

1,206,250.

Patented Nov. 28, 1916.

4 SHEETS—SHEET 1.

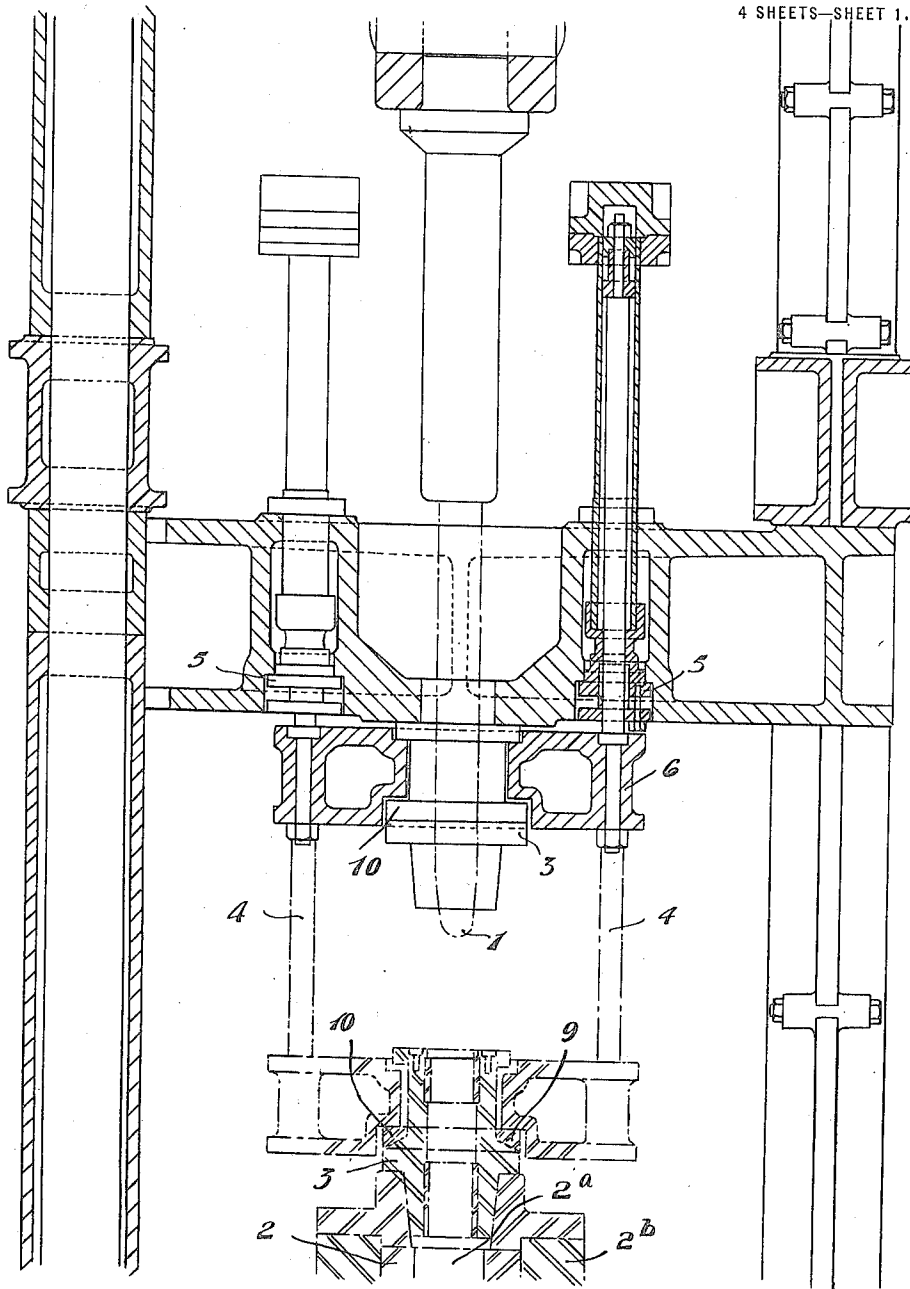


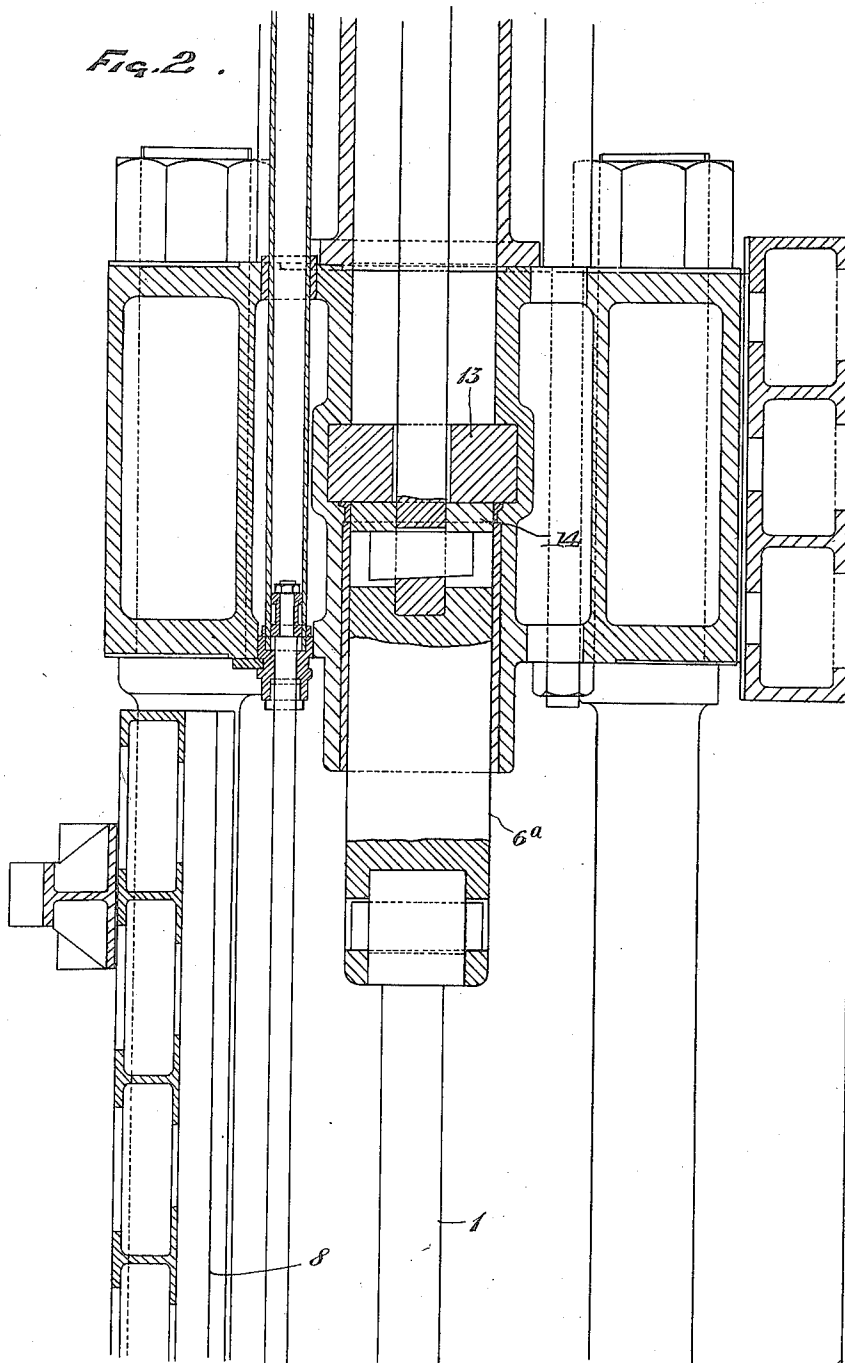
FIG. 1.

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HYDRAULIC PRESS.
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4 SHEETS—SHEET 2.



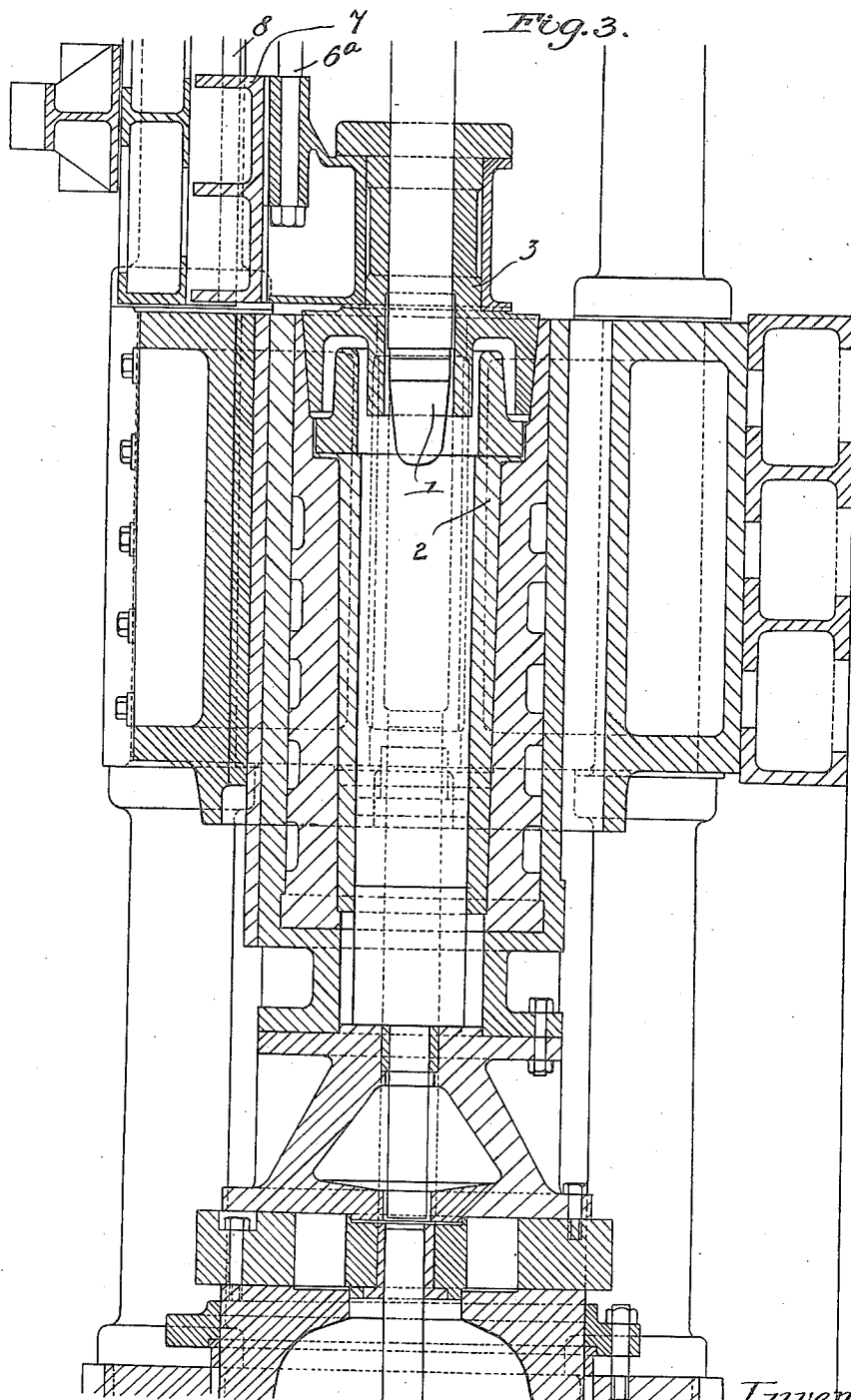
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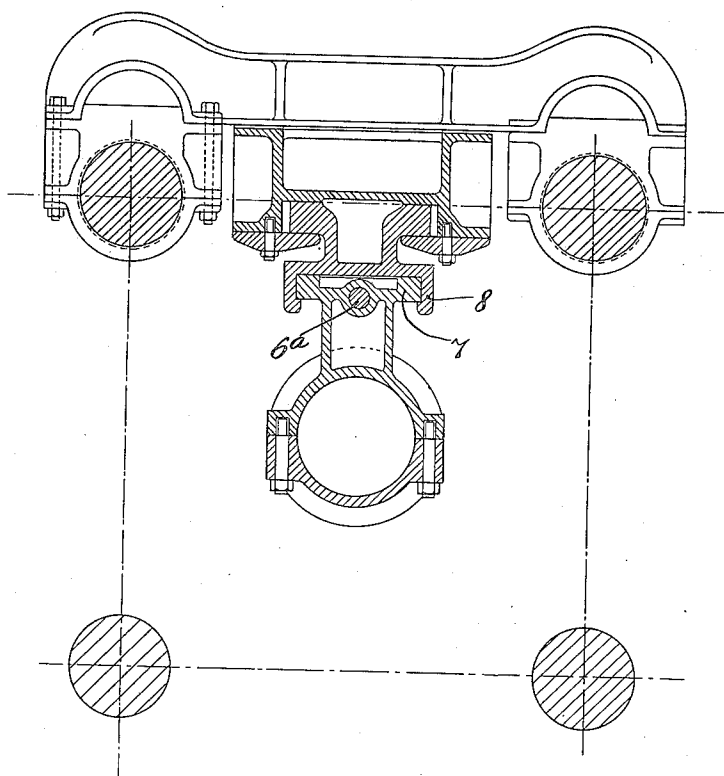


Fig. 4.

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UNITED STATES PATENT OFFICE.

HAROLD BULKELEY REYNOLDS, OF RENFREW, SCOTLAND, ASSIGNOR TO THE BABCOCK & WILCOX COMPANY, OF BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HYDRAULIC PRESS.

1,206,250.

Specification of Letters Patent.

Patented Nov. 28, 1916.

Application filed February 3, 1916. Serial No. 76,066.

To all whom it may concern:

Be it known that I, HAROLD BULKELEY REYNOLDS, a subject of the King of the United Kingdom of Great Britain and Ireland, and residing at Renfrew, Renfrewshire, Scotland, have invented a certain new and useful Improvement in Hydraulic Presses, of which the following is a specification.

10 This invention relates to improvements in hydraulic presses for forging hollow articles, particularly projectiles and the like, and has for its object to provide for more perfect guidance of the mandrel coaxially with the die than heretofore accomplished whereby projectiles or like articles of uniform thickness may be produced.

The invention is illustrated in the accompanying drawing in which—

20 Figure 1 shows one embodiment in vertical section; Figs. 2 and 3 are fragmentary views showing collectively vertical sections of a modification and Fig. 4 is a view in section showing a cross-head and slideway

25 hereinafter referred to.

According to the embodiment illustrated in Fig. 1, the improved hydraulic press comprises a main ram terminating in a mandrel 1 constrained to move axially into a hollow 30 die 2 containing the billet 2^a and carried by a die-holder 2^b. The mandrel 1 is enveloped by, and is slidable relatively to, a bush 3 which may be of frusto-conical form and is constrained to perform axial movements into 35 and out of engagement with a counterpart pocket. For imparting the requisite movements to the bush 3 there are provided supplementary hydraulic rams of which extensions 4 of the plungers are guided in bushes 40 5 and secured to a member 6 in which is housed the bush 3.

It will be readily understood that, as the bush 3 is constrained to enter a pocket located immediately adjacent to the die 2, the 45 mandrel 1 will, in operation, always occupy a position coaxial with the die 2.

To compensate for any tilting movement of the member 6 due to failure of the extensions 4 to move in unison, the bush 3 is 50 formed at 9 with a spherical surface pre-

sented in conjunction with a correspondingly formed washer 10 a universal joint. It follows that tilting movement of the member 6 is not communicated to the bush 3.

According to the modification illustrated 55 in Figs. 2 and 3 the mandrel 1 is disposed horizontally and the bush 3 is adapted to be moved by a single ram 6^a, which is fitted with a crosshead 7 tracking a slideway 8. In this embodiment the final operation of 60 pressing the billet is effected by moving the die 2 toward the mandrel 1, the mandrel 1 being temporarily restrained against retrograde movement by a hydraulically operated snib 13 coöperating with a shoulder 14 65 on the mandrel holder.

What I claim is:—

1. In a hydraulic press, in combination, a billet-receiving die, a mandrel adapted to enter said die, hydraulic means for effecting 70 relative movement of said die and said mandrel, a bush sleeving said mandrel, and hydraulic means for moving said bush, substantially as and for the purpose set forth.

2. In a hydraulic press, the combination 75 of a billet-receiving die with a pocket coaxial therewith, a mandrel to enter said die, hydraulic means for effecting relative movement of said mandrel and said die, a bush to enter said pocket and to guide said mandrel, 80 and hydraulic means for operating said bush, substantially as and for the purpose set forth.

3. In a hydraulic press, the combination 85 of a billet-receiving die with a pocket coaxial therewith, a mandrel to enter said die, a ram for effecting relative movement of said mandrel, a bush to enter said pocket and to guide said mandrel, hydraulic means for operating said bush, and a universal joint 90 mechanically interposed between said hydraulic means and said bush, substantially as and for the purpose set forth.

4. In a hydraulic press, the combination 95 of a movable billet-receiving die with a pocket coaxial therewith, a mandrel to enter said die, a bush to enter said pocket and to guide said mandrel, hydraulic means for moving said mandrel into a position adjacent to said die, hydraulically operated 100

means for temporarily sustaining said mandrel in such position and hydraulically operated means for moving said die into operative relationship with said mandrel, substantially as described.

5 5. In a hydraulic press, the combination of a billet-receiving die with a pocket coaxial therewith, a mandrel to enter said die, means for operating said mandrel, a bush to enter
10 said pocket, a ram for operating said bush,

a crosshead on said ram, and a slideway tracked by said crosshead.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HAROLD BULKELEY REYNOLDS.

Witnesses:

WALLACE CRANSTON FAIRWEATHER,
HENRY MASON.