Nov. 27, 1934. J. A. WEBER 1,982,488

HOLD-DOWN PLUG FOR PUNCH PRESSES AND THE LIKE

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Fig. 2.

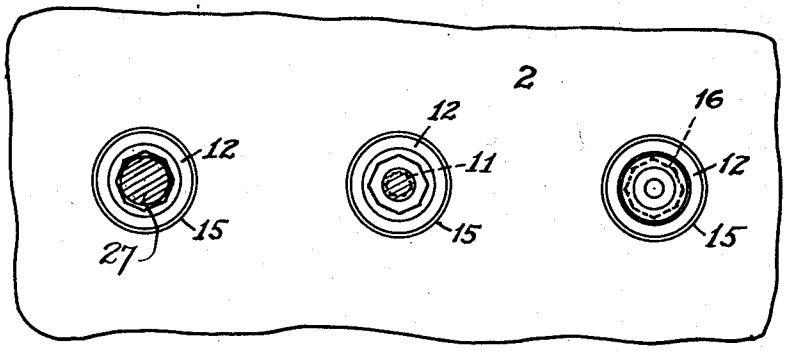


Fig. 1.

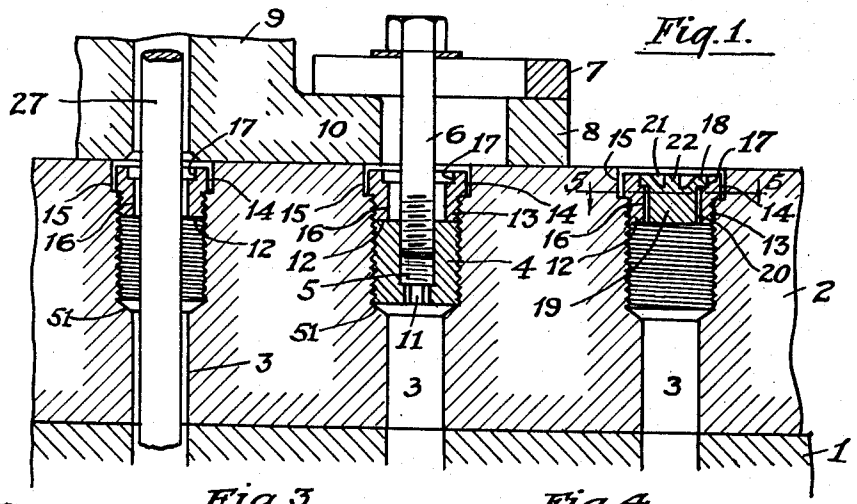


Fig. 3.

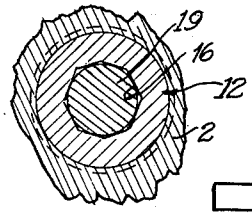
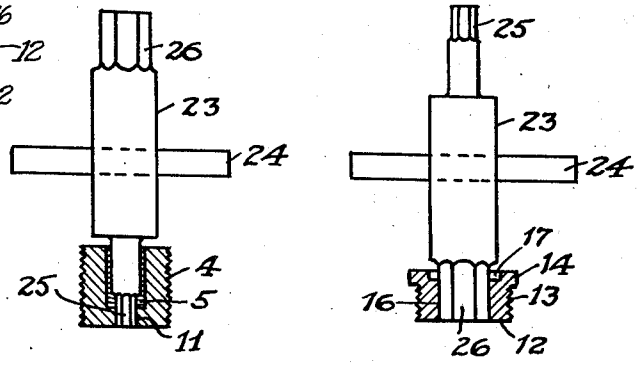


Fig. 5.

Fig. 4



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HOLD-DOWN PLUG FOR PUNCH PRESSES AND THE LIKE

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8 Claims. (Cl. 164—85)

This invention relates to hold-down plugs for punch presses and the like and is especially applicable to presses of the larger type used in automobile and other plants, although its use is not to be confined to this particular type.

In presses of the kind referred to the bolster plates and rams are provided with a series of tapped holes, spaced at equal distances and extending over practically their entire surfaces, into which holes bolts are inserted in selective locations for the purpose of securing the die shoes and punches in their proper positions in the machine. These tapped holes are subject to considerable wear due to taking off and replacing or otherwise changing the dies, with the result that the threads become worn in the holes most often used so that it becomes necessary quite frequently to remove the parts in question from the press and re-work the holes, that is to say, to drill out the worn threads and re-tap the holes to receive bolts of a larger size.

Apart from the great expense of this re-working operation and the resulting hold-up of production while it is being done, a very objectionable feature lies in the resulting variation in diameters of bolts and a consequent confusion and extra expense of setting up the press for a given job. Further, in cases where the urgency of the work precludes the possibility of re-working the holes, it is sometimes necessary to set the dies and punches off the center of the press in order to match the same up with holes which are in good condition, which sometimes results in an inferior quality of the work produced or even in breakage of the parts.

The principal object of my invention is to provide a series of standardized plugs of larger diameter than the holding-down bolts and internally threaded to receive the said bolts, which plugs may be inserted in the appropriate tapped holes in the ram and in the bolster, and which may be retained in position so long as the particular job in hand remains in production, so that the wear and tear due to removal and re-insertion of the bolts comes on the plugs instead of upon the ram and bolster, and since these plugs may be made of heat-treated steel or other durable material, the life of the parts is very much increased, and in some cases, also, smaller bolt diameters and finer pitch of threads may be employed, resulting in considerable economy.

Another object of my invention is to provide locking means for securing the standard plugs in position, which locking means may be employed alone for the purpose of acting as guides for the pressure pins which pertain to the pneumatic or other cushion system of the press, for which special holes are usually provided.

A further object of my said invention is to provide means for protecting certain of the tapped holes in the bolster which are not being employed for holding-down purposes, but which may be exposed to slugs, chips, or dirt which are otherwise liable to fall down the holes and work their way under the bolster with resulting unevenness of pressure upon the parts and probable damage to the cushion system.

With these and other objects in view, the invention consists in the improved construction, arrangement, and combination of parts which will be hereinafter fully described, reference being had to the accompanying drawing, which illustrates a preferred embodiment thereof, in which drawing—

Figure 1 is a partial transverse section of the bolster and associated parts of a press equipped with my improved hold-down plugs.

Figure 2 is a partial plan view of the bolster illustrating the details of my improved plugs, and

Figures 3 and 4 are diagrams showing the operation of a special wrench which I employ in conjunction with my improved plugs.

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Similar characters designate corresponding parts throughout the several views.

1 is the bed of the press and 2 is the bolster plate having a series of spaced holes 3, the upper portions of which are tapped to receive my improved plugs. 4 is a plug, externally threaded to fit the holes and having the internally threaded portion 5 adapted to receive the holding-down bolt 6 which, in cooperation with the U clamp 7 and spacer 8, secure the die shoe 9 in position upon the bolster, the said clamp engaging the flange 10 upon the shoe in the manner well known in the art. In the lower end of the plug 4 is a hexagonal hole 11 by means of which the plug is inserted or removed, as will be hereinafter explained. 12 is a shorter plug having the externally threaded portion 13 adapted to be screwed into the tapped holes in the bolster plate, and this plug, when used in conjunction with one of the plugs 4 (as illustrated in the center of Figure 1), acts as a jam nut to secure the latter in place and prevent it from backing out. The plug 12 is also provided with a head 14 of cylindrical shape adapted to fit within a counterbore 15 which is common to all of the tapped holes 3. In the plug 12 is also an octagonal hole 16 adapted to receive a wrench for screwing it in place, as will be hereinafter explained. It will be observed by reference to the drawing that the parts are so proportioned that the plug 4 bears upon the shoulder 51 at the bottom of the threaded portion, and that when the plug 12 is screwed into position to lock the main plug, the head 14 is slightly below the upper surface of the bolster.

Above the octagonal hole 16 is a cylindrical re-

cess 17. This recess is for the purpose of receiving the cylindrical head 18 of a solid plug 19, the said plug having a cylindrical body 20 fitting tangentially within the octagonal hole 16 of the plug 12 (as shown in Figure 5). This solid plug is used in conjunction with one of the short plugs 12 in holes which are not being used for holding-down purposes but which are exposed to dirt and chips during the operation of the press, preventing the entrance of such matter into said holes. The plug 19 is provided in its upper surface with an annular groove 21 which defines a button or handle 22 by which the plug may be removed and inserted as required.

At the left hand in Figure 1 is shown one of the standard holes which is not being used for holding-down purposes but through which a pressure pin 27 passes, the said pressure pin forming a part of the cushion system hereinbefore referred to. In this position is inserted one of the short plugs 13, the internal octagonal opening of which acts as a guide for the said pin since the sides of the opening have tangential contact with the pin.

It will be understood from the foregoing description that I have provided means whereby a single set of component parts may be employed and combined in various ways in a set of standardized holes in the bolster plate of the press, and which may also be employed in part in the ram of a press. In Figures 3 and 4 is shown a special wrench 23, for use with my improved plugs, having a hole for the reception of a transverse lever 24 and having at one extremity a hexagonal portion 25 adapted to co-operate with the holes 11 in the plugs 4, and at the other extremity an octagonal portion 26 which co-operates with the holes 16 in the short plugs 12.

While I have herein described and shown a preferred embodiment of my invention, it will be readily understood by those skilled in the art that the same may be modified in various ways to meet any particular or peculiar requirement, without departing from the spirit of my invention.

Having thus described my said invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a press, the combination, with a member having a series of tapped holes in spaced relation, the said holes having cylindrical counterbores at their upper ends, of a plug externally threaded to fit within any one of the said holes and having a head adapted to bear against the bottom of said counterbore, said plug having a polygonal aperture for co-operation with wrench means to turn it, and a pressure pin having tangential contact with the sides of said aperture for guiding said pin.

2. In a press, the combination, with a member having a series of tapped holes in spaced relation, the said holes having cylindrical counterbores at their upper ends, of a plug externally threaded to fit within any one of the said holes and having a head adapted to bear against the bottom of said counterbore, said plug having a polygonal aperture for co-operation with wrench means to turn it and a cylindrical recess defined by a shoulder, and a cylindrical dirt-excluding plug fitting tangentially within said polygonal aperture and having a head adapted to rest upon said shoulder.

3. In a press, the combination, with a member having a series of tapped holes in spaced relation, of a plug adapted to be screwed into the lower portion of one of said holes, a second plug adapted to be screwed into the upper portion of said hole and having a polygonal aperture therein, and a dust-excluding plug adapted to fit within said aperture and close the same, the first and second named plugs being adapted for use separately or in combination.

4. In a press, the combination with a member having a series of tapped holes in spaced relation, of a plug externally threaded to fit within any one of the holes and having a polygonal aperture adapted to cooperate with wrench means for turning the same, an auxiliary plug also externally threaded to fit said holes engageable with the plug aforesaid to lock the same in place and having a counterbored annular recess at the upper end, and a cylindrical dust excluding plug fitted within said annular recess.

5. In a press, the combination with a member having a series of tapped holes in spaced relation, of a plug externally threaded to fit within any one of said tapped holes, said plug having a tapped opening in the upper end thereof for receiving a bolt and having a polygonal aperture adapted to cooperate with wrench means for turning the plug, an auxiliary plug externally threaded to fit in said holes above the plug aforesaid to engage the same and having a polygonal opening therethrough to provide for the passage of the bolt and to also cooperate with suitable wrench means for turning said auxiliary plug, and a dust excluding plug having a cylindrical portion adapted to fit within a counterbored recess in the upper end of the auxiliary plug when said bolt is omitted from the assembly.

6. In a press of the type wherein members are adapted to be clamped in different positions upon a plate by means of bolts and also of the type embodying pressure pins, a plate having a plurality of spaced tapped openings for alternately receiving pressure pins and threaded plugs with tapped openings for threadedly receiving said bolts, and additional plugs threaded in said openings having apertures therethrough predetermined to form guides for the pins and said latter plugs also engageable with the first named plugs to lock the latter in said plate.

7. In a press of the type wherein members are adapted to be clamped in different positions upon a plate by means of bolts and also of the type embodying pressure pins, a plate having a plurality of spaced tapped openings for alternately receiving pressure pins and threaded plugs with tapped openings for threadedly receiving said bolts, additional plugs threaded in the openings in said plate and having apertures therethrough predetermined to form guides for the pins and said latter plugs also engageable with the first named plugs in the openings for locking the latter in place and dust-excluding plugs insertable into the apertures of the second named plugs located in those openings in the plate not in use.

8. In a press of the type wherein members are adapted to be clamped in different positions upon a plate by means of bolts, a plate having a plurality of spaced tapped openings, plugs threaded within certain of said openings and tapped to threadedly receive the bolts, additional plugs threaded in the openings for locking the first named plugs in the plate and apertured to provide for the passage of the bolts therethrough, and dust-excluding plugs insertable into the openings in the second named plugs located in those openings in the plate not in use.

JOHN A. WEBER.