

PATENT SPECIFICATION (11)

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(54) PORTABLE PRESS

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumicho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to presses, and more specifically to a portable press for particular use in such operations as trimming and perforating extruded frame members of sash windows or the like at sites of building construction.

For installation of the outer frames of sash windows or the like in buildings, the current practice is to use frame members which have been produced by extrusion to standard sizes. Particularly in the case of private houses which have been rebuilt or enlarged however outer window frames cannot sometimes be assembled and installed properly with the use of such standardized frame members. These frame members must then be cut to size or trimmed.

Relatively simple trimming jobs can be done on the site of the building, by means of simple tools which require no great operating force. For more complex jobs, however, or for those which require machinery capable of exerting greater forces, the frame members have had to be carried over to the local agent or some other establishment equipped to perform such jobs.

The present invention seeks to provide portable press apparatus capable of performing various operations such as trimming and perforating.

According to the invention there is provided a portable press apparatus comprising a top and a bottom plate fixedly spaced apart, a fluid actuated cylinder mounted on the top plate and having a ram extending through the top plate into the space between the plates and means for releasably mounting between the plates a cutting or punching assembly of two parts, one of which is floatingly supported for actuation by the ram.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:—

Figure 1A is a perspective view of a frame assembly of a portable press apparatus embodying the principles of this invention;

Figure 1B is a perspective view of one form of a cutting assembly for installation in the frame assembly shown in Figure 1A;

Figure 1C is a perspective view of a punching assembly;

Figure 2 is a fragmentary side elevational view, partly in section, of the press apparatus having the punching assembly of Figure 1C installed in position in the frame;

Figure 3A is a fragmentary perspective view of an extruded window frame member which has been trimmed by the press apparatus;

Figure 3B is a fragmentary perspective view of the extruded window frame member of Figure 3A which has been further perforated by the apparatus;

Figure 4 is an enlarged vertical cross-sectional view of the cutting assembly of Figure 1B as installed in the frame assembly, the view showing the extruded window frame member of Figure 3A held in position on the cutting assembly for trimming operation; and

Figure 5 is a view similar to Figure 4 but showing the extruded window frame member after the trimming operation.

With reference initially to Figures 1A to 1C of the drawings, a preferred form of the portable press apparatus according to the invention broadly comprises a frame assembly 10 having a hydraulic cylinder 11 mounted uprightly thereon, a lever operated pump 12 for actuating the hydraulic cylinder, and a plurality of interchangeable cutting or punching assemblies 13 and 14 to be selectively mounted in the frame assembly 10, each for performing a particular machining operation.

The frame assembly 10 comprises a pair of rectangular top plate 15 and bottom plate 16 which are rigidly interconnected by a plurality of columns 17 extending between the corresponding corners of the top and bottom plates, so that a space is provided therebetween.

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tween for installation therein of either of the cutting or punching assemblies 13 and 14. At least one positioning boss 18 is formed on the bottom plate 16 to permit
5 any selected punch-die assembly to be mounted and retained in position in the frame assembly 10.

As shown in Figure 2, the hydraulic cylinder 11 fixedly mounted on the top plate 15
10 of the frame assembly 10 has a ram or plunger 19 connected to its piston, not shown, and this ram slidably extends downwardly through a central bore 20 of the cylinder 11.

With reference back to Figures 1A to 15
1C, the head end fluid chamber of the hydraulic cylinder 11 is in communication with the pump 12 of known construction by way of a delivery conduit 21. The pump 12 is provided with a lever 22 which can be
20 actuated manually in the usual manner to deliver pressurized hydraulic fluid into the hydraulic cylinder 11 and thereby to cause descent of its ram 19 into the frame assembly 10.

25 The two cutting or punching assemblies shown in Figures 1B and 1C are shown to be merely illustrative of a wide variety of such assemblies which can be employed in the press apparatus according to this invention. The representative cutting assembly 13
30 of Figure 1B is for use in trimming unnecessary portions of upstanding walls 23 of a workpiece 24 shown in Figure 3A as an extruded window frame member, whereas the
35 punching assembly 14 is for use in piercing or punching holes 26 in the plane portion of the workpiece 24 which has been formed by removal of the unnecessary unstanding wall portions.

40 As will be seen from both Figures 1A and 1B and Figure 4, the cutting assembly 13 has a rectangular mounting plate 27 on which are arranged a cutter die 28, a floating cutter holder 29 carrying a set of trimming cutters
45 30, and a work holder mechanism 31. The cutter die 28, fixedly mounted on the mounting plate 27, is relatively deeply slotted or grooved at 32 to accommodate the upstanding walls 23 of the workpiece 24.

50 Arranged in side-by-side relationship to the die 28, the floating cutter holder 29 is slidably mounted on a pair of upright guide posts 33 on the mounting plate 27 for up-and-down motion relative to the die. Compression springs 34 are coiled around the
55 respective lower end portions of the guide posts 33 for biasing the floating cutter holder upwardly. The set of trimming cutters 30 carried by this floating punch holder are stacked up vertically and cooperate to define
60 cavities 35 for receiving with clearance the portions 23' of the upstanding walls 23 of the workpiece 24 to be cut off.

65 The work holder mechanism 31, arranged opposite to the floating cutter holder 29,

comprises a support block 36 fixedly mounted on the mounting plate 27, a presser 37 slidably supported by the support block for movement toward and away from the set of trimming cutters 30, and a threaded rod 38
70 to be turned manually to cause the presser to move toward and away from the trimming cutters for holding or releasing the workpiece.

The threaded rod 38 extends horizontally
75 through a tapped hole 39 in the support block 36 and has one of its ends inserted into a clearance hole 40 in the presser 37 for abutting contact with its closed end. The open end of the clearance hole 40 is flared
80 at 41 to engage a stop 42 on the threaded rod 38, so that the rod is restrained from withdrawal out of the clearance hole. Fixedly mounted on the other end of the threaded
85 rod 38, projecting out of the tapped hole 39, is a knob 43 which may be shaped like a wing nut as shown. Thus, by the manual turn of this knob 43 in either direction, the
90 presser 37 can be moved back and forth with respect to the set of trimming cutters 30 carried by the floating cutter holder 29. The presser 37 is recessed at 44 to accommodate projections 45 formed on that side of
95 the workpiece 24 opposite to its upstanding walls 23.

The punching assembly 14 shown in Figure 1C is further illustrated in Figure 2 as installed in its working position in the frame
100 assembly 10. With reference therefore to both Figures 1C and 2, the punching assembly 14 has a die 46 fixedly mounted on a rectangular mounting plate 47, and a floating punch holder 48 carrying a perforating punch or punches 49 and arranged for up-and-down motion with respect to the die 46.
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The die 46 is slotted or grooved at 50 to accommodate the end portions of the upstanding walls 23 of the workpiece 24 and is additionally formed with holes 51 into
110 which the punches 49 are to be thrust as they pierce the workpiece.

Over the die 46 the floating punch holder 48 is slidably mounted on a pair of upright guide posts 52 erected on the mounting plate 47 and is thereby constrained to movement
115 toward and away from the die 46. A pair of compression springs 53 are coiled around the respective guide posts 52 for biasing the floating punch holder 48 away from the die 46. Each of the mounting plates 27 and
120 47 of the punch-die assemblies 13 and 14 has a positioning recess, not shown, formed in its bottom face for receiving the positioning boss 18 on the bottom plate 16 of the frame assembly 10 when the punching
125 assembly is installed in position thereon.

In operation, for trimming the unnecessary portions 23' of the upstanding walls 23 of the workpiece 24, the cutting assembly 13 is installed between the top and bottom plates
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15 and 16 of the frame assembly 10, with the positioning boss 18 on the bottom plate fitted in the unshown positioning recess in the mounting plate 27 of the punch-die assembly. The cutting assembly 13 is further engaged by all or some of the columns 17 of the frame assembly 10 so as to remain in position on the bottom plate 16.

The upstanding walls 23 of the workpiece 24 are then inserted into and through the slots 32 in the die 28 of the cutting assembly 13 so that their unnecessary portions to be removed will be received in the cavities 35 in the trimming cutter set 30 carried by the floating cutter holder 29. The knob 43 on the threaded rod 38 is then turned manually in such a direction that the presser 37 is urged toward the trimming cutter set 30. The workpiece can thus be caught tightly between the punches 30 and the presser 37 of the work holder mechanism 31.

The lever 22 on the pump 12 is now operated to supply pressurized fluid into the head end chamber of the hydraulic cylinder 11 via the delivery conduit 21, thereby causing descent of the ram 19 into the frame assembly 10. Since this ram overlies the floating cutter holder 29 of the cutting assembly 13 mounted in position on the bottom plate 16, as will be seen from Figure 4, the cutter holder with the trimming cutter set 30 is simultaneously forced down relative to the work holder mechanism 31 and the die 28 against the bias of the compression springs 34.

Figure 5 illustrates the unnecessary portions 23¹ of the upstanding walls 23 removed from the workpiece 24 by the trimming cutters 30 which have been depressed as aforesaid by the ram 19. The threaded rod 38 of the work holder mechanism 31 is then loosened by the turn of the knob 43 to cause retreat of the presser 37 away from the trimming cutter set 30 and thus to permit the trimmed workpiece to be withdrawn from the punch-die assembly 13 in the frame assembly 10.

For punching the holes 26 in the plane portion of the workpiece 24 which has been formed by removal of the unnecessary upstanding wall portions 23¹ as above, the punching assembly 14 is installed in position in the frame assembly 10 in the above described manner. Then, as will be seen from Figure 2, the plane portion of the workpiece 24 is placed over the die 46, with the adjacent end portions of its upstanding walls 23 accommodated in the die slots 50. With the workpiece thus held in position over the die 46, the pump 12 is manually operated to actuate the hydraulic cylinder 11. By the ram 19 of this cylinder 11 the floating punch holder 48 is forced down against the bias of the compression springs 53 to thrust the punches 49 into the holes 51 in the die 46 through the workpiece. The

desired holes 26 are thus formed in the plane portion of the extrusion 24. The perforated workpiece can be readily withdrawn from the punching assembly 14 as the ram 19 is subsequently retracted into the hydraulic cylinder 11.

Although particular adaptations of this invention have been described and illustrated herein, it is recognized that numerous modifications and variations may readily occur to those skilled in the art. For example, in the cutting assembly 13, a pair of dies similar to the die 28 may be provided on opposite sides of the floating cutter holder 29 so that the upstanding walls 23 of the workpiece may be trimmed anywhere between its ends. Furthermore, the dies 28 and 46, the cutters 30 and the punches 49 and the presser 37 of the punching or cutters assemblies 13 and 14 may be made readily replaceable to adapt the assemblies for use with various known types of extruded window frame members or the like.

WHAT WE CLAIM IS:—

1. A portable press apparatus comprising a top and a bottom plate fixedly spaced apart, a fluid actuated cylinder mounted on the top plate and having a ram extending through the top plate into the space between the plates and means for releasably mounting between the plates a cutting or punching assembly of two parts, one of which is floatingly supported for actuation by the ram.
2. A press according to Claim 1, wherein a plurality of columns are provided for rigidly interconnecting the top and bottom plates of the frame assembly each column being connected at both ends to the top and bottom plates respectively.
3. A press according to Claim 1 or 2, wherein the fluid actuated cylinder is provided with a source of fluid under pressure by a hand operated pump.
4. A press according to Claim 1, 2 or 3, wherein the cutting or punching assembly further comprises a mounting plate having the die means fixedly mounted thereon; at least one upstanding guide post fixedly mounted on the mounting plate, the cutting or punching means being slidably mounted on the guide post; and a spring means for biasing the cutting or punching means away from the mounting plate, the cutting or punching means being forced down against the bias of the spring means by the ram of the fluid actuated cylinder.
5. A press according to claim 4, wherein the cutting or punching means comprises at least one cutter or punch and a holder carrying the cutter or punch, the guide post slidably extending through the holder.
6. A press according to any one of claims 1 to 4, wherein positioning means are provided for placing and retaining the cut-



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15 and 16 of the frame assembly 10, with the positioning boss 18 on the bottom plate fitted in the unshown positioning recess in the mounting plate 27 of the punch-die assembly. The cutting assembly 13 is further engaged by all or some of the columns 17 of the frame assembly 10 so as to remain in position on the bottom plate 16.

The upstanding walls 23 of the workpiece 24 are then inserted into and through the slots 32 in the die 28 of the cutting assembly 13 so that their unnecessary portions to be removed will be received in the cavities 35 in the trimming cutter set 30 carried by the floating cutter holder 29. The knob 43 on the threaded rod 38 is then turned manually in such a direction that the presser 37 is urged toward the trimming cutter set 30. The workpiece can thus be caught tightly between the punches 30 and the presser 37 of the work holder mechanism 31.

The lever 22 on the pump 12 is now operated to supply pressurized fluid into the head end chamber of the hydraulic cylinder 11 via the delivery conduit 21, thereby causing descent of the ram 19 into the frame assembly 10. Since this ram overlies the floating cutter holder 29 of the cutting assembly 13 mounted in position on the bottom plate 16, as will be seen from Figure 4, the cutter holder with the trimming cutter set 30 is simultaneously forced down relative to the work holder mechanism 31 and the die 28 against the bias of the compression springs 34.

Figure 5 illustrates the unnecessary portions 23¹ of the upstanding walls 23 removed from the workpiece 24 by the trimming cutters 30 which have been depressed as aforesaid by the ram 19. The threaded rod 38 of the work holder mechanism 31 is then loosened by the turn of the knob 43 to cause retreat of the presser 37 away from the trimming cutter set 30 and thus to permit the trimmed workpiece to be withdrawn from the punch-die assembly 13 in the frame assembly 10.

For punching the holes 26 in the plane portion of the workpiece 24 which has been formed by removal of the unnecessary upstanding wall portions 23¹ as above, the punching assembly 14 is installed in position in the frame assembly 10 in the above described manner. Then, as will be seen from Figure 2, the plane portion of the workpiece 24 is placed over the die 46, with the adjacent end portions of its upstanding walls 23 accommodated in the die slots 50.

With the workpiece thus held in position over the die 46, the pump 12 is manually operated to actuate the hydraulic cylinder 11. By the ram 19 of this cylinder 11 the floating punch holder 48 is forced down against the bias of the compression springs 53 to thrust the punches 49 into the holes 51 in the die 46 through the workpiece. The

desired holes 26 are thus formed in the plane portion of the extrusion 24. The perforated workpiece can be readily withdrawn from the punching assembly 14 as the ram 19 is subsequently retracted into the hydraulic cylinder 11.

Although particular adaptations of this invention have been described and illustrated herein, it is recognized that numerous modifications and variations may readily occur to those skilled in the art. For example, in the cutting assembly 13, a pair of dies similar to the die 28 may be provided on opposite sides of the floating cutter holder 29 so that the upstanding walls 23 of the workpiece may be trimmed anywhere between its ends. Furthermore, the dies 28 and 46, the cutters 30 and the punches 49 and the presser 37 of the punching or cutters assemblies 13 and 14 may be made readily replaceable to adapt the assemblies for use with various known types of extruded window frame members or the like.

WHAT WE CLAIM IS:—

1. A portable press apparatus comprising a top and a bottom plate fixedly spaced apart, a fluid actuated cylinder mounted on the top plate and having a ram extending through the top plate into the space between the plates and means for releasably mounting between the plates a cutting or punching assembly of two parts, one of which is floatingly supported for actuation by the ram.

2. A press according to Claim 1, wherein a plurality of columns are provided for rigidly interconnecting the top and bottom plates of the frame assembly each column being connected at both ends to the top and bottom plates respectively.

3. A press according to Claim 1 or 2, wherein the fluid actuated cylinder is provided with a source of fluid under pressure by a hand operated pump.

4. A press according to Claim 1, 2 or 3, wherein the cutting or punching assembly further comprises a mounting plate having the die means fixedly mounted thereon; at least one upstanding guide post fixedly mounted on the mounting plate, the cutting or punching means being slidably mounted on the guide post; and a spring means for biasing the cutting or punching means away from the mounting plate, the cutting or punching means being forced down against the bias of the spring means by the ram of the fluid actuated cylinder.

5. A press according to claim 4, wherein the cutting or punching means comprises at least one cutter or punch and a holder carrying the cutter or punch, the guide post slidably extending through the holder.

6. A press according to any one of claims 1 to 4, wherein positioning means are provided for placing and retaining the cut-

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ting or punching assembly in a predetermined position on the bottom plate of the frame assembly.

5 7. A press according to claim 1, wherein the cutting and punching assembly comprises at least one die supported on the bottom plate, a punch holder supported on the bottom plate for sliding movement and adapted at one end to be driven by the ram, the punch holder being adapted to support at least one punch for cooperating with the die in response to driven movements by the ram, and a workpiece presser adjustably carried on the bottom plate at one side of the punch holder, and adapted to engage the workpiece for biasing it in a direction transverse to that of the sliding punch holder movement for urging the workpiece to a fixed position of engagement against a lateral side of the punch.

8. A press according to claim 7, wherein a plurality of dies are provided on the bottom plate, disposed one above the other, and a plurality of punches are provided on the punch holder disposed one above the other and each having cutting edge means, there being a recess beneath each of the cutting edge means receptive of the portion of the workpiece which is to be removed.

9. A press according to claim 8, wherein at least one of the recesses is in the upper

side of one punch directly below the punch having one of the cutting edge means.

10. A press according to claim 8 or 9, wherein the punches are directly superimposed one above the other, the cutting edge means extending substantially horizontally.

11. A press according to claim 8, 9 or 10, wherein the presser is engageable with the workpiece at the side thereof which is opposite to but registers with the part of the workpiece to be engaged by said punches.

12. A press according to any one of claims 7 to 11, in which the presser has horizontally elongated recesses for receiving at least one portion of the workpiece directed away from the punch holder.

13. A press according to any one of claims 7 to 12, including a C-shaped bracket on the base slidably receiving a portion of the presser within its C-shape; and clamping means acting between the bracket and the presser for moving it toward and away from the workpiece.

14. A portable press apparatus substantially as herein described with reference to the drawings.

For the Applicants:
J. F. WILLIAMS & CO.,
Chartered Patent Agents,
113 Kingsway,
London, WC2B 6QP.