Dec. 10, 1963 J. CRESAP 3,113,540

SINGLE RAM PRESS

Filed Jan. 31, 1961 3 Sheets-Sheet 1

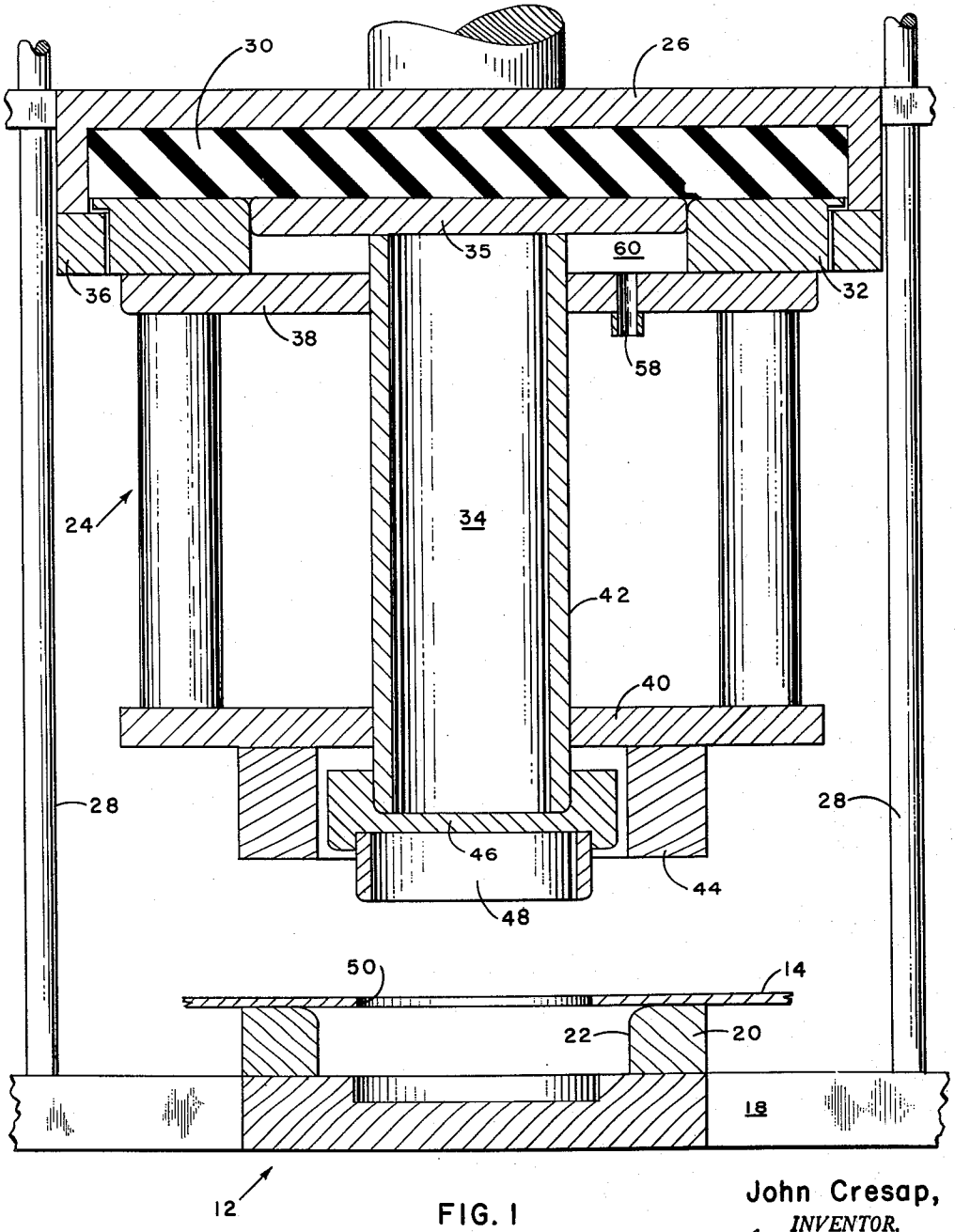


FIG. 1

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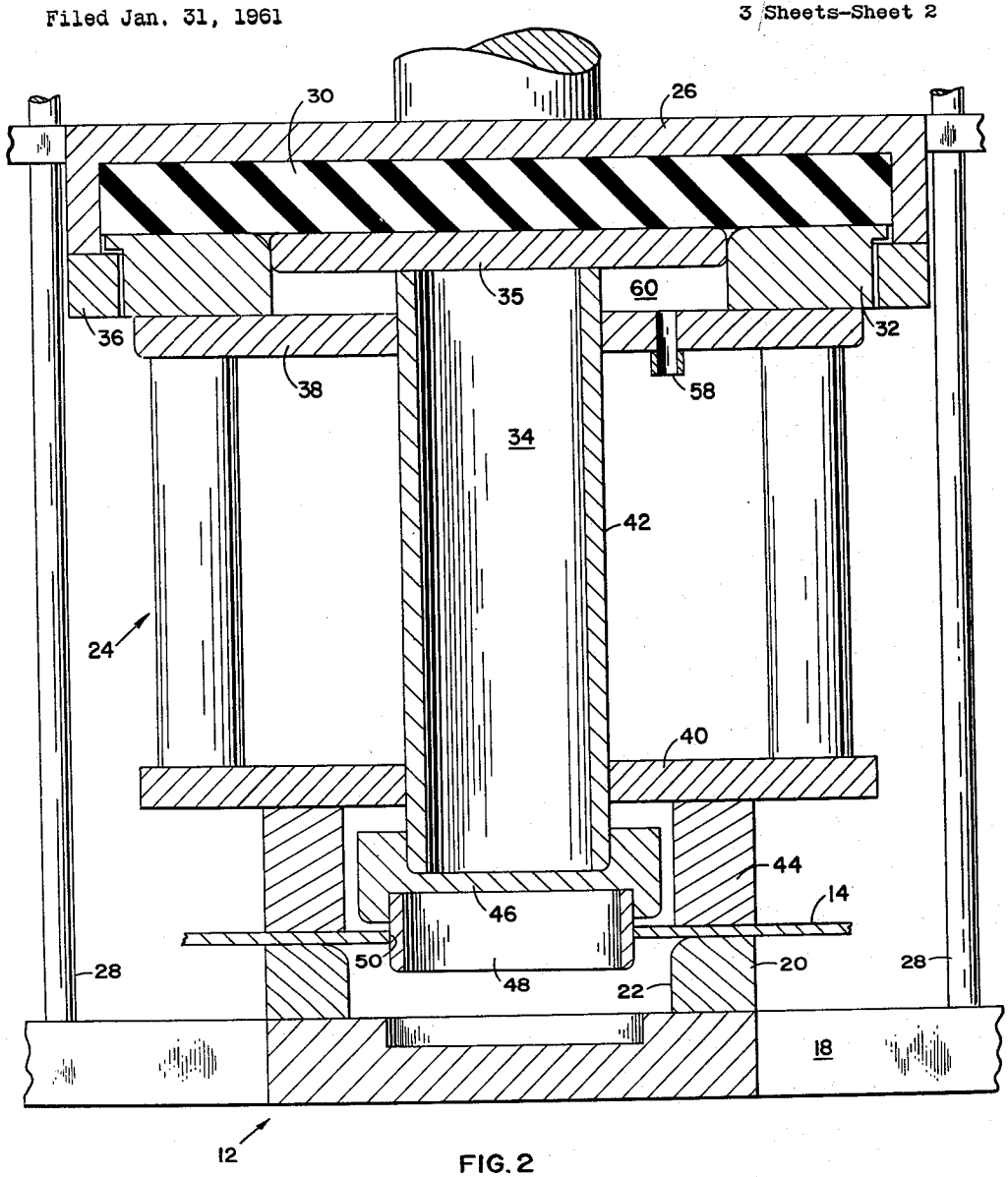


FIG. 2

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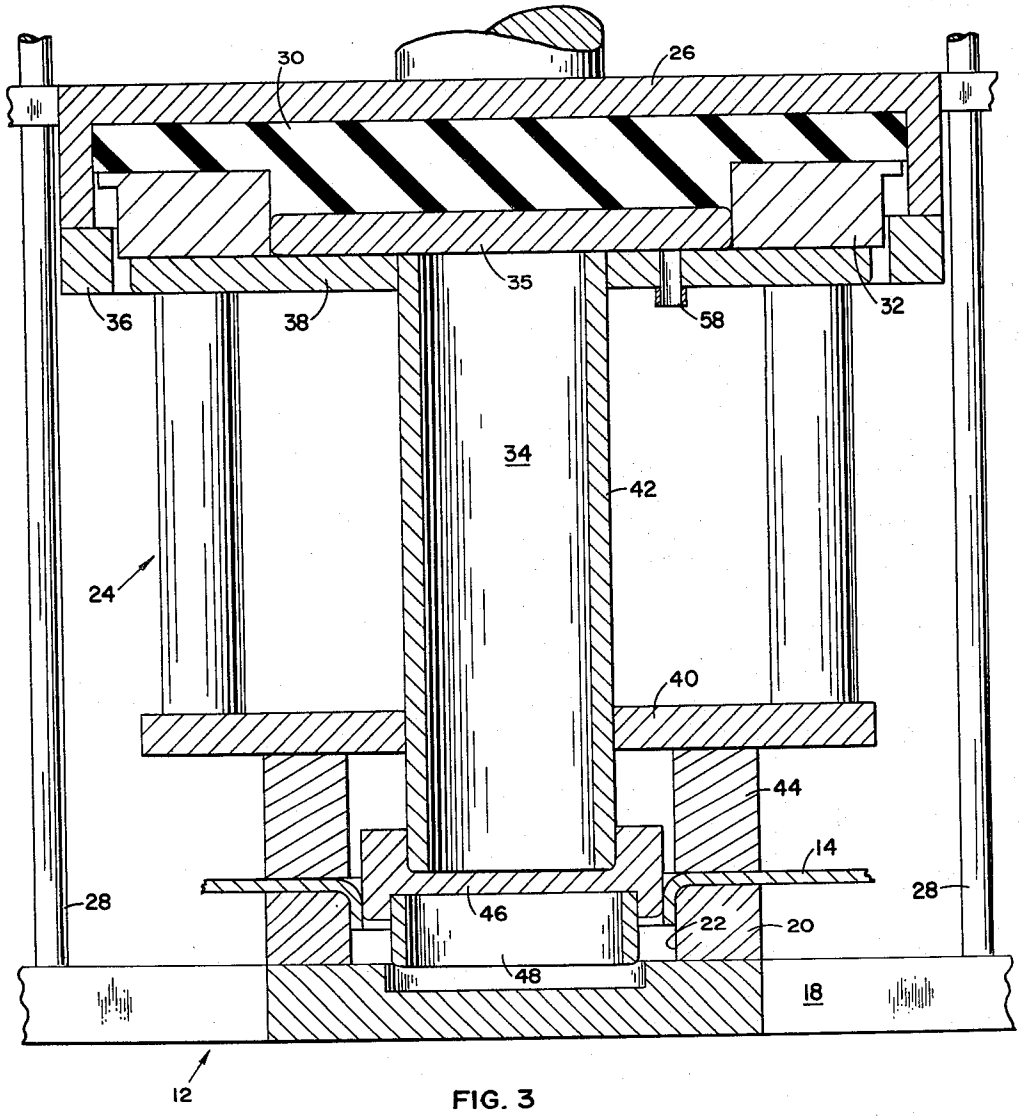


FIG. 3

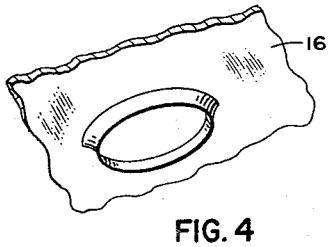


FIG. 4

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SINGLE RAM PRESS

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2 Claims. (Cl. 113—38)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

My invention relates to presses for forming articles from blanks and more particularly to such a press provided with a single ram.

Such presses respectively include a die supported on a bed and disposed to enclose an aperture and conventional presses each include at least a pair of rams operated in the direction normal to the bed respectively to secure the blank to the die and to project a plunger into the aperture to press the material of the blank against the surface of the die and form the article.

Conventional presses require separate power sources for the rams and apparatus for timing the respective operation of the rams.

An object of my invention is to provide such a press with a ram for forming an article in a single reciprocal operation.

Another object of my invention is to provide such a ram with a pad and a plunger for respectively securing a blank to a die and for pressing the material of the blank to the die to form an article.

Other aims and objects of my invention will appear from the following description.

In carrying out my invention, a forming press includes a bed for supporting a die and the die is provided with an aperture in normal relation with the bed. A cylindrical ram is disposed for reciprocal slidable operation normal to the bed in power and return strokes from and to a starting position. Pressure is applied to the ram in the power strokes.

A member is slidably disposed in the ram and a piston is disposed in slidable relation in the member for concentric relation of the ram, piston, and member to completely enclose a resilient shoe.

The piston is provided with a pilot and a plunger, the member is provided with a pad, and the ram is disposed for operation in a power stroke for successive engagements of the pilot, pad and plunger with the blank for formation thereof around the contours of the die to produce the article.

For more complete understanding, reference is directed to the following description and the accompanying drawing, in which,

FIGURE 1 is a view of a forming press at the beginning of the power stroke, with a blank in engagement with the die;

FIGURE 2 is a similar view with the pad in position to secure the blank to the die;

FIGURE 3 is a similar view with the plunger extending into the die; and

FIGURE 4 is a perspective view of the formed article.

Accordingly, a press 12 for forming a blank 14 into an article 16 is provided with a bed 18 disposed to support a die 20 having an aperture 22 in normal relation with bed 18. A device 24 is provided with a ram 26 disposed for slidable engagement with guides 28 secured in normal relation with bed 18.

A member 32 is disposed in slidable relation with ram 26, and a piston 34 is provided with a head 35 slidable in member 32. Head 35 is disposed in concentric relation with member 32 and ram 26 to completely enclose a shoe 30 of resilient material, and the head is disposed in axial relation with aperture 22. A ring 36 is secured to ram 26 to secure member 32 therein, and a stem 42 is secured to head 35. Device 24 is provided with spaced flanges 38 and 40 to guide piston 34 with relation to member 32 and to guide stem 42 in the concentric relation. Device 24 includes a pad 44 secured to flange 40. Piston 34 includes a plunger 46 secured to stem 42 and a pilot 48 secured to plunger 46. Blanks 14 include holes 50 corresponding to pilot 48. Member 32 and head 35 form concentric pistons.

A pipe 58 secured to flange 38 communicates with the space 60 between one of the flanges 38 and head 35 and with a source of air pressure.

Device 24 is disposed for reciprocal operation in power and return strokes from and to a starting position, shown in FIGURE 1, with pressure applied to ram 26 in the power strokes.

Operation

As ram 26 proceeds in a power stroke, pilot 48 engages hole 50 of a blank 14 to orient the blank with die 20, after which pad 44 engages blank 14 to secure the blank to the die during the remainder of the power stroke responsive to the pressure applied to ram 26.

As ram 26 continues in the power stroke, the portion of shoe 30 between ram 26 and member 32 is compressed and the material of the shoe flows into member 32 to project plunger 46 into engagement with blank 14 and into aperture 22 for formation of article 16 in accordance with the configuration of die 20.

Pressure on ram 26 is relieved in the return stroke to permit shoe 30 to be restored to the original configuration thereof responsive to the resiliency of the material of the shoe and air pressure is applied to pipe 58 to retain head 35 in contact with shoe 30 for withdrawal of plunger 46 from article 16.

In the remainder of the return stroke of ram 26 to the starting position, pad 44 is displaced from engagement with article 16 for removal thereof from the press.

The capacity of press 12 is substantially 100 tons and the material of shoe 30 is 70 durometer rubber. Shoe 30 may be comprised of liquid or gas with the addition of sealing components to member 32 and piston 34.

It is to be understood that the form of the invention that is herein shown and described is the preferred embodiment, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A press for formation of an article comprising: a bed with a die secured thereto to support a blank provided with a hole; guides normally secured to said bed; a source of hydraulic pressure; a device including a ram disposed for application thereto of the hydraulic pressure for reciprocal slidable operation on said guides in power and return strokes from a starting position; inner and outer pistons disposed in concentric relation

and mounted in said device with said inner piston provided with a head slidably disposed in said outer piston, a plunger having a pilot secured thereto for engagement with said hole, and a stem secured between said head and said plunger and said outer piston provided with spaced flanges to secure together said pistons and guide said stem in the concentric relation, and a pad for engagement with said blank in the power stroke; a ring secured to said ram to retain therein said outer piston; and a shoe of resilient material enclosed by said ram and said concentric pistons; said ram and said outer piston being disposed for compression therebetween of a portion of said shoe for flow of the material thereof and consequent displacement of said inner piston in the power stroke for sequential engagement with the blank of said pilot, pad and plunger for the formation of the article responsive to the compression; and said device

disposed for return stroke disengagement of said pilot, pad and plunger from the article responsive to relief of the hydraulic pressure.

2. A press as in claim 1 provided with a source of air pressure; and a tube secured to one of said flanges for communication between said one flange and said head to retain said head in engagement with said shoe in the return stroke responsive to the air pressure.

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