March 10, 1925. 1,529,054

W. CAMERON

BLANK FEEDING MECHANISM

Filed Dec. 1, 1921 2 Sheets-Sheet 1

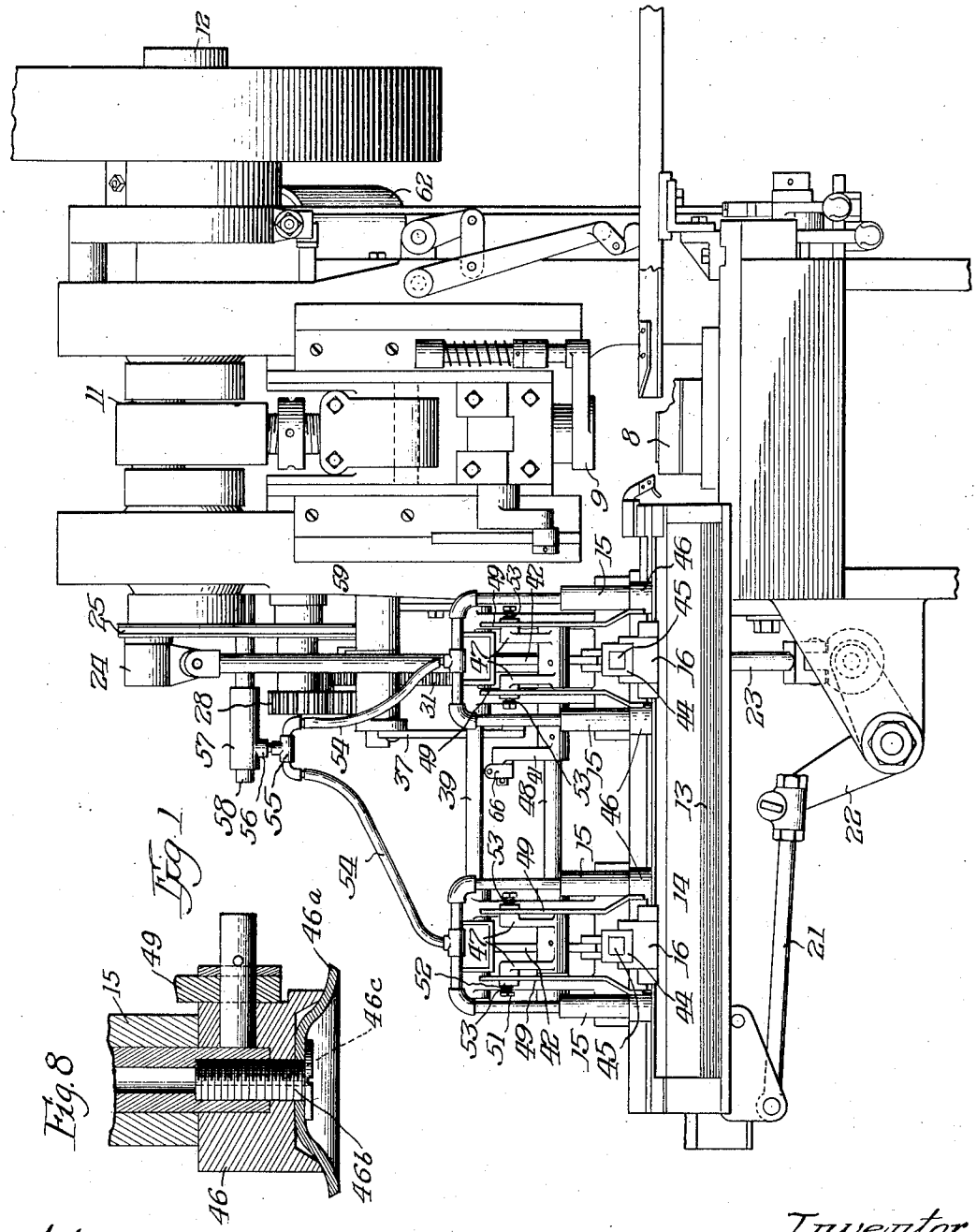


Fig. 1

Fig. 8

Witness:
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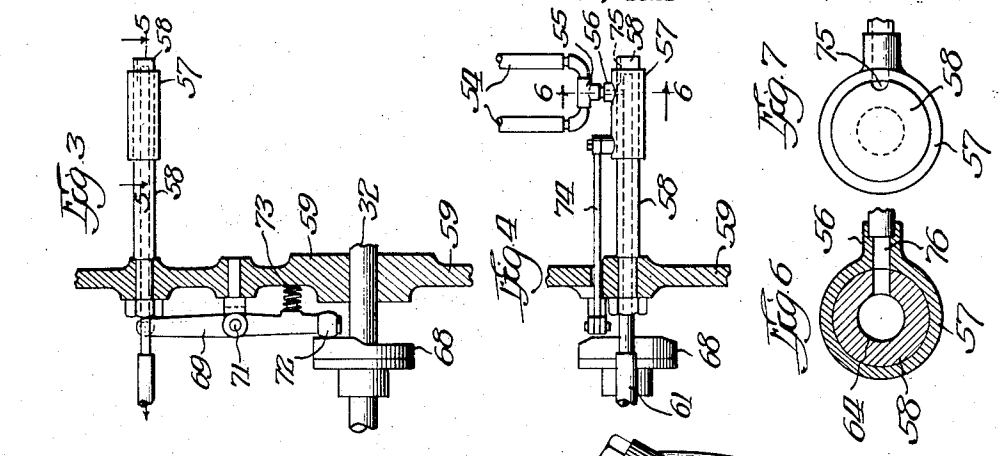
Inventor
William Cameron
By Ira J. Wilson, Atty

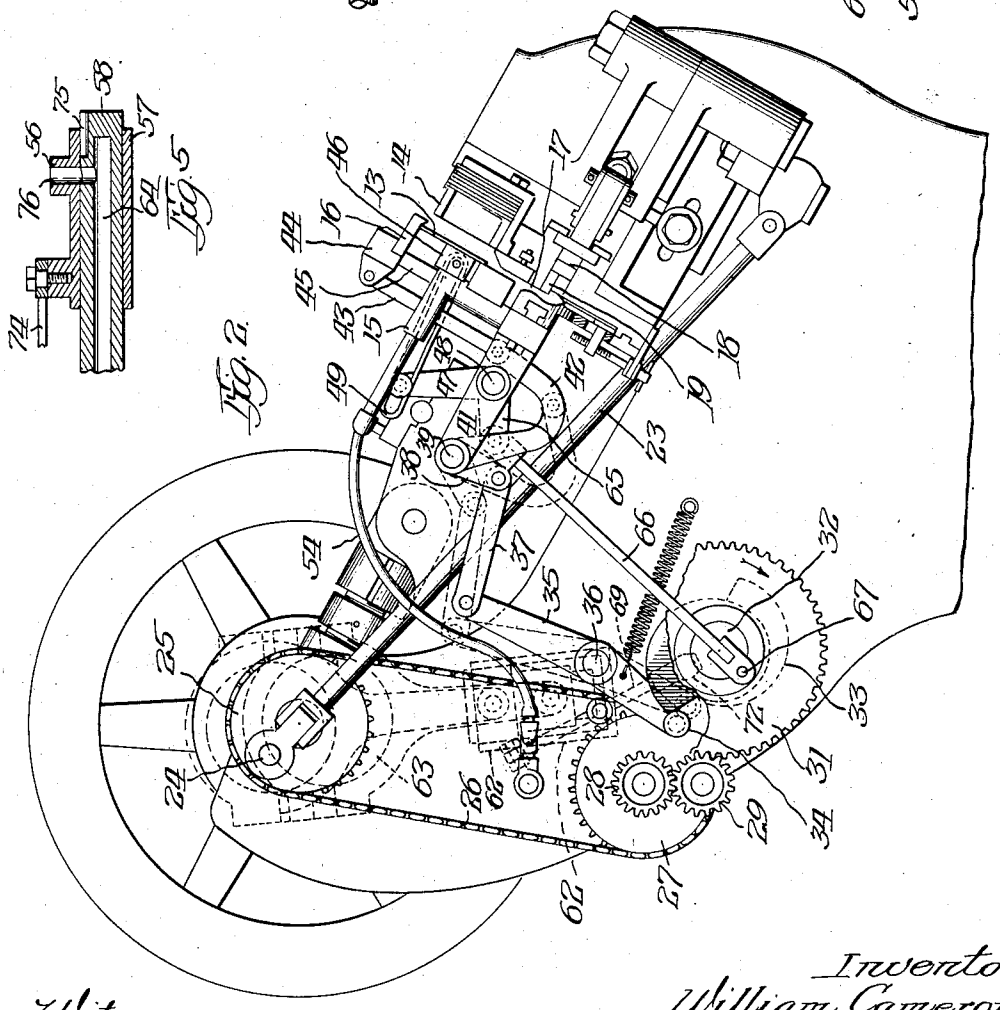
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BLANK FEEDING MECHANISM

Filed Dec. 1, 1921 2 Sheets-Sheet 2





Witness:
Geo. C. Dorion

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Patented Mar. 10, 1925. 1,529,054

UNITED STATES PATENT OFFICE.

WILLIAM CAMERON, OF CHICAGO, ILLINOIS.

BLANK-FEEDING MECHANISM.

Application filed December 1, 1921. Serial No. 519,109.

To all whom it may concern:

Be it known that I, WILLIAM CAMERON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Blank-Feeding Mechanism, of which the following is a specification.

This invention relates in general to blank feeding apparatus, and while capable of use for a variety of purposes, it is illustrated in the present instance as applied to a press adapted to stamp out articles, such as can ends, for instance, from metal blanks or sheets.

In machines of this character, the blanks are stacked in a magazine, from which they are lifted in succession by reciprocatory pneumatic lifting devices, and when elevated clear of the magazine, they are transferred laterally by reciprocatory transferers into a feed channel, along which they are fed longitudinally by a step-by-step movement to the blanking dies. It is essential that the blanks be accurately controlled during their movements from the magazine into the feed channel, or otherwise, they will not enter the channel and the machine will jam. The employment of pneumatic lifting devices having suction cups made of rubber or other relatively soft material designed to insure against air leakage between the cup and the blank being lifted has heretofore been attempted. In some instances, the blanks have been slid edgewise by the transferers from the suction cups into the feed channel while the suction between the blank and the cups was maintained, but this sliding of the blanks across the face of the cups under suction causes the faces of the cups to wear off very rapidly. In other instances, stripping devices have been employed to strip the blanks from the cups prior to the transferring operation, but when thus stripped from the cups, control of the blanks is lost to an appreciable degree, with the result that the blanks are not guided accurately into the feed channel, and many jams occur which not only destroy the blanks, but diminish the output of the machine. For these reasons, the rubber faced suction cups for this purpose have not been successful.

Resort has therefore been made to the use of metal faced suction cups, which do not wear away like rubber, but on the other hand their inflexibility renders them incapable of conforming to the uneveness and irregularities of bent, warped, or otherwise distorted blanks, consequently, the suction between a cup and a blank is frequently broken, one end of the blank drops and a jam and probable breakage of the machine ensues.

One of the primary purposes of my present invention is the provision of mechanism which will insure that the blanks are lifted by a positive suction from the magazine and positioned in alignment with the feed channel, whereupon, just as the edgewise movement of a blank under the influence of the transferer is about to take place, the suction on the lifting devices is relieved, thereby releasing the blank from the lifting devices so that wear on the suction cups is eliminated, and at the same time, the timing is such that the blanks are at all times under control and are accurately guided into the feed channel.

Another object of the invention is to provide mechanism for the purpose indicated, which will permit the employment of rubber faced suction cups without subjecting them to wear by the blanks being transferred therefrom, and which will be simple in construction, and durable, reliable and efficient in operation.

Other features of advantage of the invention will be readily appreciated as the same becomes better understood, by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a front view of a machine equipped with my invention;

Fig. 2 is an end view looking toward the right at Fig. 1;

Fig. 3 is a fragmentary sectional view of the suction controlling mechanism;

Fig. 4 is a similar view looking down upon the structure shown in Fig. 3;

Fig. 5 is an enlarged sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 4;

Fig. 7 is an end view looking toward the left at Figs. 3 and 4, and

Fig. 8 is a fragmentary sectional view of one of the suction cups.

Presses of this general character, adapted to handle and operate upon metal blanks, are well known, the general structure of

such a press being shown in my prior Patent No. 1277342, issued August 27, 1918, and I have therefore shown on the present drawing, and will describe only so much of the press structure as is necessary for an understanding of my invention.

The press, as illustrated, comprises a stationary die 8 adapted to co-operate with a reciprocatory die 9, which is actuated by a crank 11 on the main drive shaft 12. The blanks 13 are stored in a magazine 14, from which they are lifted in succession by pneumatic lifting devices, indicated generally by reference character 15, into the position shown in Fig. 2, from which they are transferred by transferers 16 edgewise into a feed channel 17. A reciprocatory feed bar 18, equipped with feed dogs 19, is reciprocated longitudinally of this channel by means of a link 21 connected with a bell crank lever 22, which in turn is oscillated by a link 23 connected at its upper end to a crank pin 24 on the end of the main shaft 12. Reciprocatory movements of this feed bar feed the blank by a step-by-step movement into position between the dies by which the desired operation is performed. All of these parts and other details of the press may be of any approved construction.

The main shaft 12 is provided near its inner end with a sprocket wheel 25 connected by a drive chain 26 with a driven sprocket 27 equipped with a pinion 28, which drives an idler 29, which in turn meshes with and drives a gear 31 fixed upon a shaft 32. The inner face of gear wheel 31 is provided with a cam 33 adapted to accommodate a follower 34 mounted upon a lever 35 fulcrumed at 36 upon the machine frame. This lever is connected by a link 37 with a lever arm 38 fixed upon a rock shaft 39 journaled in suitable supports 41. The rock shaft is equipped with a plurality of curved arms 42, each connected by a link 43 with a transferer head 44 carrying the transferer 16. This head is adapted to be reciprocated transversely of the magazine and is guided in its reciprocatory movements upon a guide bar 45. The transferers, acting in unison, are adapted to transfer a blank 13 which has been lifted from the magazine by blank lifting devices, which will be later described, into the feed channel 17, along which it is fed by a step-by-step movement to the dies 8 and 9.

The blank lifting devices, indicated generally by reference character 15, and four of which are shown in the present instance, are provided at their lower ends with suction heads 46 comprising rubber cups 46^a attached to the body of the head by headed stems 46^b, each provided with an aperture 46^c through which suction is applied to a blank 13 in contact with the head. The heads are reciprocated toward and from the magazine by means of arms 47 fixed upon a rock shaft 48 and frictionally connected with links 49 which are attached at their lower ends to the heads 46. These links, as will be apparent from Fig. 2, are slotted to accommodate threaded bolts 51 which pass through the slots and into the ends of the arms 47, the friction between the arms and the links being established by means of washers 52, which are urged against the links by expansion springs 53 surrounding the bolts 51. Suction is applied to the lifting devices at predetermined intervals through hose or tube 54 connected to a T-coupling 55 (Fig. 4) which is attached to the hollow stud 56 of a sleeve 57 adapted to be reciprocated upon a hollow rod 58 extending outwardly from the frame member 59 of the machine. The inner end of the rod 58 is connected by hose 61 to a suction pump 62 of any preferred construction, adapted to be continuously actuated by an eccentric 63 fixed on the main shaft 12.

The bore 64 of the rod 58 terminates inwardly from the outer end of the rod and opens laterally, as shown in Fig. 5, in position to communicate with the bore of the stud 56 so as to establish communication between the suction pump and the lifting devices to thereby apply suction to said devices to enable these devices to lift the uppermost sheet from the magazine into the position shown in Fig. 2. In order to effect the reciprocatory movements of the lifting devices, the rock shaft 48 is provided with an arm 65 which is connected by a link 66 with a crank pin 67 mounted upon the outer face of the gear wheel 31 so that at each revolution of the shaft 32, a complete reciprocation is imparted to the lifting devices in predetermined timed relation with a complete reciprocation of the transfers, which are also actuated from the shaft 32 through the action of the cam 33.

The shaft 32 is further provided with a cam 68 which is adapted to actuate a lever 69 fulcrumed at 71 to the frame of the machine and equipped with a follower 72 which is held against the face of the cam 68 by an expansion spring 73. The opposite end of lever 69 is connected by a link 74 with the sleeve 57 upon the hollow rod 58 so that at each revolution of the shaft 32, a complete reciprocation is imparted to the sleeve 57. The outer end of the rod 58 beyond the termination of the bore 64 is provided with a longitudinally extending groove 75 adapted to register with the bore 76 of the stud 56 when the sleeve 57 approaches the end of the rod 58. It will be manifest therefore, that when the bore 76 is in registration with the bore 64, suction will be applied to the lifting devices from the suction pump, and as the sleeve 57 travels toward the end of

the hollow rod, the suction will first be cut off and then the passage 76 will be brought into communication with the groove 75, thus admitting air under atmospheric pressure to the lifting devices so as to relieve the suction therein.

Since the lifting devices, the transferers, and the suction control sleeve are all actuated from the shaft 32, each being given a complete actuation at each revolution of the shaft, it will be obvious that these parts operate in predetermined timed relation, which is so regulated that the suction on the lifting devices will be relieved just at the time that the transfers engage the lifted blank to transfer it edgewise into the feed channel. The blank is therefore released from the control of the lifting devices just as control thereof is assumed by the transferers, with the result that while the blank is at all times in its movement from the magazine into the feed channel under perfect control, the transferers are not obliged to work against the resistance to movement of the blanks which would be offered if the suction on the lifting devices were not relieved, and furthermore, the faces of the suction heads are not subjected to wear which would result from frictional sliding of the blanks across the faces thereof.

The operation of a machine embodying my invention is therefore, briefly as follows: Upon each revolution of the shaft 32, the lifting devices are lowered into the magazine into engagement with the topmost blank therein, variations in the heighth of the blank being taken care of by the frictional sliding connection between the links 49 and the arms 47. When the lifting devices have reached the lowermost limit of their travel and the faces of the suction heads 46 are engaged with the upper surface of the uppermost blank in the magazine, the sleeve 57 has been moved to a point to register the passage 76 with the bore 64 of the rod 58, thereby permitting the application of suction from the suction pump to the lifting devices. This suction causes the uppermost blank to adhere to the suction heads, and upon upward movement of the devices, the blank is lifted from the magazine into the position shown in Fig. 2. When it has reached this position, the transferers are moved across the path of movement of the lifting devices to transfer the blank from the lifting devices into the feeding channel. Just as the transferers are brought into engagement with the outer edge of the blank, the sleeve 57 has moved outwardly to register the passage 76 with the groove 75, thereby admitting atmospheric air to the lifting devices to relieve the suction thereon so that the blank may be transferred without resistance by the suction heads and without wear upon the faces of these heads. The blank, therefore, is under control at all times but the control by the lifting devices and the transferers, instead of being simultaneous, is alternate, thereby producing an easier running machine and reducing the wear on the faces of the suction heads to a minimum.

It is believed that the construction, operation, and many of the advantages of this invention should be understood and appreciated without further description, and while I have shown and described a preferred embodiment of the invention, obviously, the details thereof may be varied within considerable limits without departing from the essence of the invention as defined in the following claims.

I claim:

1. In a blank feeding mechanism, the combination of pneumatic blank lifting devices, a transferer, means for reciprocating said transferer, a suction creating device, a connection between said device and said blank lifting devices, said connection including a hollow tube and a sleeve slidable thereon, and means for reciprocating said sleeve to intermittently establish communication between the lifting devices and the suction device and between the lifting devices and atmosphere in predetermined timed relation with respect to the movements of said transferer.

2. In a blank feeding mechanism, the combination of reciprocatory blank lifting devices, a transferer, a driven shaft, means for reciprocating said transferer from said shaft, a suction device, a connection between said suction device and said lifting devices including a hollow tube and sliding sleeve, a cam on said shaft, and means operated by said cam for reciprocating said sleeve so as to alternately connect said lifting devices with said suction device and with atmosphere respectively in predetermined timed relation with the movements of the transferer.

3. In a blank feeding mechanism, the combination of a blank lifting device, a transferer, means including a cam shaft for reciprocating said transferer across the path of said lifting device, suction creating means, a connection between said suction creating means and said lifting device, a control mechanism interposed in said connection through which communication is established between said lifting device and said suction creating device or atmosphere alternately, and means operated by said cam shaft for actuating said control mechanism in predetermined timed relation with respect to movements of said transferer to thereby relieve the suction on said lifting device and release a blank lifted thereby, at the proper time to be transferred by said transferer without interference by said lifting device.

4. In a blank feeding mechanism, the combination of a pneumatic lifting device, a transferer, means for reciprocating said transferer, a suction creating device, means including a longitudinally movable sleeve for establishing communication between said lifting device and said suction device and between said lifting device and atmosphere in alternation, and means for actuating said sleeve in predetermined timed relation with respect to the movements of said transferer.

WILLIAM CAMERON.