece support. Consequently, downward movement of the foot pedal results in the work piece engager engaging a pressable portion of the work piece and exerting a downward pressing action thereagainst.

In addition, the foot actuated press assembly of the present invention includes an extension to said work piece support that has a cutout formed therein to receive a work piece with a shaft extending therefrom. In this case, a rectangular frame structure is operatively connected to the foot pedal and extends over the work piece support extension to hold the work piece engager thereover. Therefore, the downward actuation of the foot pedal results in the rectangular frame causing the work piece engager to engage the pressable portion of the work piece and shaft assembly supported within the work piece extension and the cutout formed therein.

8 Claims, 7 Drawing Figures



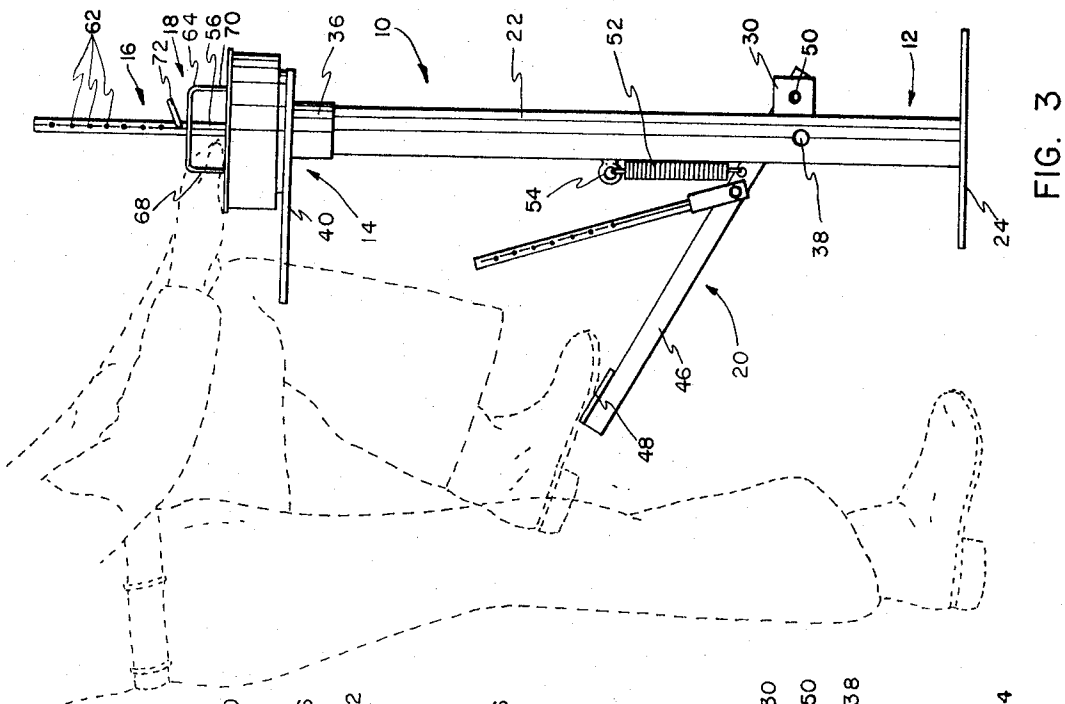


FIG. 1

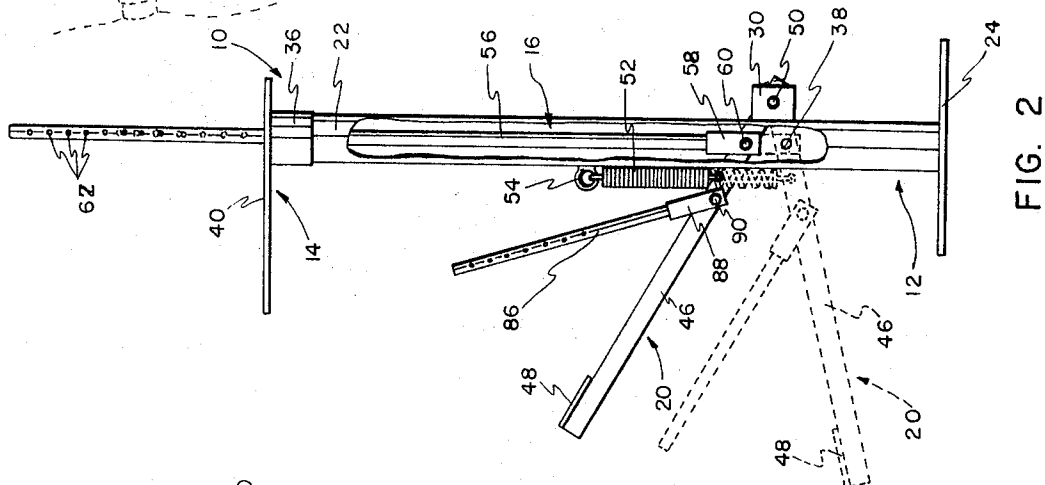


FIG. 2

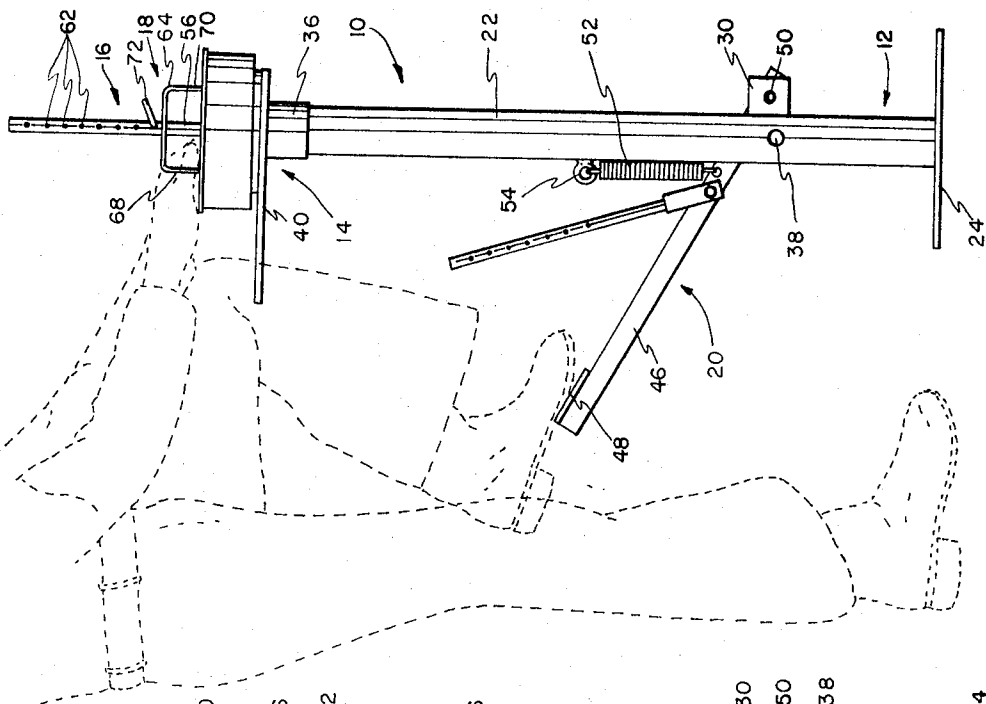


FIG. 3

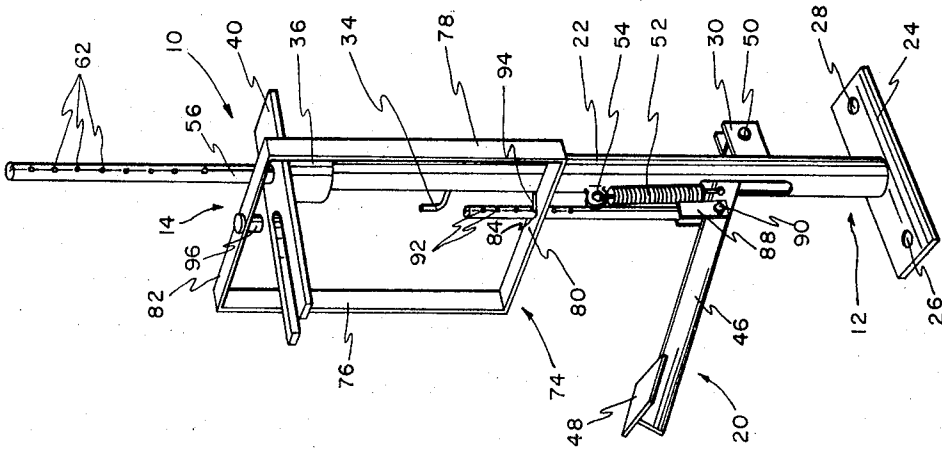


FIG. 5

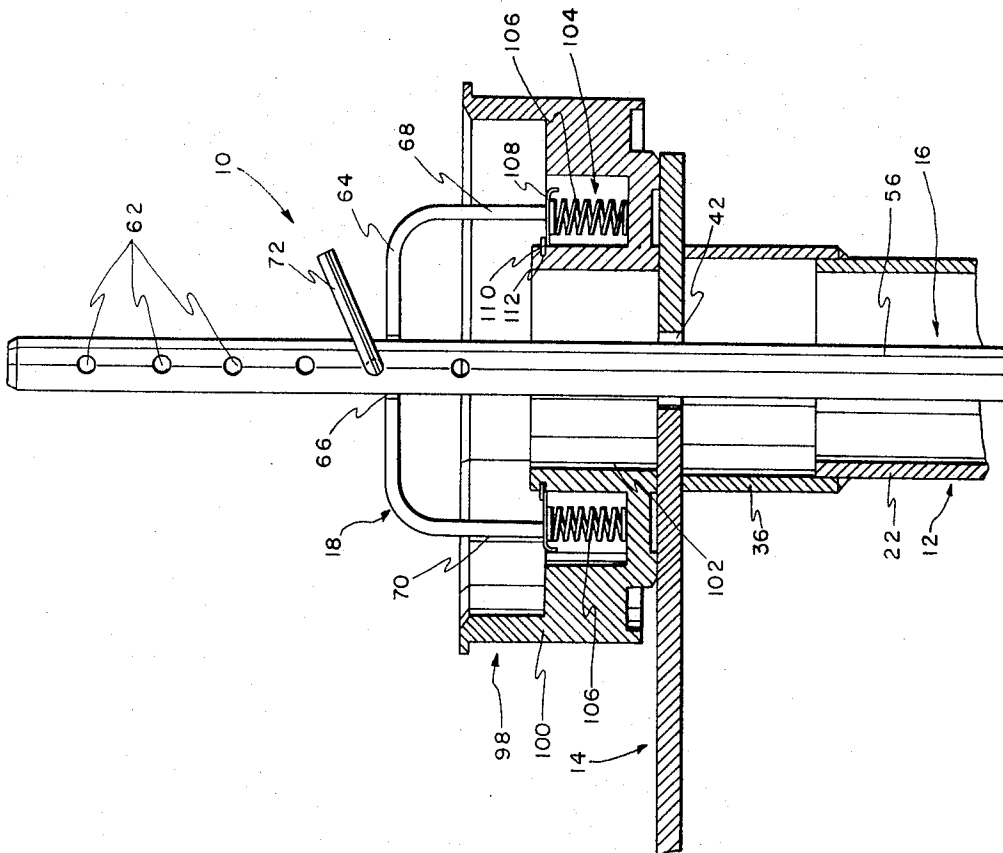


FIG. 4

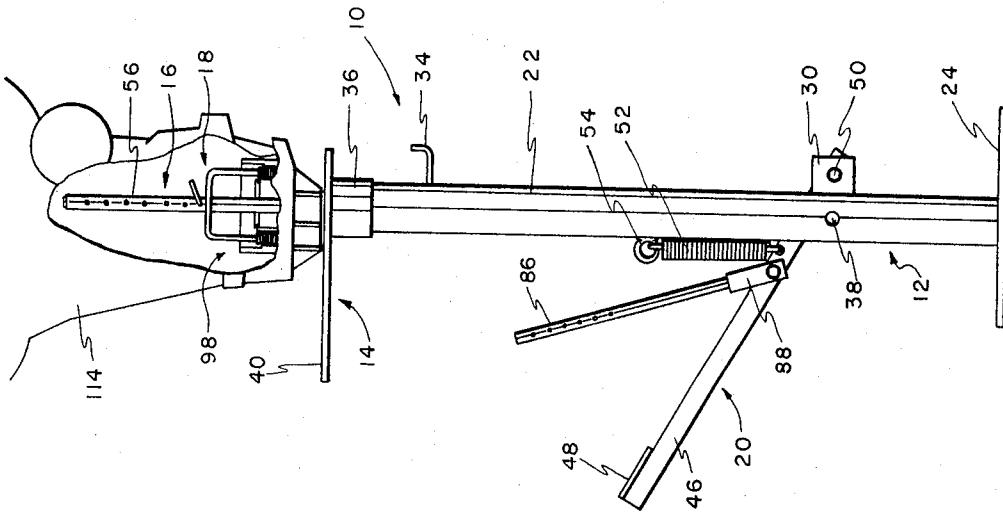


FIG. 7

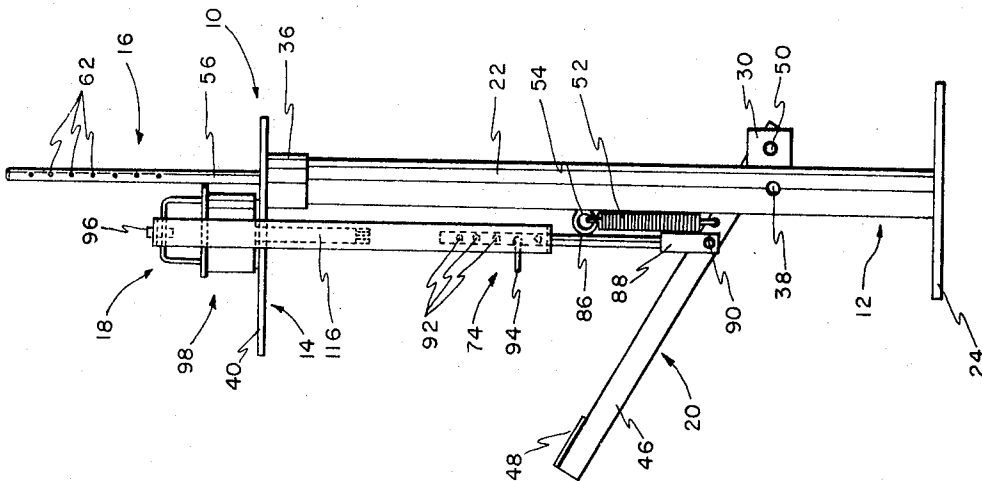


FIG. 6

FOOT ACTUATED PRESS

The present invention relates to tools, and more particularly to a special foot actuated tool which is adapted to be used as a press to "break down" a clutch assembly or the like.

One of the most common forms of repair and maintenance required in automatic transmissions and pumps is that of replacing the seals therein. In fact, it is common practice among mechanics and servicemen to routinely replace the seals in automatic transmissions and pumps during any major repair or overhaul.

The actual replacement of the seal or seals in an automatic transmission, pump, or the like is not a difficult task in itself. The problem, however, is "breaking down" the various assemblies to get to the seal or seals. In the case of an automatic transmission, to gain access to the seal or seals, the clutch assembly must be "broken down." To break down a clutch assembly of the type used in automatic transmissions, normally requires that a snap ring be removed from the clutch assembly. The snap ring usually engages and holds a circular retainer which is biased against the snap ring by an adjacent spring loaded clutch cylinder. Thus, to remove the snap ring requires that the retainer engaging the spring loader clutch cylinder be pressed against the springs of the clutch cylinder away from the snap ring. Once the retainer has been sufficiently displaced from the snap ring, the snap ring can then be removed from the clutch assembly and the retainer and clutch assembly can be likewise removed and access can be gained to the seals of the clutch assembly.

In the past, the pressing of the retainer has often been accomplished by the use of simple hand tools along with any auxiliary tools or instruments the mechanic or serviceman may find in his shop area. To sufficiently press the retainer against the clutch cylinder requires that a substantial force be applied and that the force be applied relatively even around the retainer and clutch cylinder. Doing this with simple hand tools becomes very difficult because the mechanic or serviceman is required to use his hands to a degree in order to remove the snap ring once the retainer is pressed against the springs of the clutch cylinder. In many instances, to remove the snap rings from the clutch assembly requires at least two individuals operating on the clutch or pump assembly at the same time, one individual to effectuate the pressing of the retainer and the other individual to remove the snap ring once the retainer is sufficiently displaced from the snap ring.

Therefore, it is seen that the pressing of the clutch assembly and the removal of the snap ring is a tedious and time consuming job that often requires at least two workers to accomplish such. In addition, with the use of small and simple hand tools and devices, it is always a possibility that during the pressing operation that such tools may slip from the retainer and cause the retainer to quickly jam against the snap ring with the possibility that the worker's fingers may be caught therebetween and mashed.

It is, therefore, an object of the present invention to provide a foot actuated press assembly that enables the operator thereof to initiate a pressing operation against the work piece by using one of his feet, leaving his hands free to do other work about the work piece.

A further object of the present invention is to provide a foot actuated press assembly for breaking down a work piece such as a clutch or pump assembly or the

like wherein said press assembly is adapted to apply a generally uniform pressure against the particular portion of the work piece such that a retainer means or holding means can be removed and the work piece disassembled for repair or overhaul.

Still a further object of the present invention is to provide a single tool adapted to break down various types of automatic transmission clutch assemblies. Specifically, the single tool of the present invention is capable of receiving and accommodating: (1) a conventional automatic transmission clutch assembly, (2) a transmission housing having an automatic transmission clutch assembly integrally constructed therein, and (3) an automatic transmission clutch assembly having a drive shaft associated therewith and extending therefrom.

A further object of the present invention is to provide a simple, relatively inexpensive, and easy to operate foot actuated press assembly that is effective to press the pressable portion of a work piece by simply actuating the same by engaging one's foot with a foot pedal and pressing the same downwardly.

Another object of the present invention is to provide a press assembly that may be conveniently stationed to the floor of a service or shop area.

Other objects and advantages of the present invention will become apparent from a study of the following description and the accompanying drawings which are merely illustrative of the present invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the foot actuated press assembly of the present invention.

FIG. 2 is a side elevational view of the foot actuated press assembly showing the foot pedal thereof in both an upper and lower position, the lower position being illustrated by dotted lines.

FIG. 3 is a side elevational view of the foot actuated press assembly showing an operator in the process of initiating a pressing action against a conventional automatic transmission clutch assembly.

FIG. 4 is an enlarged fragmentary sectional view of the foot actuated press assembly wherein a conventional automatic transmission clutch assembly supported thereon is engaged by the work piece engager of the foot actuated press assembly.

FIG. 5 is a perspective view of the foot actuated press assembly illustrating the use of an attaching structure to press an automatic transmission clutch assembly having a drive shaft associated therewith and extending therefrom.

Fig. 6 is a side elevational view of the foot actuator press assembly and the attaching structure shown and illustrated in FIG. 5.

FIG. 7 is a side elevational view of the foot actuated press assembly particularly illustrating its ability to receive and accommodate the entire transmission housing and to operatively engage the clutch assembly integrally constructed therein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With further reference to the drawings, particularly FIG. 1, the foot actuated press assembly of the present invention is shown therein and indicated generally by the numeral 10. Prior to giving a detail description of the parts and components of the foot actuated press as-

sembly 10, it might be beneficial to review the basic components thereof. In this regard, it is seen that the foot actuated press assembly includes a frame structure 12 having a horizontal work piece support means 14 disposed about the top thereof. A foot actuated pedal means 20 is pivotably mounted to the frame structure 12 and adapted to move an intermediate connecting means 16 vertically up and down. Operatively connected to the top portion of the intermediate connecting means 16 is a work piece engager means 18 that is adapted to apply a downward pressing action against a particular work piece such as a clutch assembly, a pump assembly or the like.

Turning to a detail discussion of the frame structure 12, it is seen that the foot actuated press assembly 10 comprises an elongated cylindrical tube 22 that has a floor plate 24 welded or secured by other suitable means to the lower end thereof. Spaced apart bolt openings 26 and 28 are provided in the floor plate 24 in order that the entire foot actuated press assembly 10 may be bolted to the floor for permanent installation.

As illustrated in FIG. 1, the cylindrical tube 22 has a pair of spaced apart brackets 30 bolted to the lower portion thereof, the brackets being adapted to receive a pivot pin 50 therebetween for mounting the foot actuated pedal means 20. Adjacent and opposite the brackets 30 are a pair of aligned elongated openings 32 formed within the cylindrical tube 22 for receiving the foot actuated pedal means therethrough.

Fixed to intermediate portions of the cylindrical tube 22 and extending therefrom are a plurality of L-shaped hangers 34 which are adapted to receive the work piece engaging members which will be discussed in greater detail subsequently herein.

The cylindrical tube 22 further includes a pair of access openings 38 disposed on opposite sides of the tube just below the area where the foot actuated pedal means extends through the tube. As will become apparent from the complete disclosure herein, the access openings 38 enable one to gain access and service a connecting point between the foot pedal means 20 and a plunger rod of the intermediate connecting means 16.

Next referring to the work piece support means 14, it is seen that the same includes a generally flat work piece support plate 40 which is fixed to an upper pipe coupling 36 which is in turn secured by weldment or other suitable means to the top of the cylindrical upright tube 22. Work piece support plate 30 includes an opening 42 disposed in generally co-axial alignment with the cylindrical tube 22, and a deep U-shaped cut-out 44 formed about a lateral extending portion of the support plate 40.

Turning to the foot actuated pedal means 20 the same comprises a foot lever 46 that includes a plate 48 fixed to the outermost remote end, the foot lever extending through the elongated openings 32 formed within the cylindrical tube 22 and pivotably mounted about the axis of the pivot pin 50 extending between the spaced apart brackets 30. As illustrated in FIG. 2, the foot pedal means 20 is spring biased to an up position by a coil spring 52 that is fixed to the foot lever 46 at a point just outside of the cylindrical tube and wherein the other end of the coil spring is secured about a tab 54 fixed to the outer portion of the cylindrical tube in alignment with the foot lever 46.

With respect to the intermediate connecting means 16, it is seen that this part of the foot press assembly 10

comprises a plunger rod 56 that is disposed interiorly of the cylindrical tube 22 and extends up generally co-axially therethrough where the upper end thereof extends through the opening 42 formed in the work piece support plate 40. The lower portion of the plunger rod 56 includes a yoke 58 that is pivotably connected to the foot lever 46 of the foot pedal means 20 by a pivot pin 60, as best illustrated in FIG. 2. The upper end of the plunger rod 56 includes a series of axially spaced apertures 62 formed therein which as will become apparent from the subsequent portions of the disclosure enables the work piece engager means 18 to be adjusted relative to the height of the particular work piece being operated upon.

The work piece engager means 18 just referred to comprises a generally U-shaped structure that in operation, as indicated in FIG. 4, assumes an inadvertent posture. The U-shaped engager means 18 includes a transverse base 64 having a central opening 66 formed therein, the opening 66 enables the U-shaped engager means 18 to be received by the plunger rod 56 and held from lateral movement thereby. As viewed in FIG. 4, extending from the outer portions of the transverse base 64 are a pair of legs 68 and 70 which are particularly spaced apart to engage the center portion of the particular work piece being operated upon. It should be pointed out at this point that the foot actuated press assembly 10 of the present invention preferably includes a series of different work piece engager means with the legs of each being spaced apart a particular distance to accommodate a certain size work piece. This, of course, would allow the foot actuated press assembly 10 to accommodate work pieces of various sizes and dimensions. To assure that in the pressing operation that the inverted U-shaped engager means 18 is compelled to move downwardly with the downward stroke of the plunger rod 56, a detachable retaining pin 72 is provided to fit through any of the apertures 62 formed in the top end portion of the plunger rod.

With the reference to FIG. 4, an automatic transmission clutch assembly is indicated generally by the numeral 98 and shown in section therein and generally represents the type of work piece that the foot actuated press assembly 10 of the present invention is capable of accommodating and operating upon. Clutch assembly 98 includes a generally outer circular housing 100 having a central cylindrical opening 102 formed therein. Disposed interiorly of the clutch housing 100 is a clutch cylinder 104 which basically includes a series of circumferentially spaced springs 107 disposed about a series of upstanding stud pins (not shown). The clutch cylinder 104 is firmly held within the clutch housing 100 by the compressing action of the springs 106 against an adjacent circular retainer 108 that engages a snap ring 110 about its upper inner edge. The snap ring 110 is held within the clutch housing 100 by a circular groove 112 that is formed on the outside of the collar which forms the central cylindrical opening 102. Therefore, it is seen that to remove the clutch cylinder 104, the snap ring 110 must be removed first. Because of the spring pressure against the retainer 108, the snap ring 110 cannot be removed until the retainer 108 is displaced by compressing the plurality of springs 106 thereunder.

To compress the springs 106 of the clutch cylinder 104 a particular size work piece engager means 18 is selected such that the lower ends of the legs 68 and 70

squarely engage the retainer 108 when the base 64 is placed around the upper portion of the plunger rod 56. The retaining pin 72 is then placed in an appropriate aperture 62. To press the springs and achieve a pressing action, the operator, as viewed in FIG. 3, places one foot on the plate 48 of the foot lever 46 and generally presses down to where the foot pedal means 20 assumes the lower position, as shown in dotted lines in FIG. 2. The downward movement of the foot lever 46 results in the plunger rod 56 being accordingly pulled downward and because of the retaining pin 72 the inverted U-shaped work piece engager means 18 engages the clutch assembly retainer 108 and presses the springs 106 downwardly. After the springs have been compressed and the retainer 108 is downwardly displaced from engagement with the snap ring 110, the operator can maintain this pressing force by keeping the foot pedal means 20 in the lower position. While maintaining this pressing force, the hands of the operator are free to use tools such as pliers, etc., to remove the snap ring 110 from the groove 112. After the snap ring 110 has been properly removed, it follows that the retainer and clutch cylinder 104 can be removed from the clutch housing 100 and the entire clutch assembly 98 can be repaired or overhauled even to the extent of replacing the seals therein.

In FIG. 7, the foot actuated press assembly 10 of the present invention is shown accommodating a clutch assembly 98 of the type integrally constructed with a transmission housing 114. In this case, the clutch assembly 98 cannot be properly removed from the transmission housing and placed on the work piece support plate 40 as discussed above and particularly illustrated in FIG. 4. To accommodate this situation, the press assembly 10 of the present invention is particularly adapted to receive and support the entire transmission housing 114 with the integrally constructed clutch assembly incorporated therein. In this case, the transmission housing 114 is turned up on end such that the clutch assembly 98 lies in the lower portion thereof. Then the clutch housing 114 is placed up above the plunger rod 46 and slowly lowered down onto the work piece support 40 such that the plunger rod 56 extends through the transmission housing and through the central opening formed in the clutch assembly 98. The pressing of the clutch assembly 98 is then performed just as discussed in the case of the separated clutch assembly shown in FIG. 4.

In some cases, the removed clutch assembly 98 has a drive shaft incorporated therein and extending therefrom such as particularly illustrated in FIGS. 5 and 6. In these cases, it is clear that the clutch assembly cannot be positioned as in FIGS. 4 and 7 because of the presence of the plunger rod 56. Therefore, to accommodate clutch assemblies having a drive shaft incorporated therein, the press assembly 10 of the present invention provides an outward extension to the work piece support plate 40 that includes a deep U-shaped cutout 44 formed therein. The clutch assembly 98 having the shaft 116 depending therefrom is placed on the work piece support plate 40 such that the shaft 116 extends downwardly through the cutout 44.

To translate the pressing action of the foot pedal means 20 to the clutch assembly and shaft 116, the intermediate connecting means 16 includes an attachable secondary connecting structure 74 (FIGS. 5 and 6) for the foot actuated press assembly. Viewing this sec-

dary connecting structure 74 in greater detail, it is seen that the same includes an open rectangular frame having a pair of laterally spaced vertical members 76 and 78 joined by lower and upper transverse members 80 and 82. An opening 84 is provided in the lower transverse member 82 for receiving a connecting link 86 which includes a yoke 88 pivotably mounted to the foot lever 46 by a pivot pin 90. The upper portion of the connecting link 86 includes a series of openings 92 for adjusting the height thereof with respect to the work piece support plate 40. To connect the open rectangular frame 74 with the connecting link 86, there is provided a retaining pin 94 adapted to be received by any one of the apertures 92. It is, therefore, seen that the presence of the retaining pin 94 assures that the downward movement of the foot pedal means 20 will also pull the open rectangular frame 74 downwardly.

As seen in FIGS. 5 and 6, the open rectangular frame 74 is particularly disposed such that the upper transverse member 82 includes a short round stud 96 formed on the underside thereof for extending through the opening 66 formed in the transverse base 64 of the U-shaped engager means 18.

Consequently then, it is seen that the open rectangular frame 74 enables a pressing action to be translated from the foot pedal means 20 to the upper work piece support plate 40 completely independent of the plunger rod 56. The particular embodiment illustrated in FIGS. 5 and 6 is, of course, used when the clutch assembly 98 has the downwardly extending shaft 116. The pressing action in this case is achieved and accomplished just as discussed with the clutch assembly 98 shown in FIG. 4. In view of this, a step-by-step discussion of the pressing action will not be treated because such will only be repetitious.

From the foregoing specification, it is seen and appreciated that the foot actuated press assembly 10 of the present invention presents a special tool that is adapted to accommodate various types and designs of work pieces especially of the clutch and pump type. The press assembly 10 enables one operator to perform the pressing operation in a stable and safe manner by using his foot only. This enables the hands of the operator to be free to manipulate and work on other parts of the work piece. In this disclosure, the problems associated with the break down of an automatic transmission clutch assembly has been focused on and it is clear that the press assembly shown herein enables one to easily and conveniently press the clutch cylinder to such a degree that the snap ring of the clutch assembly can be easily and quickly removed. It should be understood, however, that the press assembly 10 can be used to press other mechanical structures and mechanisms as well.

The terms "upper," "lower," "forward," "rearward," etc. have been used herein merely for the convenience of the foregoing specification and in the appended claims to describe the foot actuated press and its parts as oriented in the drawings. It is to be understood, however, that these terms are in no way limiting to the invention since the foot actuated press may obviously be disposed in many different positions when in actual use.

The present invention, of course, may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are,

therefore, to be considered in all respects as illustrative and not restrictive and all changes coming within the meaning and equivalency range are intended to be embraced herein.

What is claimed is:

1. A foot actuated press assembly adapted to engage a work piece and to exert a pressing force thereagainst, said foot actuated press comprising: a frame structure including an upright cylindrical tube having a bottom horizontal floor plate adapted to be secured to a floor and to support said cylindrical tube in an upright fashion; means associated with said frame structure for supporting said work piece, said means for supporting said work piece extending across said cylindrical tube and including an opening therein, said work piece supporting means further including an extension extending from said upright cylindrical tube and including a cutout therein for receiving a work piece having a shaft extending therefrom such that when supported the shaft of said work piece extends downwardly through said cutout; a foot actuated pedal means movably mounted to said frame structure; intermediate connecting means movably responsive to the actuation of said foot actuated pedal means for movement relative to said frame structure and including a plunger rod operatively connected to said foot actuated pedal means and disposed interiorly of said cylindrical tube, said plunger rod extending through said opening in said means for supporting said work piece; a work piece engager means associated with said intermediate connecting means for engaging the work piece and exerting a pressing action thereagainst in response to the actuation of said foot actuated pedal means; and a secondary connecting structure means for interconnecting said foot actuated pedal means with said work piece engager means when the work piece is of the type having a shaft extending therefrom and the work piece is supported on said extension of said work piece support means, said secondary connecting structure means including an open rectangular frame having a pair of laterally spaced vertical members connected by lower and upper transverse members, said lower transverse members being operatively connected to said foot actuated pedal means by an interconnecting link and said upper transverse member having means for receiving said work piece engager means about the underside thereof.

2. The foot actuated press assembly of claim 1 wherein said work piece engager means includes a generally inverted U-shaped member comprising a base having a pair of legs extending therefrom, the space between said legs of said inverted U-shaped member being preselected to engage that portion of the work piece that is to be pressed.

3. The foot actuated press assembly of claim 2 wherein said connecting link between said open rectan-

gular frame structure and said foot actuated pedal means includes means for adjusting the height of said open rectangular frame with respect to said work piece support means such that the press defined thereby may accommodate work pieces of various heights.

4. The foot actuated press assembly of claim 3 wherein said foot actuated pedal means is pivotably mounted about a horizontal axis to said frame structure and is pivotable thereabout between upper and lower positions; and wherein said press assembly includes a spring operatively interconnected between said frame structure and said foot pedal means for biasing the same to an upper position.

5. The foot actuated press assembly of claim 1 wherein said cylindrical tube is hollow, and said plunger rod is movable vertically up and down therein by the actuation of said foot pedal means.

6. The foot actuated press assembly of claim 5 wherein said foot actuated pedal means is pivotably mounted about a horizontal axis to said frame structure and movable about said horizontal axis between upper and lower positions, said foot actuated pedal means further being connected to a lower portion of said plunger rod for moving the same vertically up and down; and wherein said foot actuated press assembly includes spring means interconnected between said frame structure and said foot actuated pedal means for biasing the latter to said upper position.

7. The foot actuated pedal assembly of claim 6 wherein said support means includes a horizontal flat top support plate extending over an upper portion of said upright cylindrical tube, said horizontal flat support plate having an opening therein for receiving said plunger rod which extends upwardly past said horizontal support plate a predetermined distance.

8. The foot actuated press assembly of claim 7 wherein said work piece engager means includes an inverted U-shaped bracket member comprising a base having an opening formed therein and a pair of legs depending therefrom, said inverted U-shaped bracket member being retained about said plunger rod by placing the plunger rod through said opening formed in the base thereof, said inverted U-shaped bracket member being held in vertical spaced apart relationship relative to said horizontal support plate by a detachable pin extending through said plunger rod below and adjacent said base, whereby the work piece with a central opening therein may be placed around said plunger rod and supported by said flat horizontal plate such that said inverted U-shaped bracket member is retained by the plunger rod thereabove and is operative to exert a pressing action against the work piece in response to the downward movement of said foot actuated pedal means by the operator.

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