

Nov. 15, 1927.

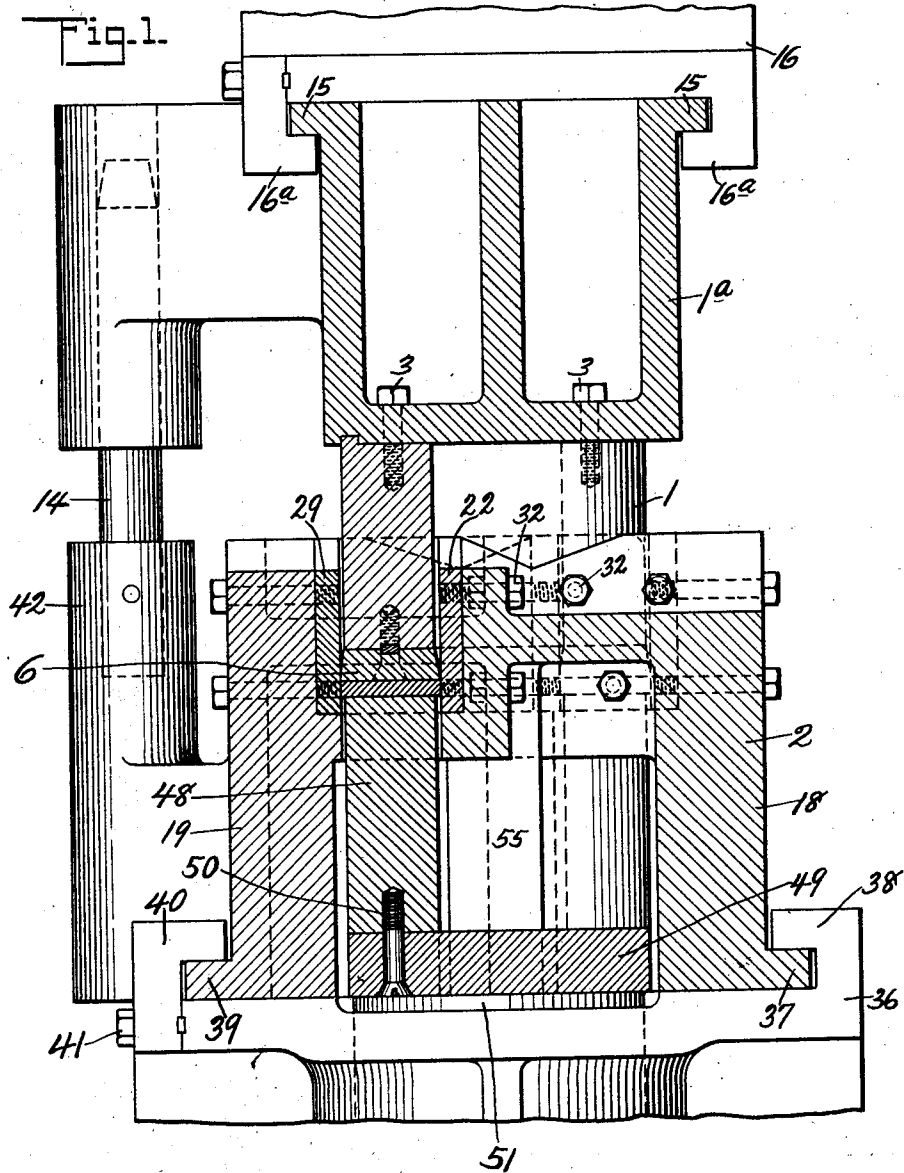
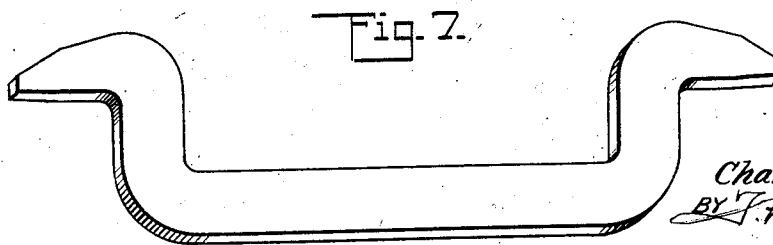
C. F. WALP

1,649,427

PUNCH PRESS

Filed Dec. 22, 1925

4 Sheets-Sheet 1



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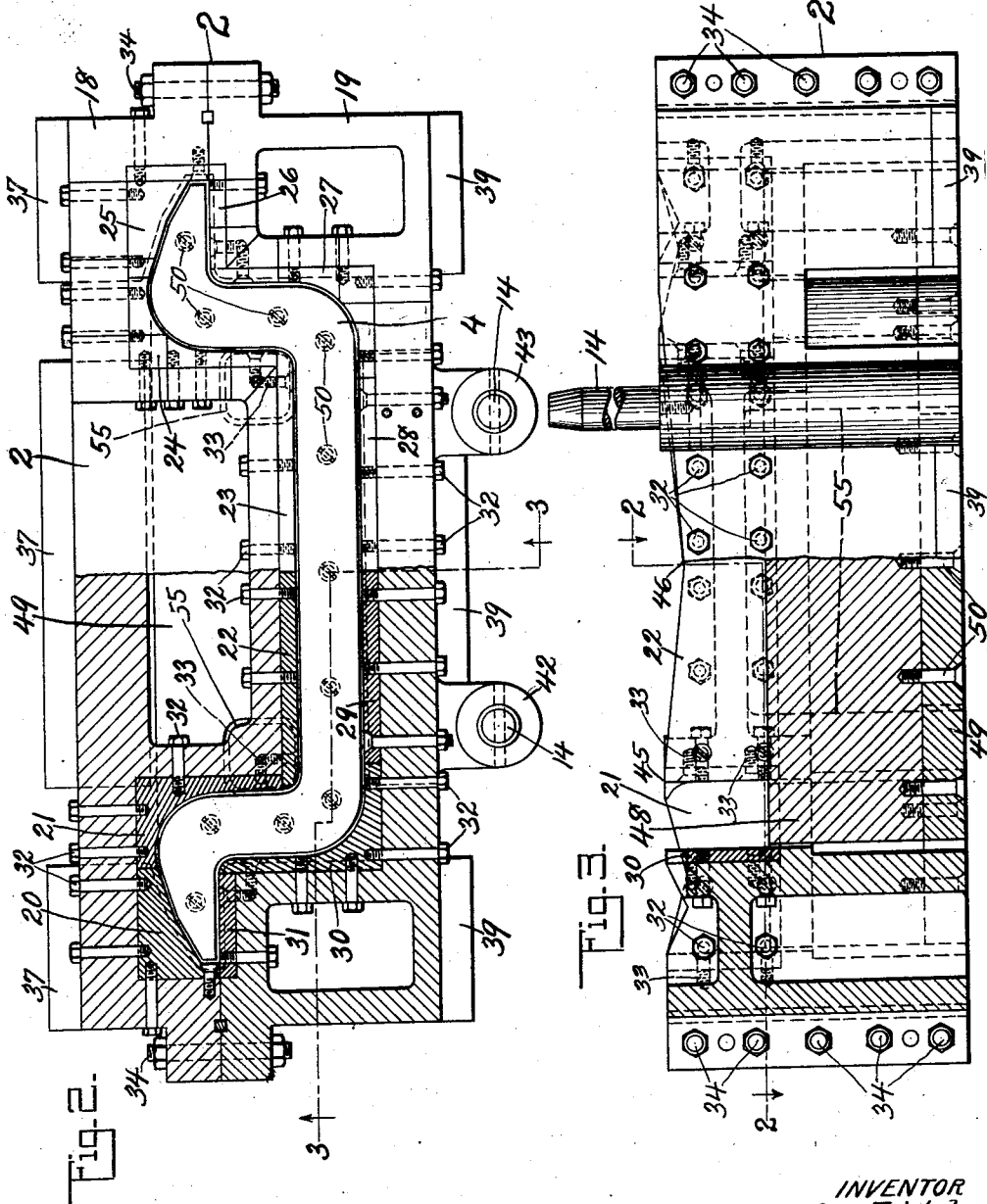
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

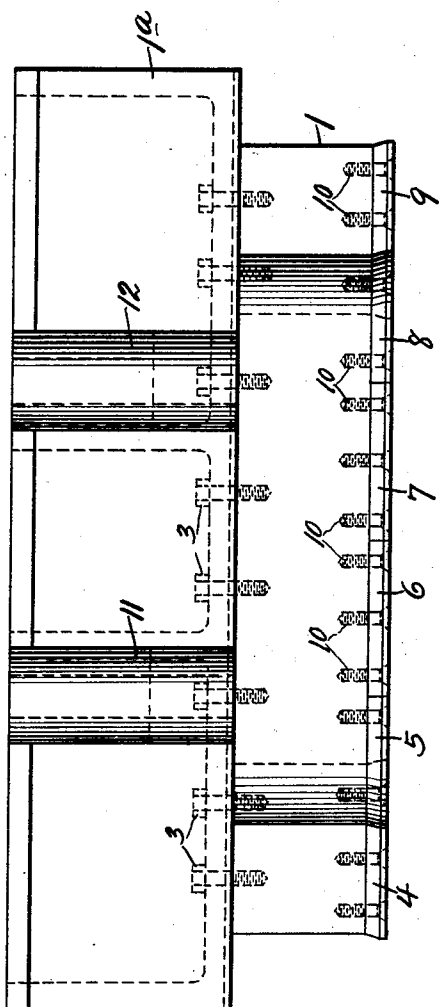


Fig. 4-

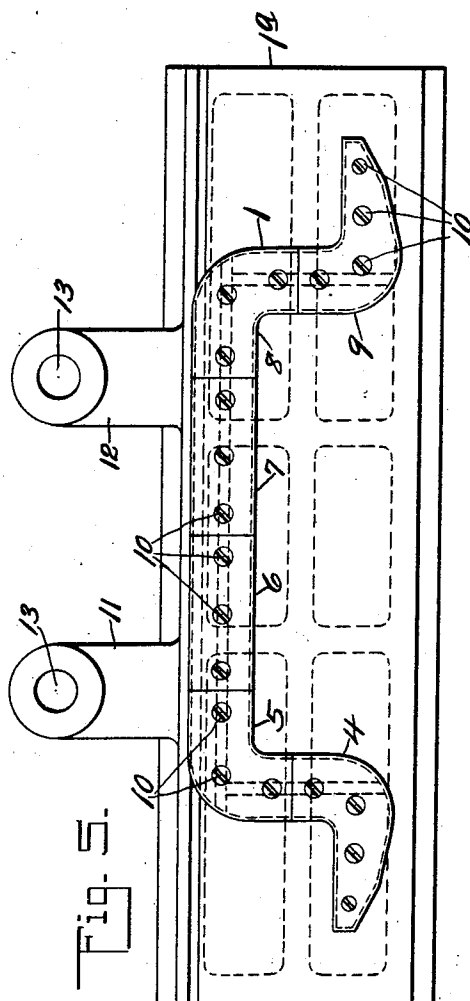


Fig. 5.

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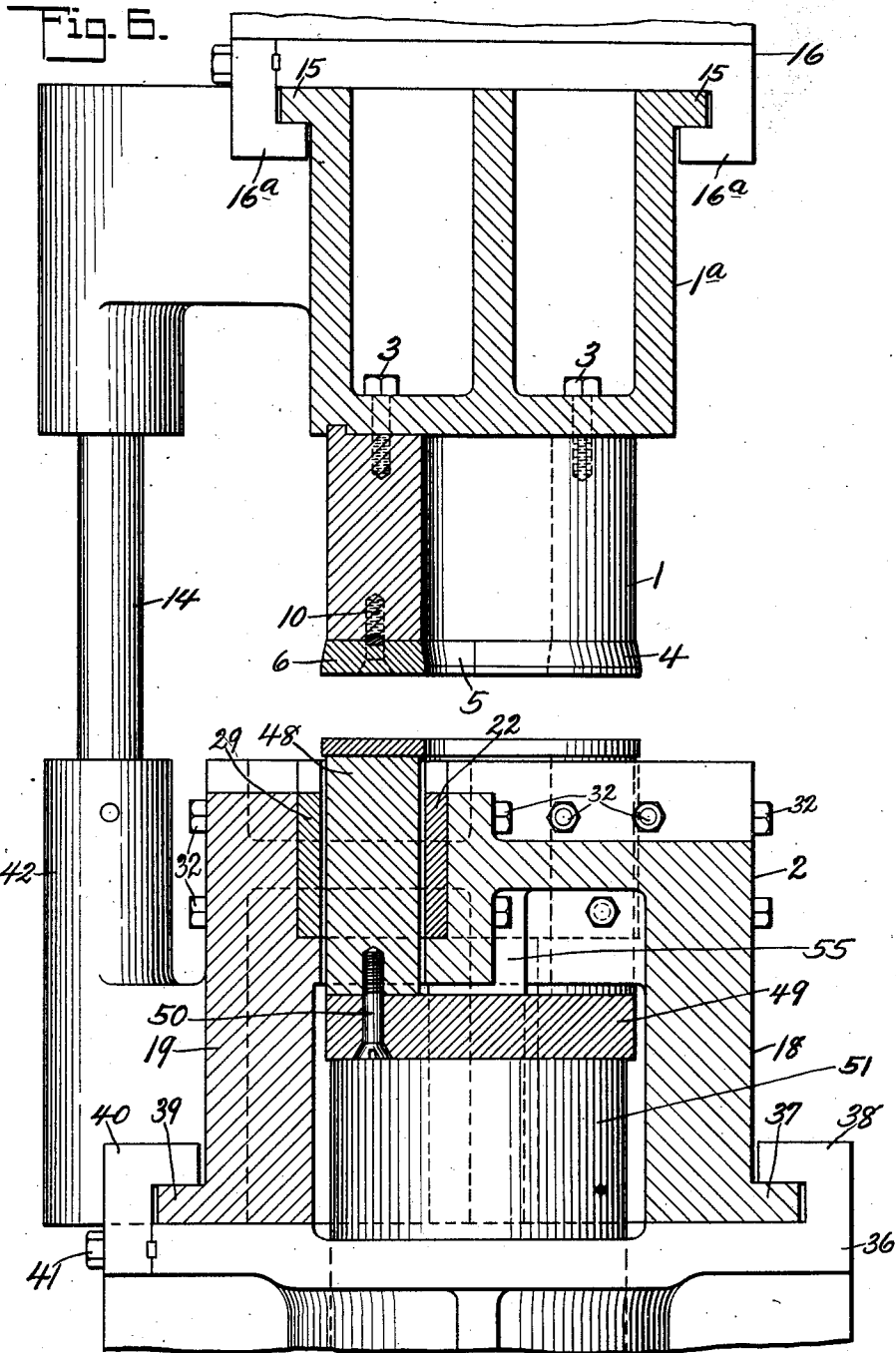
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PUNCH PRESS

Filed Dec. 22, 1925

4 Sheets-Sheet 4



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Patented Nov. 15, 1927.

1,649,427

UNITED STATES PATENT OFFICE.

CHARLES F. WALP, OF BERWICK, PENNSYLVANIA, ASSIGNOR TO AMERICAN CAR AND
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PUNCH PRESS.

Application filed December 22, 1925. Serial No. 77,002.

In the drawings:

Figure 1 is an elevational view of the punch press showing a central section of the dies and with the head and male die in lowered position;

Figure 2 is a plan view, partially in section along the line 2—2 of Figure 3, of the female die;

Figure 3 is an elevational view, partially in section along the line 3—3 of Figure 2, of the female die;

Figure 4 is an elevational view of the male die and the supporting head therefor;

Figure 5 is a bottom plan view of the male die and the head;

Figure 6 is an elevational view similar to Figure 1 and with the male die in elevated position; and

Figure 7 is an isometric view of an equalizer bar adapted to be finished from a blank in the machine.

One object of the invention is to provide a punch press that shall hold the article being punched against distortion during the punching operation and that shall force the punched article from the press without effecting any distortion in the shape thereof so as to necessitate a separate straightening operation being performed thereon.

The above object is accomplished by providing means for engaging the blank, on the underside thereof opposite to the male die, with a bottom member having a cross section similar to the cross section of the male die. The bottom member is movable within the female die and is held firmly in engagement with the blank during the entire punching operation and upon withdrawal of the male die forces the punched article from the female die.

Referring to the drawings, a punch press is illustrated comprising a male die 1 and a female die 2. The male die 1 is supported on a male die holder 1^a by means of bolts 3 and carries six punching knives 4, 5, 6, 7, 8 and 9 which are formed in the shape of an equalizer bar as illustrated in Fig. 5 of the drawings. The knives are secured to the body portion of the die by means of set screws 10. The die holder 1^a is provided with two projecting arms 11 and 12 having openings 13 there-through for receiving rods 14 which are attached to the female die. The rods 14 serve to guide the movement of the male die 1.

The die holder 1^a is provided with shoulders 15, as shown in Figs. 1 and 6 of the drawings, to be engaged by shoulder brackets 16^a formed on a movable head 16. One of the shoulder brackets 16^a is removable and held in position by bolts. The head 16 and the means for operating it have not been fully described inasmuch as the construction and operation of similar presses is well known and a detailed description thereof is deemed unnecessary. Preferably the head 16 is raised and lowered by means of hydraulic power. The knives 4 to 9, inclusive, are formed of tool steel and are relieved along the punching edges as best shown in Figs. 1 and 6 of the drawings.

The female die 2 comprises two die-holding sections 18 and 19 which carry the knives 20 to 31, inclusive. The knives are secured to the die holders 18 and 19 by means of bolts 32 and screws 33 as illustrated in Figs. 2 and 3 of the drawings. The two sections 18 and 19 of the female die holder are secured together by means of bolts 34 which extend through flanges projecting from the ends of the die holders. The two portions 18 and 19 of the die holder are mounted on a stationary base 36 as shown in Figs. 1 and 6 of the drawings. A shoulder or flange 37 on the portion 18 of the die holder is held in position by a fixed bracket 38 on the base 36. A shoulder 39 on the portion 19 of the die holder is engaged by a removable bracket 40. The bracket 40 is secured to the base 36 by means of bolts 41. The portion 19 of the die holder is provided with two projecting arms 42 and 43. The rods 14, which guide the movements of the male die, are suitably secured in the projecting arms 42 and 43.

The blades 20 to 31, inclusive, which are connected to the die holders 18 and 19 have their cutting edges formed at an angle to a plane parallel to the male die as best illustrated in Fig. 3 of the drawings. Accordingly, the cutting edge of the female die varies in height, so that when the male die descends there is a tendency to distort the blank and the punched article. Referring to Fig. 3 it will be noted the blade 22 has a high point at 45 and low point at 46. In like manner each of the blades 20, 21 and 23 to 31, inclusive, have their engaging edges formed at an angle to a plane parallel to the male die. The so forming of the engaging

edges insures an easier punching operation.

A bottom member 48 which has a cross section substantially similar to the cross section of the male die is located within the female die and is secured to a balance plate 49 by means of screws 50. The plate 49 is supported on a plunger or ram 51 which operates in the base 36. The plunger 51 is hydraulically operated in any suitable manner for holding the bottom plate 48 in engagement with the blank during a punching operation while permitting movement of the bottom plate in accordance with the movement of the male die. The plunger 51 is also operated to force the completed article, which in this case is an equalizer bar, from the female die after the completion of the punching operation. Two arms 55 project from the die holding portion 19 through the plate 49 for guiding the movement of the plate 49 and the bottom member 48.

Prior to the punching of the equalizing bar from a blank the plunger 51 is raised to hold the bottom member 48 in engagement with the blank. The bottom member 48 is held in engagement with the blank during the entire punching operation so that the finished article is not distorted during the punching operation. Formerly in machines of this character it was necessary to subject the equalizer bar to a straightening operation in order to flatten and cure it of the distortions produced during the punching operation. It should be noted the angular cutting edges formed on the blades of the female die tend to distort and bend the bar during the cutting operation. However, by holding the bottom plate firmly in engagement with the blank during the punching operation it is unnecessary to subject the equalizing bar to a separate straightening operation. After the completion of the punching operation and the raising of the head and the male die, the plunger 51 is operated for raising the bottom member 48 to force the finished equalizing bar from the female die.

I claim:—

1. In a punch press, a female die with cutting edge varying in height, so that the dies tend to distort the punched article, a male die movable with respect to the female die, a bottom member having substantially the cross section of the article to be punched and mounted to move within the female die for engaging the blank to hold it securely against the male die during the punching operation.

2. In a punch press, a female die with cutting edge varying in height, so that the dies tend to distort the punched article, a male die movable with respect to the female die for punching a form from a blank, and a bottom member having substantially the shape of the article to be punched and mov-

able within the female die, said bottom member engaging the blank to hold it securely against the male die and prevent bending during the punching operation and to force it from the female die after the punching operation.

3. In a punch press, a female die having a number of knives, the engaging edges of said knives being inclined with respect to the plane of the blank, a male die movable with respect to the female die, a bottom member having substantially the cross section of the article to be punched and mounted to move within the female die for engaging the blank to hold it securely against the male die during the punching operation.

4. In a punch press, a female die having a number of knives, the engaging edges of said knives being inclined with respect to the plane of the blank, a male die movable with respect to the female die for punching an article from a blank, and a bottom member having substantially the same cross section as the male die and movable within the female die, said bottom member serving to hold the blank firmly against the male die during the punching operation and to force the punched article from the female die.

5. In a punch press, a stationary female die adapted to support a blank and varying in height, so that the dies tend to distort the punched article, a male die guided for movement relative to the female die to punch an article from the blank, a bottom member having substantially the cross section of the male die and the article to be punched and movable within the female die, said bottom member engaging the blank opposite to the male die to hold it against distortion during the punching operation and to force the finished article from the female die.

6. In a punch press, a stationary base, a female die supported on said base and having its cutting edge vary in height, so that the dies tend to distort the punched article, a movable head having guided movement with respect to the stationary base, a male die secured to said head and movable therewith, a bottom member movable within the female die and having a cross section substantially similar to the cross section of the male die and a plunger for operating said bottom member to hold the article being punched against distortion during the punching operation and to force the punched article from the top of the female die.

7. In a punch press, a stationary base, a female die supported on said base and having its cutting edge vary in height, so that the dies tend to distort the punched article, a movable head guided for movement with respect to the stationary base, a male die secured to said head and movable therewith to cooperate with said female die and punch an article from a blank, and a bottom mem-

ber movably mounted on said stationary base for engaging the blank opposite to the male die to hold it firmly against the male die during the punching operation and for forcing the punched article from the female die upon withdrawal of the male die.

8. In a punch press for forming equalizer bars, a stationary base, a female die secured to said base and having its cutting edge vary in height, so that the dies tend to distort the punched article, a movable head, a male die secured to said head and movable therewith to cooperate with said female die and punch an equalizer bar from a blank, and a bottom member mounted on a plunger for movement in said female die and having a cross section similar to the equalizer bar to be formed, said bottom member engaging the blank opposite to the male die to hold the equalizer bar being punched against distortion and to force the finished equalizer bar from the top of the female die.

9. In a punch press, a male die and a fe-

male die movable with respect to each other for punching an article from a blank, the cutting edge of said female die varying in height so that the die tends to distort the punched article, and means for engaging the blank during the punching operation, said means being movable within the female die and of such shape and area as to prevent distortion of the blank during the punching operation.

10. In a punch press, a male die and a female die movable with respect to each other for punching a predetermined shape from a blank, the cutting edge of the female die varying in height, and a bottom member engaging the blank on the side opposite to its engagement with the male die, said bottom member being of sufficient shape and area as to prevent distortion of the article being punched.

In witness whereof I have hereunto set my hand.

CHARLES F. WALP.