Nov. 20, 1923.

1,474,473

W. F. HEROLD

PRESS MECHANISM

Filed Aug. 25, 1921

4 Sheets-Sheet 1

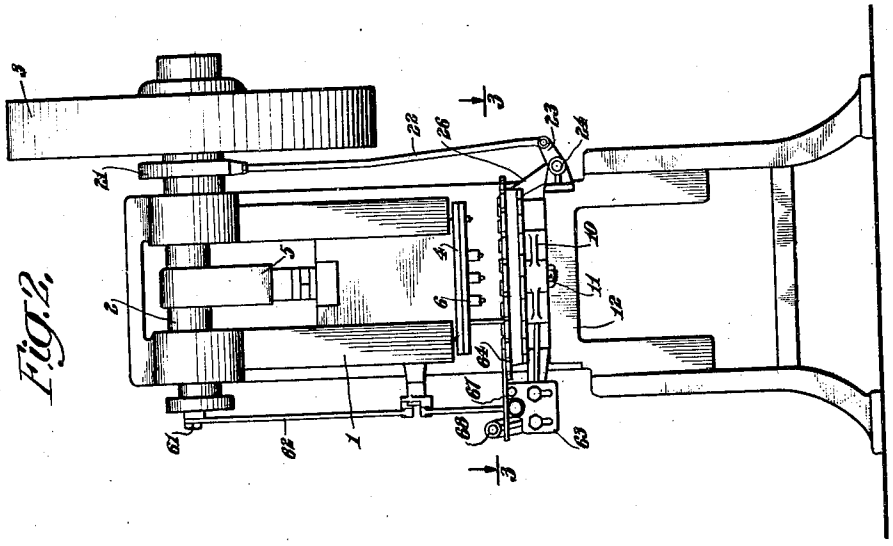


Fig. 2.

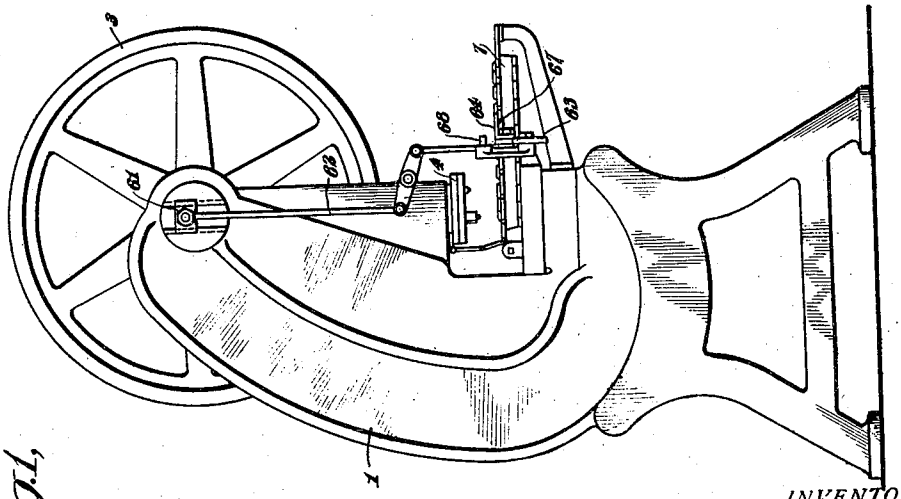


Fig. 1.

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PRESS MECHANISM

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4 Sheets-Sheet 2

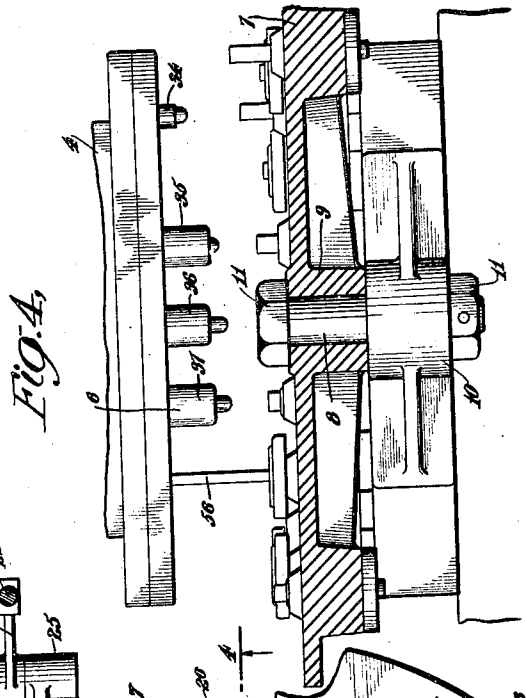


Fig. 4.

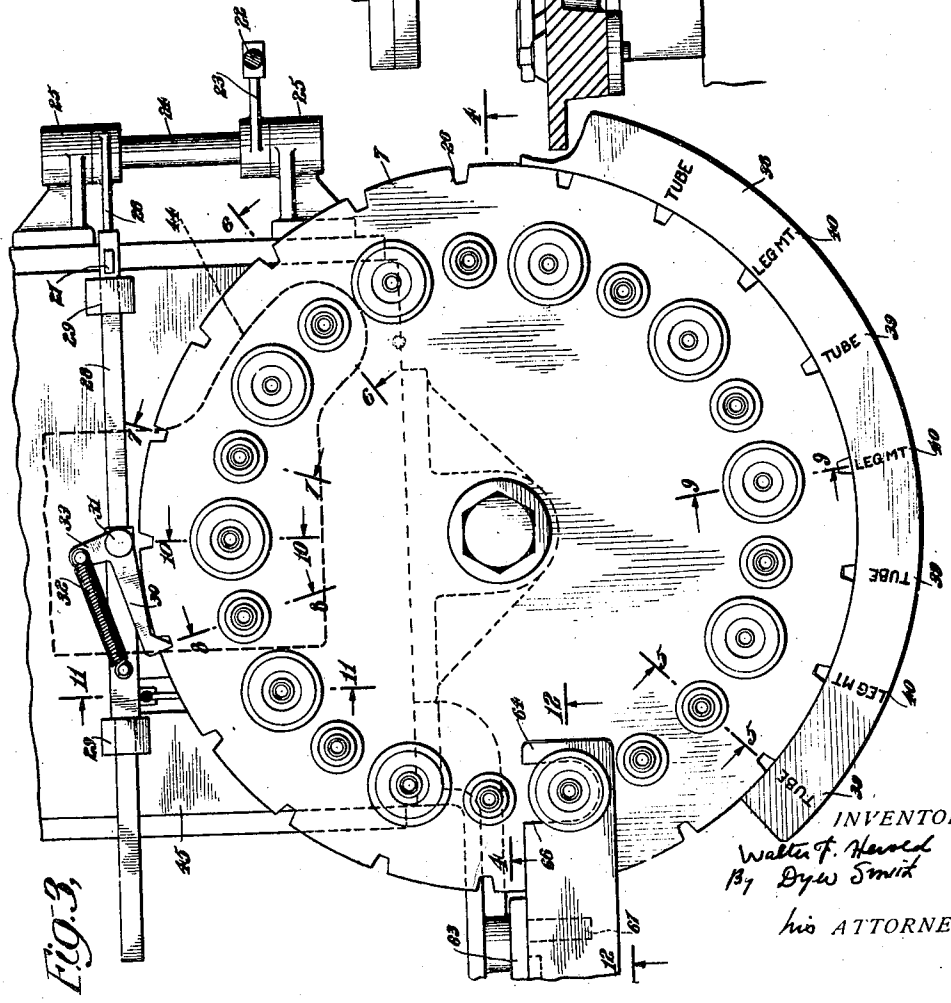



Fig. 3.

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Nov. 20, 1923. 1,474,473

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PRESS MECHANISM

Filed Aug. 25, 1921 4 Sheets-Sheet 3

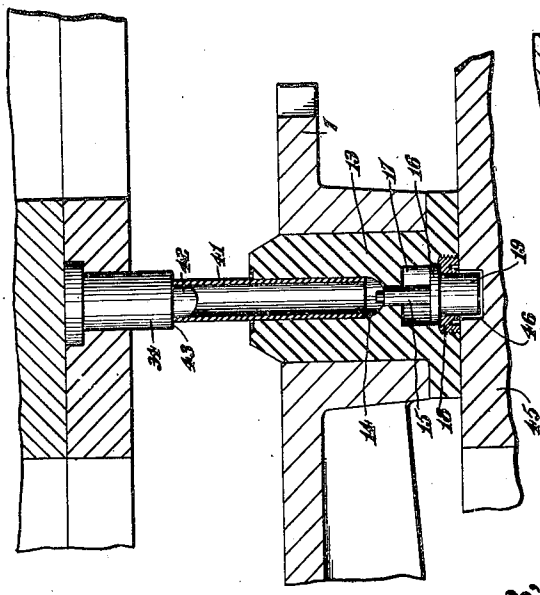


Fig.6,

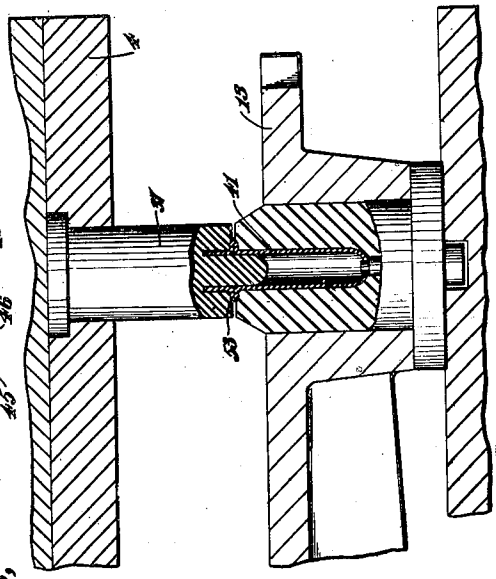


Fig.8,

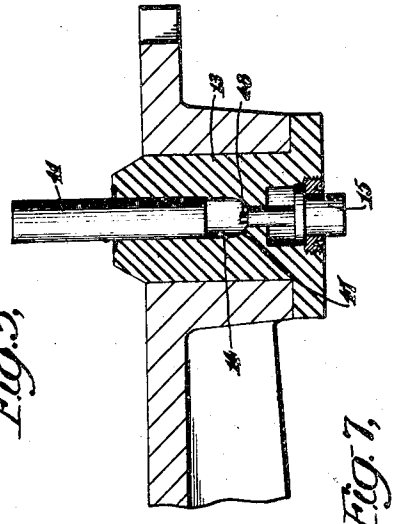


Fig.5,

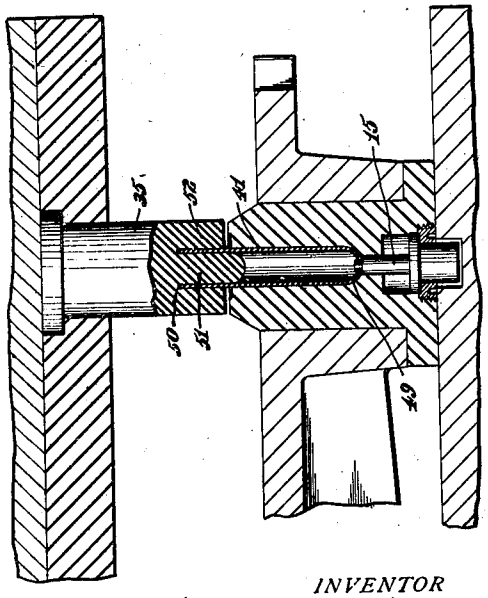


Fig.7,

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PRESS MECHANISM

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4 Sheets-Sheet 4

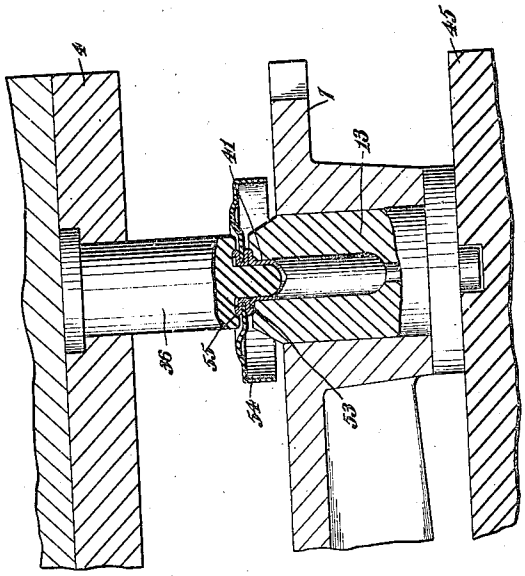



Fig. 10.

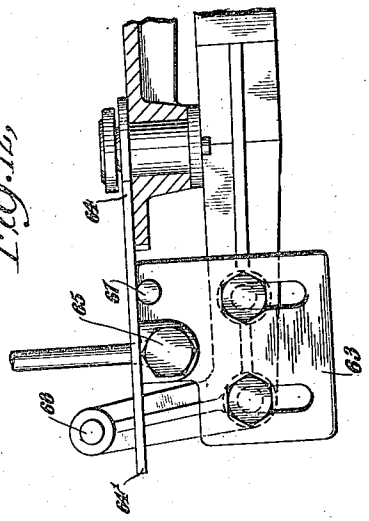



Fig. 12.

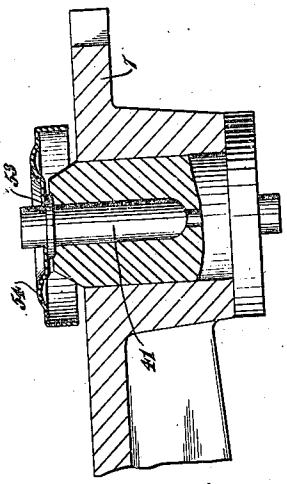



Fig. 9.

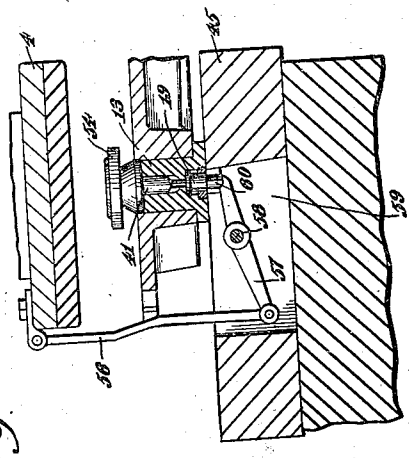



Fig. 11.

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Patented Nov. 20, 1923. 1,474,473

# UNITED STATES PATENT OFFICE.

WALTER F. HEROLD, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE BASSICK COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## PRESS MECHANISM.

Application filed August 25, 1921. Serial No. 495,254.

*To all whom it may concern:*

Be it known that I, WALTER F. HEROLD, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Press Mechanism, of which the following is a specification.

The invention relates to press mechanism, and particularly to devices in which different pressing operations may be carried out in the same machine. Machines are known in which a plate carrying dies is stepped around so as to bring an article in one of the die recesses successively beneath punches or other pressing members carried by the press head or ram, which successively perform different operations on the article.

One of the objects of the present invention is to provide an improved construction of the character referred to, whereby, inter alia, the carrier plate referred to will carry articles to be operated upon two or more times beneath the press head, in such a manner that different pressing operations will be performed upon each article during the second or subsequent time it is carried beneath the press head, from those performed during the first or former time. This may be accomplished by so arranging the feed of the carrier plate in relation to the spacing of the die recesses on the plate and the punching or pressing members carried by the press head that each article, on a second trip beneath the press head, will be presented successively to punches or pressing members different from those to which it was presented on the previous trip. One specific manner in which this may be accomplished is by providing an odd number of die recesses in the carrier plate, and feeding the plate an even number of die spaces, such as two die spaces, forward, each actuation. Accordingly, a die space which stops at position "one", in one rotation of the plate will pass by this position during the next rotation of the plate, and will stop instead at position "two", where it will be presented to a different punch or pressing member. One advantage of such an arrangement is that, after an article has been operated on by one or more pressing members carried by the press head, it will come out into a position which will permit something further to be done to it, or some adjustment or change made, by hand or by some mechanism other than the press head, after which it will again travel under the press head and be operated on by a different set of pressing members, carried by the press head. With such an arrangement an article may be completely formed or operated upon without removing it from the die carrier of the machine, in cases in which, under the former practice, it woud have to be removed from one machine after certain operations and placed in another machine, or other machines, one after the other, which would perform subsequent operations.

Other objects of the invention comprise the provision of novel and improved combinations of elements and details of construction all as will be more fully described hereinafter and particularly pointed out in the appended claims.

In order that a clearer understanding of the invention may be had attention is herby directed to the accompanying drawings forming part of this application and illustrating one embodiment thereof. In the drawings,

Figure 1 is a side elevation of a punch press embodying one form of the invention;

Fig. 2 is a front elevation of the same;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3; and

Figs. 5 to 12 inclusive, are respectively vertical sections taken on lines 5—5, 6—6, 7—7, 8—8, 9—9, 10—10, 11—11 and 12—12 of Fig. 3.

Referring to the drawings the machine may be provided with a suitable frame 1, carrying a crank shaft 2 which may be rotated from any suitable source of power, this shaft being illustrated as provided with a pulley 3 which may be rotated by belt connection. The press head 4 is vertically reciprocated between suitable guides from crank shaft 2 by the connecting rod indicated at 5. The press head or ram 4 carries a plurality of punches or pressing members indicated generally at 6.

Articles to be operated upon are carried by a carrier plate which in the embodiment of the invention illustrated takes the form of a rotatable disc 7 which is mounted for

rotation about the axis of the vertical pin 8. Plate 7 may be provided with a central downwardly extending boss 9 mounted for rotation upon a fixed member 10, pin 8 extending through boss 9 and member 10 and being suitably secured in position as by providing the same with a head and a nut 11, 11, on the upper and lower ends thereof. Member 10 may be carried upon a transverse portion 12 of the frame of the machine. The construction so far described is all old.

The carrier plate 7 is provided with a plurality of recesses in which the dies generally indicated at 13 are positioned. These dies are adapted to contain articles which are to be brought beneath the pressing members 6 of the ram or pressing head 4 to be operated upon. These dies should be so spaced in relation to the positions of the pressing members 6 and in relation to the feed of the carrier plate 7, that an article carried by any one of the dies 13 will be progressed successively beneath certain of the pressing members 6, during one rotation or movement of plate 7, and, after being carried out from beneath the pressing head then will subsequently be progressed beneath certain others of the pressing members 6 carried by the pressing head. In the embodiment of the invention illustrated this result is accomplished by providing an odd number of recesses in plate 7 and dies carried thereby, arranged in a circular series adjacent the outer edge of plate 7, plate 7 being advanced step by step, each step rotating the plate a peripheral distance sufficient to advance each die recess the distance between an even number of die recesses.

Each die 13 may be provided with a suitable recess 14 in which an article to be operated upon may be positioned. A knock out pin 15 is also preferably positioned beneath recess 14 in position to raise the article in recess 14, so that it may readily be removed therefrom, after the operations upon the article have been completed. In the form of construction shown each knock out pin comprises a stem extending upwardly from a disc 16 which is slidably mounted in a recess 17 in the lower part of the die, the stem 15 extending upwardly from recess 17 through a suitable opening in the die so as to enter recess 14 and dislodge the article therein when desired. The base portion or disc 16 of the pin may rest upon a plug 18 screw threaded into the lower portion of recess 17. Each pin is preferably provided with a cylindrical portion 19 extending downwardly a short distance below the disc 16 of the pin.

Disc 7 is preferably rotated step by step by appropriate pawl and ratchet mechanism and for this purpose may be provided with equally spaced notches 20 about its periphery, these notches preferably being so spaced that radial lines extending from the center of disc 7 and passing through the vertical axes of dies 13 will also pass through notches 20.

The disc 7 is rotated upon each operation of the press head through a peripheral distance equal to the distance between an even number of notches 20, the construction illustrated being intended to be advanced the distance between two notches, upon each actuation of the press. This may be accomplished by any suitable mechanism. As illustrated crank shaft 2 of the press may be provided with an eccentric 21 or equivalent device whereby the rod 22 is moved up and down as shaft 2 rotates. The lower end of rod 22 is connected by arm 23 to a short horizontal shaft 24 supported in suitable bearings 25. This shaft carries another arm 26 the upper end of which, indicated in Fig. 3 at 27, moves within a slot in a rod 28 which is mounted for horizontal reciprocation through bearings indicated at 29.

A pawl 30 is pivotally connected to member 28 as shown at 31, and this pawl is adapted to co-operate with notches 20 and to thereby advance plate 7 a distance between two notches during each rotation of shaft 2. Pawl 30 may be spring pressed into position to engage with notches 20 during the forward movements of the pawl, by a suitable spring 32 which may for example be a spiral spring having one end connected to member 28 and the other end connected to a tail 33 of the pawl.

As illustrated plate 7 extends partly beneath the press head and partly outside the edges thereof. The pressing devices 6 carried by the press head may be of various characters and of a varied number in accordance with the operations which are to be performed. In the embodiment of the invention illustrated, by way of example, a socket for a caster is to be formed from a tube of metal and have a washer or leg mount secured thereon. To perform this operation the pressing members designated generally by the reference character 6 may be four in number, indicated respectively by the reference characters 34, 35, 36 and 37, which are adapted to perform different operations upon the metal tube.

In the embodiment illustrated an indicating plate 38 in the form of a partial annulus may be fixedly mounted in front of the plate 7, to extend partly around the same. At various points on this indicating plate, as is indicated at 39, some designation may be printed such as the word "tube" to indicate that the blank tubes may be dropped into empty dies which momentarily stop opposite these designations. Also, at points intermediate the designations 39, other indications 40 may be printed on the indicating

plate, such as the words "leg mount", which in the particular form of apparatus illustrated indicates that a leg mount or washer may be slipped over partially formed sockets, which have been carried beneath the press head and thus partially formed and are, therefore, ready to receive the leg mounts which are to be secured in position on the sockets during the second travel of the latter beneath the press head.

A metal tube 41 is indicated in Fig. 5 as having been slipped into the recess 14 of any one of the dies 13, at any of the positions indicated at 39. Plate 7 being stepped around two spaces at a time, the tube 41 will arrive beneath the pressing member 34, as is indicated in Fig. 6. The object of this member is simply to set the tube firmly in position within the die recess 14. Member 34 may suitably comprise a pilot 42 adapted to enter the upper end of the tube and a horizontal face 43, surrounding the base of the pilot 42, adapted to strike against the upper end of the tube. Member 34 is of such length as merely to press the tube firmly into recess 14 without doing anything further.

The outline of the press head is indicated in Fig. 3 in dotted lines at 44. A bolster or fixed member 45 is mounted beneath the portion of the plate 7 which extends at any time beneath the press head, the dies 13 sliding over this bolster so as to be firmly supported during the pressing operations. Bolster 45 may be provided with an annular recess 46 through which the downwardly extending portions 19 of the knock out pins 15 will move.

The tube 41 having been properly set in position, the next forward actuation of plate 7, moving the same forward two notches or two die spaces, as stated, will position this tube beneath the punch or pressing member 35 shown in Fig. 7. It will be noted that the recess 14 of each die is provided with a curved bottom portion 47. Each knock out pin 15 is preferably provided with a short upward extension 48 of reduced diameter which is positioned within the lower end of recess 14. The function of pressing member 35 is to push tube 41 downwardly a sufficient amount to arch or dome its lower end, as is indicated at 49 in Fig. 7.

Accordingly member 35 may be provided with a striking surface 50 adapted to engage against the upper edge of tube 41, with a pilot 51 adapted to enter the upper end of the tube and with an annular wall 52 adapted to extend around the upper end portion of the tube. The portions 51 and 52 of member 35 preventing the upper portion of the tube from buckling inwardly or outwardly and accordingly downward pressure on the tube results in curving the lower end of the same, as is shown at 49, against the curved surface 47 of the die, the upward extension 48 of pin 15, in the form of construction illustrated, forming an abutment about which the lower end of the tube will be positioned at the end of this operation. The position of member 35 and its downward movement will be such as to produce the desired doming of tube 41.

The next advance of tube 41, of two spaces, brings it beneath pressing member 37, as shown in Fig. 8. This member is adapted to form the peripheral bead 53 about the upper portion of tube 41, member 37 being so formed and of the proper length to obtain this result, as will be obvious from the drawing.

The tube 41 under consideration will now be advanced out from under the press head. As soon as it arrives at any of the positions indicated at 40 an operator will slip the flanged washer or leg mount indicated in Fig. 9 at 54 over the upper end of tube 41. This leg mount comprises a metal disc having a central opening therethrough through which the upper end of tube 41 will extend, when the leg mount has been dropped in position, the leg mount resting upon the peripheral bead 53 which has now been formed on the tube.

In the continued operation of the machine tube 41 will again move beneath the press head but will not stop beneath pressing members 34, 35, or 37 because of the fact that an odd number of dies are provided while the plate 7 is stepped around an even number of spaces each time. Accordingly no punches or pressing members will be encountered until the tube is brought beneath the pressing member 36, illustrated in Fig. 10, which as is indicated by Fig. 3 may be positioned intermediate the pressing members 35 and 37. Pressing member 36 is adapted to press the upper end of tube 41 into a peripheral bead 55 which is firmly pressed against the upper surface of leg mount 54 so that the latter will be firmly held between beads 53 and 55. Member 36 may be arranged to produce this result in an obvious and well known manner.

Referring to Fig. 3, it will be noted that the positions of pressing members 34 and 35, indicated by section lines 6—6 and 7—7 are two die spaces apart, and the position of member 37, indicated by section line 8—8, is two die spaces beyond the position of member 35. Pressing member 36, however, as stated, is intermediate members 35 and 37 (see section line 10—10 in Fig. 3), so that member 36 is only one die space away from either member 35 or 37.

The socket with washer attached now being complete nothing remains but to remove the same from the die, which is preferably done automatically. In the form of construction illustrated the tube 41 is first loos-

ened in the die cavity and somewhat raised therein by a knock out mechanism of known form, indicated in Fig. 11. This may comprise a rod 56 which extends downwardly from the press head 4 and is pivotally connected at its lower end to an arm 57 which is pivoted intermediate its length on a pin 58 within a recess 59 in the bolster 45. The opposite end of arm 57 is provided with an upwardly extending projection 60 adapted to strike against the bottom surface of the bottom portion 19 of the knock out pin 15 of the die 13 brought to rest above the same, the downward movement of the press head and link 56 serving to raise the socket 41 in the die cavity somewhat so that the leg mount 54 fastened on the upper end of the socket will be positioned a short distance above the top of the die.

It is, of course, now only necessary to remove the finished socket from the die recess which may be accomplished by known mechanism, as indicated in Fig. 12. As illustrated crank shaft 2 may carry an eccentrically mounted pin 61 thereon to which a vertical link 62 is connected. A block 63 is secured to the lower end of link 62 and is suitably guided to rise and fall each rotation of crank shaft 2. A pick up lever 64 is pivotally mounted as shown at 65 on block 63, lever 64 having a recess 66 formed in one side of the same. As each tube 41 which has been somewhat raised in its die recess by the knock out device shown in Fig. 11, comes around to the position indicated by the section line 12—12 in Fig. 3, the tube 41 will enter the recess 66 in the adjacent side of lever 64, with the leg mount 54 above lever 64. Tube 41 being so positioned, the press head starts to rise. Pick up lever 64 is horizontally positioned at this time by the provision of a pin 67 on block 63 on which lever 64 rests. The end of lever 64 beneath the leg mount 54 will accordingly rise vertically a sufficient amount to lift the socket out of its cavity. The tail portion $64^1$ of the pick up lever then strikes against a fixed pin 68 and as block 63 continues to rise the stoppage of the tail portion of lever 64 will result in swinging the lever in a counterclockwise direction about its pivot until the lever reaches a vertical position, the completed caster socket being thereby thrown to the left, referring to Fig. 12.

It will be obvious that the operations described will be carried on continuously, blank tubes being positioned by the operator in each die recess as the empty recesses reach the operator's position and leg mounts being placed in position on each of the partly formed sockets as fast as the latter come around to the operator's position. It will also be obvious that the invention is not limited to the particular method of making sockets for casters which has been particularly described, by way of example, but that various pressing operations may be carried out by similar mechanisms within the scope of the invention, the latter being considered as of considerable breadth, as is indicated by the accompanying claims.

What I claim is:—

1. In a press mechanism, the combination of a rotatable plate the periphery of which may be divided into equal spaces by an odd number of dividing points, a plurality of dies spaced peripherally thereabout, at equal distances from the axis of said plate, on radii of said plate drawn through said dividing points, a plurality of pressing members, in line with the path of said dies, two of said members being separated from each other a distance equal to an even number of said equal spaces and a third one of said members being separated from one of said first two members a distance equal to an odd number of said spaces, means for actuating said members in unison, and means for rotating said plate, upon each actuation of said pressing members, a distance equal to an even number of said spaces.

2. In a press mechanism, the combination of a rotatable plate having an odd number of dies spaced equal distances apart, peripherally thereabout, a reciprocating press head having a pair of pressing members, positioned above the path of said dies, and means for rotating said plate step by step a distance of two die spaces upon each operation of said press head, said pressing members being separated from each other a distance equal to $\frac{n}{2}$ times the feed of said plate, where $n$ is an odd number.

3. In a press mechanism, the combination of a rotatable carrier plate having a die therein, a reciprocating press head having a plurality of pressing members, and means for rotating said plate step by step equal distances in one direction to progress an article in said die beneath said pressing members, said die and pressing members all being positioned equidistant from the axis of said plate, two of said pressing members being separated from each other a circular distance equal to the circular movement of said die during each actuation of said rotating means, and another one of said pressing members being separated from one of said first two named pressing members a circular distance equal to an integral fraction of the circular movement of the die during each actuation, and the circular movement of said die each actuation being of a length which is exactly divisible into the closed circular path of said die plus or minus the circular distance between the third named pressing member and the adjacent one of said first two named pressing members.

4. In a press mechanism, the combination

of a carrier plate having a die therein, a reciprocating press head having a plurality of pressing members, and means for intermittently moving said plate equal distances in one direction to progress an article in said die beneath said pressing members, two of said pressing members being separated from each other a distance equal to the movement of said die during each actuation of said intermittent moving means, and another one of said pressing members being separated from one of said first two named pressing members a distance less than the movement of the die during each intermittent actuation, and each intermittent movement of said die being of a length which is exactly divisible into one complete cyclic path of said die plus or minus the distance between the third named pressing member and the adjacent one of said first two named pressing members.

5. In a press mechanism, the combination of a carrier plate having dies arranged therein to travel through a closed path, a reciprocating press head having a plurality of pressing members of varying character, and means for moving said plate intermittently equal distances to progress articles in said dies beneath said pressing members, two of said members being spaced apart one distance and another being spaced from one of said first members a different distance, said plate moving means being calculated to position an article in one of said dies beneath one of said members during one travel of the plate, and, during the next travel of the plate beneath said press head, to cause said article to be carried past said pressing member and positioned in alignment with another of said pressing members.

6. In a press mechanism, the combination of a rotatable carrier plate having dies arranged therein, a reciprocating press head having a plurality of pressing members, said dies and pressing members being in curved series equidistant from the axis of said plate, said dies being equally spaced apart, while a plurality of said pressing members are spaced apart one distance, and another one of said members is spaced a different distance from one of said first named members, so that various of said dies may be brought simultaneously in alignment with said pressing members, and pawl and ratchet mechanism for advancing said plate each actuation of said press head, through such a peripheral distance that certain of said dies will be positioned in alignment with one of said pressing members during one revolution of said plate, and during the next revolution of said plate will be carried past said pressing member and will be positioned in alignment with another of said pressing members.

7. In a press mechanism the combination of a reciprocating press head having a plurality of pressing members, a carrier plate having a plurality of dies, and means for moving said plate step by step partly under and partly not under said press head, said moving means acting to move a given die into co-operation with certain only of said pressing members then out from under said press head and back again under said press head and into co-operation with another of said pressing members until each die has successively coacted with each pressing member, certain of said pressing members being spaced apart by one distance and another being spaced a different distance from one of said first named members.

8. In a press mechanism, the combination of a rotatable carrier plate having a die therein, a reciprocating press head having a plurality of pressing members arranged in a curved series concentric with said plate, means in alignment with said pressing members, adapted to lift an article from said die, and means for rotating said plate step by step to progress an article in said die beneath said pressing members and adjacent to said lifting means, said rotating means being arranged to rotate said plate equal distances to position the article beneath certain only of said pressing members, successively, during one revolution of said plate, and only beneath other of said pressing members subsequently, and then to position the article in position to permit said lifting means to operate thereon, said first named members being equally spaced apart, and said other of said pressing members and lifting members being spaced at different distances from said first members.

Signed at New York, in the county of New York and State of New York, this 22d day of August A. D. 1921.

WALTER F. HEROLD.