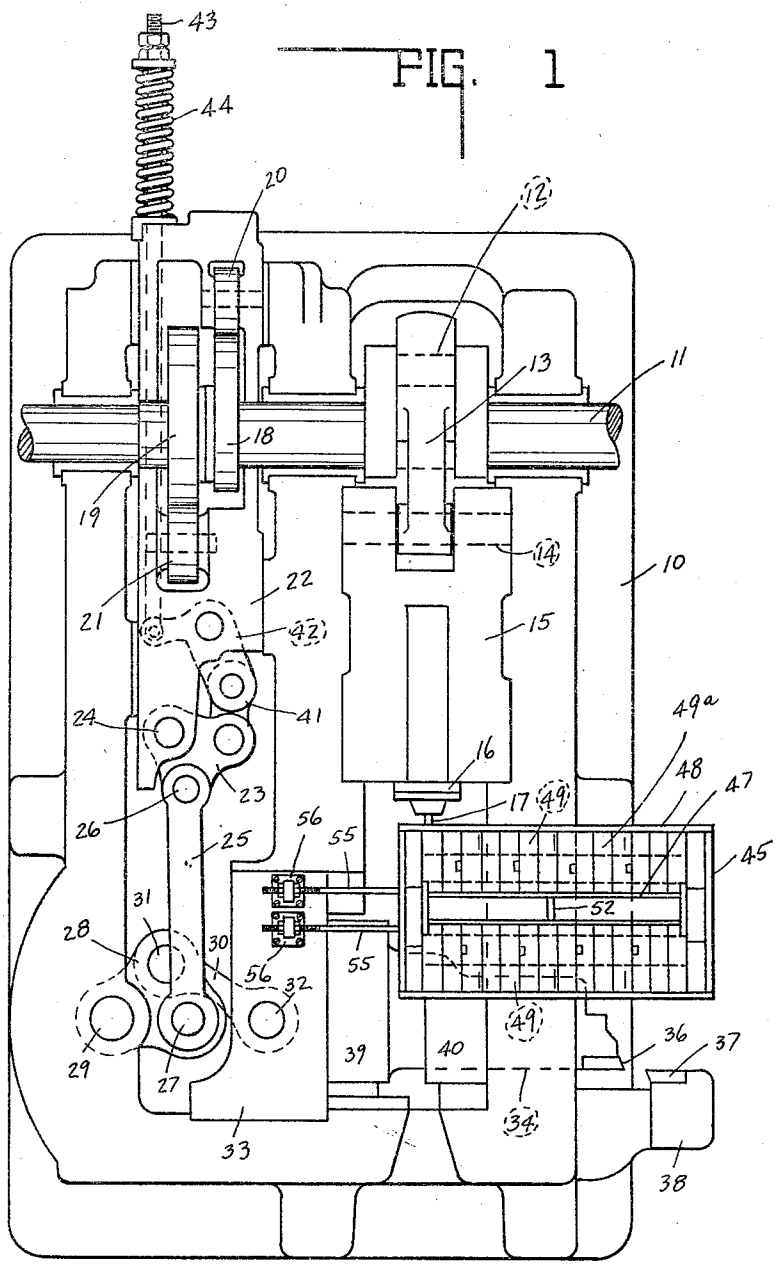
Feb. 21, 1933. C. L. WEST 1,898,279

BLANK FEEDER FOR FORGING MACHINES

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FIG. 1



INVENTOR.
CHARLES L. WEST.

BY
Lockwood Lockwood Goldsmith & Galt

ATTORNEYS.

Feb. 21, 1933. C. L. WEST 1,898,279

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FIG. 2

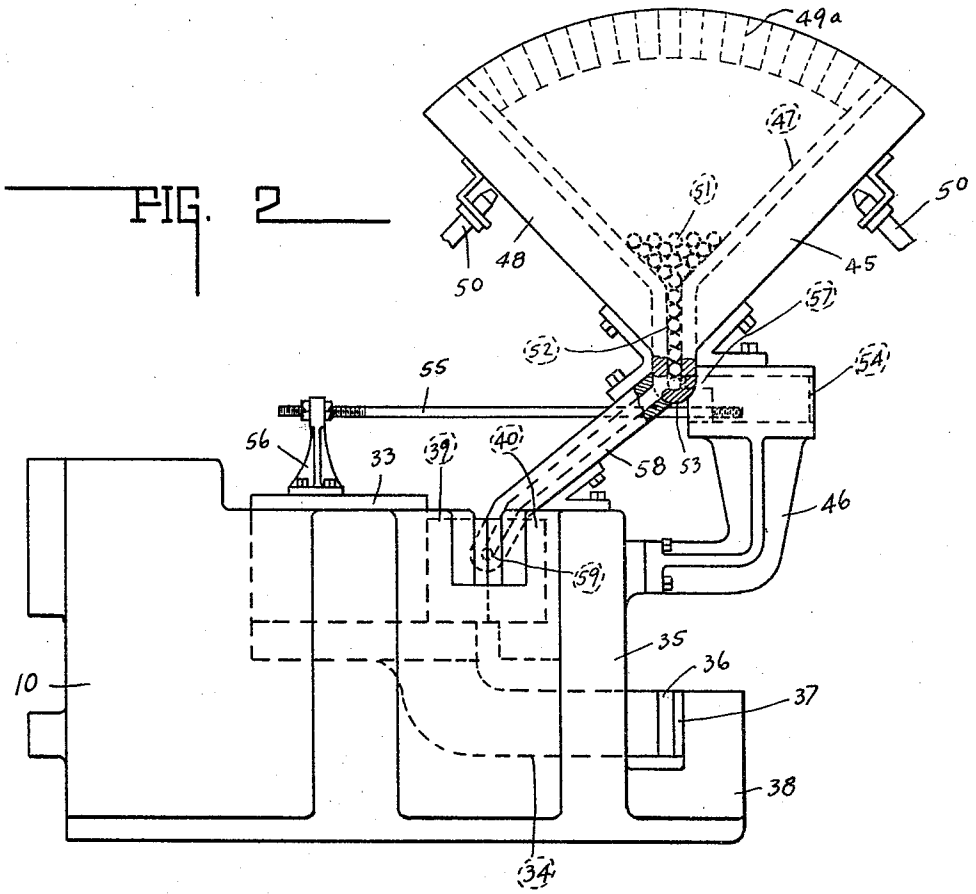
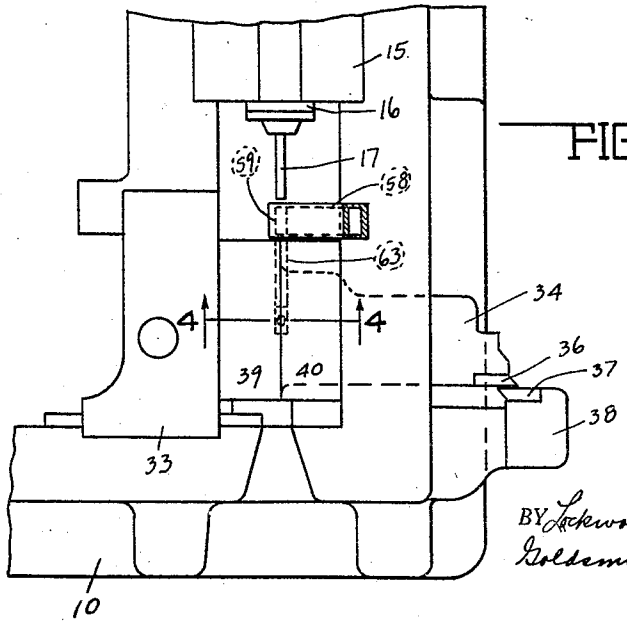


FIG. 3



INVENTOR.
CHARLES L. WEST.

BY Lockwood Lockwood Goldsmith & Galt

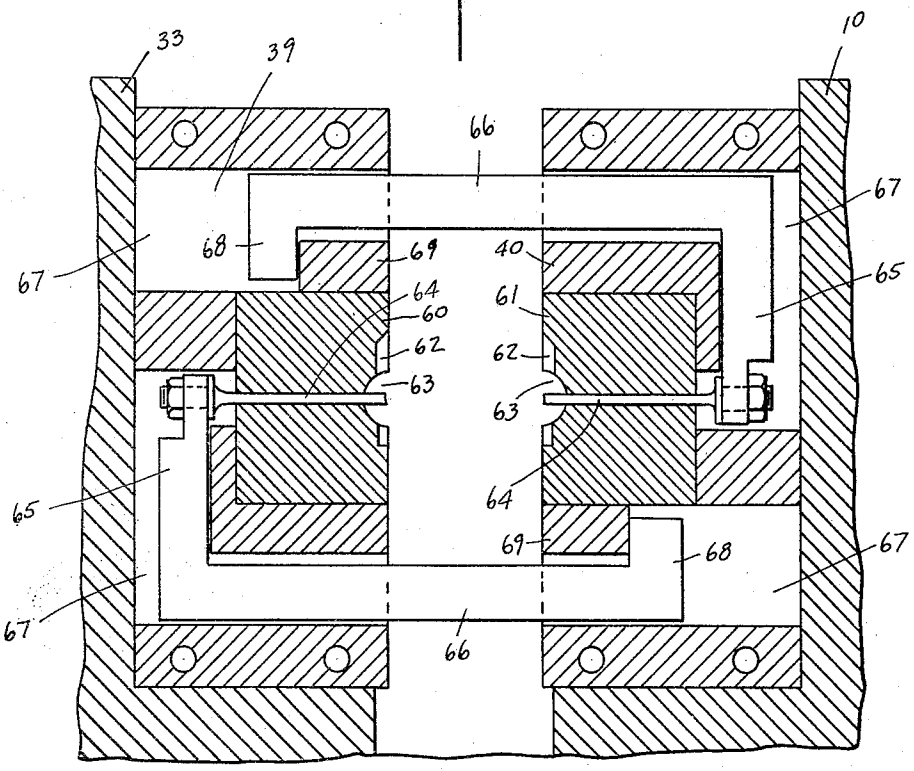
ATTORNEYS.

Feb. 21, 1933. C. L. WEST 1,898,279

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FIG. 4



INVENTOR.
CHARLES L. WEST.

BY Lockwood Lockwood Goldsmith & Galt

ATTORNEYS.

Patented Feb. 21, 1933 1,898,279

UNITED STATES PATENT OFFICE

CHARLES L. WEST, OF TIFFIN, OHIO, ASSIGNOR OF FORTY PER CENT TO D. R. LINDLEY, OF INDIANAPOLIS, INDIANA

BLANK FEEDER FOR FORGING MACHINES

Application filed December 26, 1929. Serial No. 416,532.

This invention relates to apparatus for feeding blanks to a forging machine. More particularly it relates to apparatus for feeding blanks to a forging machine having an enclosed forging die containing a cavity into which a metallic blank of the same weight as the finished forging is pressed under sufficient pressure to cause the blank to fill the cavity and to conform to the shape thereof.

Heretofore metallic forgings have been made by one of three methods,—first, the drop hammer method wherein the forging blank is placed upon a die plate and repeatedly struck with a hammer having a corresponding die impression upon the striking surface and, second, by the upset method wherein bar stock is gripped between two jaws and the protruding end of the stock is struck by a ram or hammer and pressed into a die cavity carried by the jaws and third, by means of the enclosed forming die mentioned above. In each of the first two methods, there is in most cases an excess of material which takes the form of a "flash" or fin at the line of juncture of the hammer and die. In some cases, the weight of flash is a large percentage of the total weight of the finished forging. In the third case, where the enclosed die is used there is no "flash". The third method therefore is much the more economical especially in the case of small forgings where the flash or scrap may be a large proportion of the total weight. In order to utilize this method for small forgings to obtain the desired economy it is necessary that expensive hand methods of feeding blanks to the die be dispensed with.

Other objects and features of the invention will be fully understood from the accompanying drawings and the following description and claims:

Fig. 1 is a plan view of a forging machine embodying the invention. Fig. 2 is an elevational view of the same. Fig. 3 is a plan view of a portion of the structure in Fig. 1 with parts removed to show other parts in detail Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3 and illustrating the interior construction of the die and ejector mechanism.

The forging machine includes a base casting 10 rotatably supporting a shaft 11 which may be rotated by any suitable source of power. The shaft 11 carries an eccentric portion 12 in turn carrying a connecting rod or pitman 13. The pitman 13 is pivotally connected by means of a pin 14 with a sliding member 15 usually known as the "heading slide." The heading slide 15 is reciprocable upon the frame 10 by the rotation of the shaft 11. A punch holder 16 is carried by the slide 15 and supports a forging punch or header 17.

The shaft 11 also carries a pair of cams 18 and 19. The cam 18 engages a roller 20 and the cam 19 engages a roller 21. The said rollers are pivotally mounted upon a sliding member 22 which is reciprocated by means of the action of the cams upon the rollers in the rotation of the shaft 11. A toggle 23 is pivotally mounted upon the slide 22 by means of a pin 24. A link 25 is pivotally connected by means of a pin 26 to the said toggle and by means of a pin 27 to a second toggle 28. The toggle 28 is pivotally mounted by means of a pin 29 upon the frame 10. A link 30 is pivotally connected by means of a pin 31 to the toggle 28 and by means of a pin 32 to a sliding member 33 commonly termed the "grip slide". The said grip slide is slidably mounted upon the frame 10 and carries an extension 34 projecting downwardly and outwardly therefrom and finding a bearing in a portion 35 of the frame 10.

As illustrated in Figs. 1 and 2, the portion 34 extends beyond the frame 10 and carries a cutting blade 36 adapted to cooperate with a cutting blade 37 carried upon a bracket 38 supported upon the frame 10. The said cutting members form a pair of shears which may be used for cutting bar stock to the proper lengths. The grip slide 33 likewise carries a die holder 39 adapted to contact with a die holder 40 carried upon the frame 10 when the said slide is moved to the right, as illustrated in Fig. 3. The toggle 23 is connected by means of a link 41 with one arm of a bell crank 42 pivotally carried upon the slide 22. The opposite arm of the said bell crank is connected to a rod 43 extending through the base 10 and carrying a compres-

sion spring 44. This structure serves as an emergency pressure relief in case the machine is accidentally operated with some solid piece between die holders 39 and 40.

A hopper furnace 45 is supported upon a bracket 46 in turn carried upon the frame 10. The hopper furnace 45 consists of an inner shell 47 and an outer shell 48 spaced therefrom so as to form a combustion chamber therebetween. The outer shell 48 is lined with fire brick 49 and the combustion chamber is roofed with arch brick 49*a* having openings therein to allow escape of the products of combustion. A plurality of oil burners 50 are located so as to project their flames into the combustion chamber. The inner hopper 47 is adapted to contain a plurality of blanks 51 preferably formed of round bar stock and each having substantially the same weight of material as the finished forgings desired. In certain cases, the blanks may be other than round. These blanks are heated to a forging temperature and maintained at that temperature by means of the oil burners 50. A vertical passageway 52 leads from the lower portion of the hopper 47 and a hook-shaped member 53 is positioned adjacent the lower end of the said passageway. The blanks 51 pass through the said passageway and the lowermost of said blanks is caught by the hooked member 53. The bracket 46 carries an ejector in the form of a slidable member 54 connected by means of a pair of rods 55 with a pair of brackets 56 carried upon the grip slide 33. The slidable member 54 carries a part 57 adapted to pass through an opening in the hooked member 53 and engage the lowermost of the blanks 51 when the said grip slide is moved to the left. This engagement moves the lowermost of the blanks from the said hook-shaped member 53 and propels the same into the upper end of a feeding chute 58. The said blank then drops by gravity down the feeding chute to a position 59 adjacent and in line with the end of the forging punch or header 17. By this construction, one of the heated blanks is fed to the position 59 at each reciprocation of the grip slide 33.

The die holders 39 and 40 are adapted to carry die blocks 60 and 61 respectively, each of which is formed with a cavity 62 of the proper shape to form the desired forging. A passageway 63 is formed with a portion in each of the said die blocks and extends from the said cavities toward the feeding position 59 of the blank. The said passageway is preferably of the proper cross section to admit the blanks used and the forging punch 17 closely fits the passageway.

Each of the die blocks 60 and 61 slidably carries an ejector pin 64 fastened at one end to an arm 65 of an ejector bar 66. The said bars are free to move in cavities 67 in the die holders 39 and 40 and each of said bars carries an arm 68 adapted to engage a portion 69 of one of said die holders as illustrated particularly in Fig. 4.

In the operation of the apparatus the blanks are first cut to lengths from bar stock by any suitable means such as the shear members 36 and 37. A plurality of the said blanks are placed in the hopper furnace 47 and heated therein to a forging temperature. Power is then applied to rotate the shaft 11 retracting the heading slide 15 and the grip slide 33 to the positions illustrated in Fig. 1. The retraction of the grip slide removes a blank from the hopper to the loading position 59 as previously described. Further rotation of the shaft 11 moves the grip slide 33 to the position illustrated in Fig. 3 while the heading slide 15 and forging punch 17 remain substantially in their retracted positions. The movement of the grip slide 33 brings the die holders 39 and 40 and the die blocks 60 and 61 into contact under heavy pressure. The said motion likewise brings the arms 68 of the ejector bars 66 into contact with the grip slide 33 and the frame 10 respectively. This contact causes a motion of the ejector bars to retract the ejector pins 64 until their ends are substantially flush with the surfaces of the cavities 62. In this position the ends of the said ejector pins form a portion of the surfaces of the die cavities. In the further rotation of the shaft 11 the grip slide remains in the position described in the heading slide 15 and the forging punch 17 are advanced to propel the blank 51 from the positions 59 through the passageway 63 into the die cavity 62. The position of the punch holder 16 upon the heading slide 15 is adjusted so that the pressure exerted upon the blank within the cavity is sufficient to cause the blank to fill the cavity. Since the forging punch 17 substantially fits the passageway 63 and since the blank has been formed with the proper amount of stock, there is no flash formed.

In the further rotation of the shaft 11 the heading slide 15 and the grip slide 33 are simultaneously retracted. The retraction of the grip slide brings the portions 69 of the die holders 39 and 40 into contact with the portions 68 of the ejector bars 66. This contact forces the ejector pins 64 into the position illustrated in Fig. 4 and the finished forging is thereby ejected from the die and is free to drop into a container provided for that purpose.

This apparatus is particularly applicable to brass forgings but may be used as well for other metals.

The invention claimed is:

In a blank feeder for a forging machine having a die with a cavity therein shaped to form a forging to a desired shape and having a horizontal passageway connecting said cavity with the exterior of said die, the com-

bination of a hopper for storing cylindrical forging blanks, a chute for conducting blanks by gravity from said hopper to a position adjacent the open end of said passageway, said chute having a rest at its lower end for receiving one of said blanks with its axis aligned with said passageway and said chute having openings in opposite walls thereof aligned with the ends of said blank when positioned upon said rest, a header movable through said openings to propel said blank from said rest through said passageway into said die for forging the same and means for feeding individual blanks from said hopper into said chute in timed relation with the movement of said header.

In witness whereof, I have hereunto affixed my signature.

CHARLES L. WEST.