

E. H. BROWN, DEC'D.
M. L. HEALD, EXECUTRIX.
PNEUMATIC FOLDING MACHINE.
APPLICATION FILED JAN. 23, 1911.

1,053,477.

Patented Feb. 18, 1913.

3 SHEETS—SHEET 1.

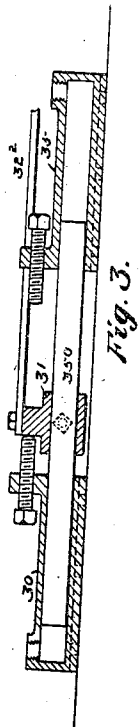


Fig. 3.

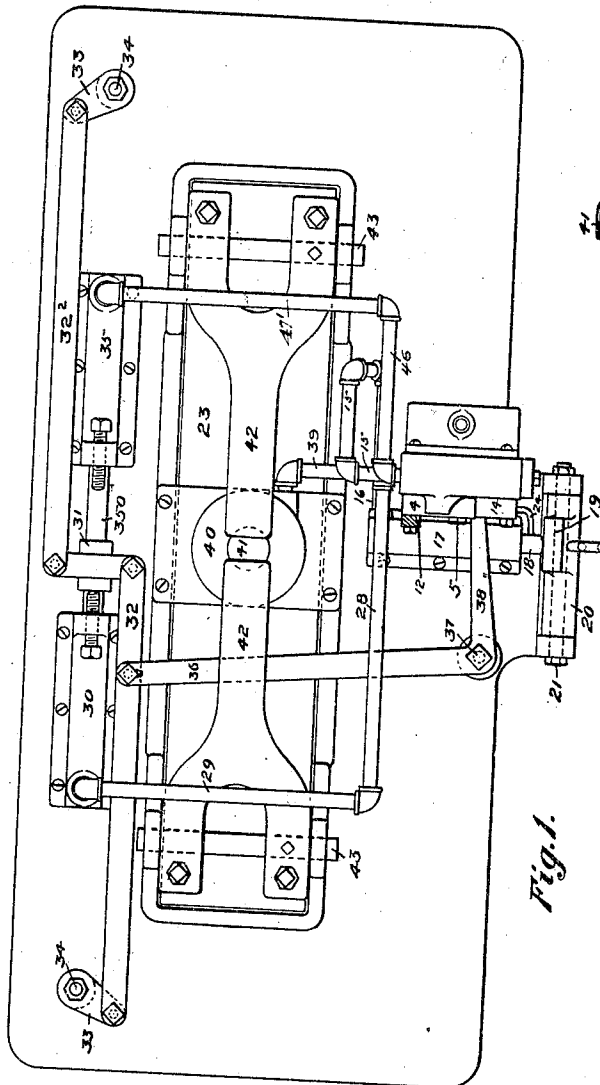


Fig. 1.

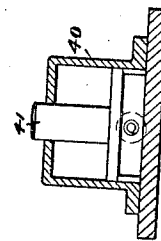


Fig. 5.



Fig. 4.

WITNESSES:

Reth Van der Volgen
John W. Burrows

INVENTOR

Eugene H. Brown

BY

Walter E. Ward

ATTY

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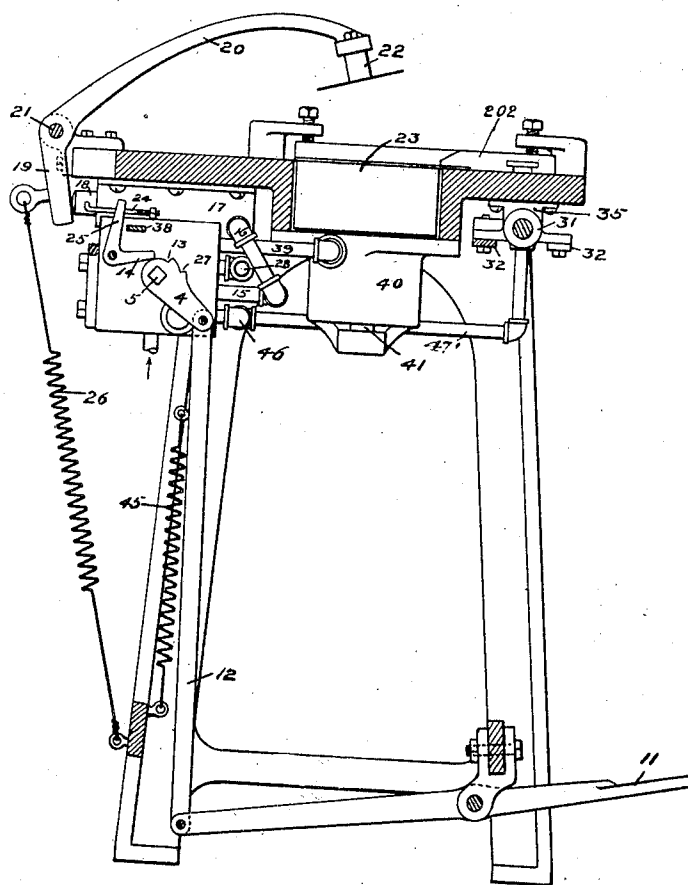


Fig. 2.

WITNESSES:

Reta Van der Volgen.
John W. Burrows

INVENTOR

Eugene H. Brown

BY

Walter E. Ward

ATTY

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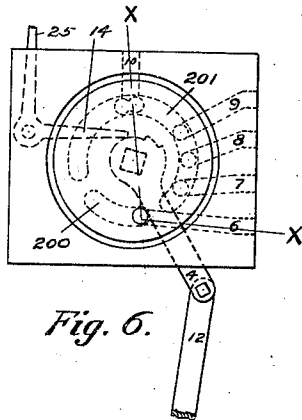


Fig. 6.

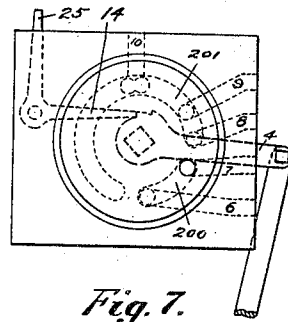


Fig. 7.

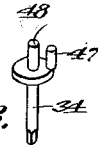


Fig. 13.

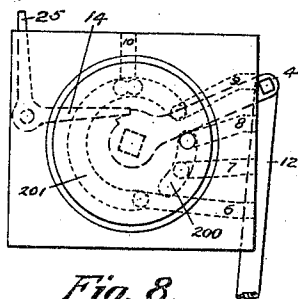


Fig. 8.

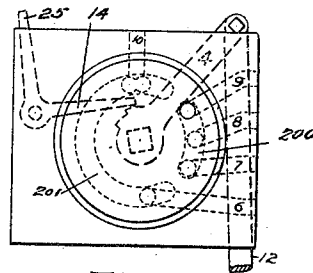


Fig. 9.

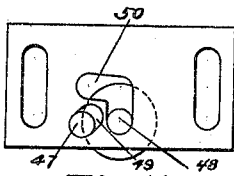


Fig. 11.

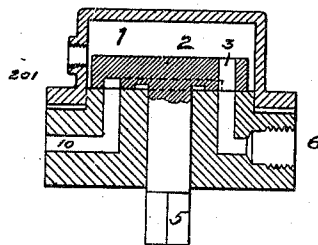


Fig. 10.

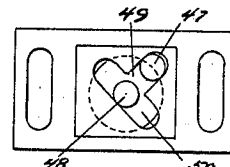


Fig. 12.

WITNESSES:

Reta Van der Volgen
John W. Burrows

INVENTOR

Eugene H. Brown

BY

Walter E. Ward

ATTY

UNITED STATES PATENT OFFICE.

EUGENE H. BROWN, OF TROY, NEW YORK; MARGARET L. HEALD EXECUTRIX OF SAID BROWN, DECEASED.

PNEUMATIC FOLDING-MACHINE.

1,053,477.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed January 23, 1911. Serial No. 604,061.

To all whom it may concern:

Be it known that I, EUGENE H. BROWN, a citizen of the United States, residing at Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Pneumatic Folding-Machines, of which the following is a specification.

My invention relates to machines for folding collar and cuff blanks and the object of my invention is to construct a machine by which the die-head will be lowered and the folder-plates operated and the goods pressed between the folder-plates and the bed-plate automatically by pneumatic pressure.

Other objects of my invention will appear in the following specification.

I accomplish these objects by means of the mechanism illustrated in the accompanying drawings in which—

Figure 1 is an inverted plan view with parts broken away. Fig. 2 is an end elevation with parts broken away. Fig. 3 is a section of the air cylinders and piston for operating the folder-plates. Fig. 4 is a section of the air cylinder and piston for lowering the die-head. Fig. 5 is a section of the air cylinder and piston for pressing the bed-plate against the folder-plates. Figs. 6, 7, 8 and 9 are diagrams illustrating different positions of the air valve. Fig. 10 is a distorted section of the air valve, along the line X—X, Fig. 6. Figs. 11 and 12 are detailed views of the eccentrics for operating the folder-plates. Fig. 13 is a perspective view of the crank for operating the folder plates.

Similar numerals refer to similar parts throughout the several views.

In the manufacture of collars and cuffs the blanks are placed upon the bed-plate of the folding machine and the die pressed upon the blanks while the folder-plates fold the edges of the blanks over the edges of the die and the blanks are then pressed between the folder-plates and the bed-plate. Such a machine is shown and described in Letters Patent No. 870,343 issued to me on the 5th day of November, 1907. My present invention is for the purpose of operating such well known types of folding machines by pneumatic pressure.

Referring to Fig. 10 of the drawings, 1 is a chamber formed by the cover of the air valve into which compressed air is conducted by any desired means from a source of supply (not shown). Within the chamber 1 is a rotary plate or disk 2 provided with a projecting stem 5 adapted to engage with and be driven by the valve lever 4. The rotary plate 2 has formed in its face the passageways 200 and 201. The passageway 200 having a port 3 connecting it to the pressure chamber 1. The passageway 201 is for the purpose of connecting the ports leading to the several operating pressure cylinders to the exhaust port 10, as will be explained later. The valve lever 4 is connected by means of the connecting rod 12 to the pedal 11 pivoted to the frame of the machine, as shown in Fig. 2. Connected to the rod 12 is the spring 45 the other end of which is fastened to the frame of the machine, also shown in Fig. 2.

Referring to the diagrams Figs. 6, 7, 8 and 9, Fig. 6 shows the relative position of the different ports when the pedal is raised and the machine at rest. When in this position pressure being admitted to the chamber 1 will pass through the port 3 in the rotary plate 2 into the passageway 200 and so into the port 6 in the valve seat and thence through the pipes 46—47 into the pressure cylinder 35 and will cause the piston 35 to move to the left, (see Figs. 1 and 3) carrying with it the cross-head 31 attached thereto. The connecting bars 32—32^a connecting the cross-head 31 to the levers 33—33 on the cranks 34—34 (see Figs. 11 and 12) will cause the folder-plates to be withdrawn from contact with the die and goods. The ports in the valve and valve seat are so arranged that pressure will not be allowed to exhaust from chamber 35 until just the time the pressure is to be admitted to chamber 30. When the pressure is applied to the pedal 11 the link or rod 12 and lever 4 will cause the rotary plate to move to the position shown in diagram in Fig. 7 when the end of the dog 14 will come into contact with the notch 13 in the lever 4. When in this position air pressure is admitted from the pressure chamber 1 through the port 3 into the passageway 200 and through the port 7 and pipes 15 and 16 into

the pressure cylinder 17, and will cause the piston 18 to be forced out against the projection 19 on the die-arm 20 which is pivoted at 21 and force the die on the die-head 22 to descend upon the blank which has been placed in position on the bed-plate 23. It will be seen that by means of the passageway 200 pressure is still admitted to the port 6 and thence to the pressure cylinder 35 which arrangement secures the folder-plates in their open position and prevents any damage to the die by the accidental moving forward of the folder-plates before the die is lowered upon the bed-plate. As the piston 18 nears its outward limit of travel the nut on the rod 24 attached thereto strikes the arm 25 on the dog 14 and pulls the dog 14 from contact with the notch 13 on the lever 4. Pressure being continued on the foot pedal, the connecting rod 12 and valve lever 4 will continue the movement of the rotary plate 2 until the dog 14 comes into contact with the notch 27 on the lever 4, when the position of the valve will be as shown in Fig. 8.

By reference to Fig. 8 it will be seen that as the port 3 and passageway 200 commence to uncover the port 8 which port admits pressure through the pipes 28 and 29 into pressure cylinder 30 for forcing the piston to the right causing the folders to close or move inwardly, the passageway 201 commences to uncover port 6 and allow the pressure in cylinder 35 to exhaust through port 10. It will also be seen that pressure is still admitted by means of the passage 200 to the port 7 and thence to pressure cylinder 17, which will hold the die firmly against the bed-plate 23 while the folders are being moved inwardly. As the piston 350 is moved to the right, carrying with it the cross-head 31, connecting bars 32—32² and by means of the levers 33—33 causing the cranks 34—34 to move the folder-plate inwardly, it also carries with it the arm 36 of the bell crank lever pivoted at 37 (see Figs. 1 and 2) and causes the arm 38 of said bell crank lever to engage the arm 25 on the dog 14 and pull it out of engagement with the notch 27 in the valve lever 4. Pressure being continued on the foot pedal, the connecting rod 12 and valve lever 4 will continue the movement of the rotary plate until it reaches the position shown in diagram in Fig. 9. When in this position, (as shown in Fig. 9) pressure will be admitted from pressure chamber 1 through port 3 into passageway 200, thence by means of port 9 and pipe 39 into pressure cylinder 40 which will cause the piston 41 (Figs. 1, 2 and 5) to be forced downward against the ends of the pressure levers 42—42 which are fulcrumed at 43—43, the other ends of the pressure levers being in contact with the bed-plate 23 will exert an upward pressure upon it and thus press the folded blank by

pressing the bed-plate upward against the folder plates and pressing the fold of the blank between them. It will be seen that in this position pressure is still admitted to ports 7 and 8. This arrangement guards against any failure of the folders and die to keep their position which might happen by reason of the pressure "running down" from leaks if the cylinders were cut off and dependence placed in their holding the pressure originally supplied. When the pressure is removed from the foot pedal the spring 45 (Fig. 2) will cause the foot pedal, connecting rod 12, valve lever 4 and rotary plate 2 to return to their original positions. As the rotary plate moves backward from the position shown in Fig. 9, the passageway 201 will, when the rotary plate reaches the position shown in Fig. 8, exhaust the pressure from the cylinder 40 by connecting port 9 with exhaust port 10 which will release the pressure on the bed-plate 23. When it reaches the position shown in Fig. 7 it will exhaust the pressure from the cylinder 30 by connecting port 8 to the exhaust port 10. At the same time it will let pressure through port 3, passageway 200 and port 6 into cylinder 35 and cause the folders to be opened or moved backward. When it reaches the original position as shown in Fig. 6 it exhausts the pressure from cylinder 17 and allows the spring 26 (Fig. 2) to raise the die and die-head 22 from contact with the bed-plate 23 and the projection 19 on the die-arm 20 to return the piston 18 to its original position. (See Fig. 4).

Figs. 11 and 12 show the crank operating the folder-plates 202 and the driving pin 47 and the guide pin 48. The pins 47 and 48 are located in the corner of the folder-plates, the driving pins 47—47 being located in the recess 49 and the pin 48 in the groove 50. By turning the crank the driving pin 47 will move the folder-plate which will be guided by the guide pin 48 working in the groove 50 and if the groove 50 is straight, as shown in Fig. 12, the folder-plate will be given a diagonal movement over the die upon the bed-plate. The direction of the movement of the folder-plates may be regulated by varying the direction of the groove 50. If the groove 50 turns at a sharp angle, as shown in Fig. 11, the folder-plate will move endwise and then sidewise, first folding the goods over the ends of the die and then over the sides of the die, or vice versa as the case may be. The object being to move the guide-plate so that it will fold the edges of the cloth over the sides and ends of the die and the movement of each section of the folder-plate will be simultaneous and concurrent. Constructed in this way one downward movement upon the foot pedal performs three successive operations. First: Bring-

ing down the die upon the goods upon the bed-plate. Second: The further pressure downward of the foot pedal moves the folders inward and folds the goods over the die. Third: The further movement of the

5 foot pedal presses upward the bed-plate and presses the goods between the bed-plate and the folder-plates. These movements follow each other as rapidly as the foot presses
10 downward the foot pedal and the pneumatic power of the compressed air moves the various parts of the machinery much more rapidly and effective than can be done by any other means.

15 The pressure cylinder under the bed-plate is sufficiently large to exert all the force desired, and presses the goods much more effectively than can otherwise be done. In this way the folding machine is worked
20 rapidly and controlled entirely by the foot of the operator so that the operator may have both hands free to handle the goods and arrange them in position on the bed-plate and remove them as desired.

25 What I claim as my invention and desire to secure by Letters Patent is,

1. In a machine of the class described, a frame, a vertically movable bed-plate mounted upon said frame, a die-arm, a die-head, a die, folder plates, a chamber adapted to receive compressed air, separate cylinders, one of which is adapted to operate said bed-plate and one of which is adapted to operate the die-arm and one of which is adapted
30 to operate the folder-plates, pipes extending from said compressed air chamber to said cylinders and means for admitting compressed air from said chamber to said cylinders successively whereby said die-arm, folder-plates and bed-plate may be operated
35 successively by means of compressed air from said chamber.

2. In a folding machine, a frame, a bed-plate mounted upon said frame, a die-arm hinged to said frame, a die-head, a die, a chamber adapted to receive compressed air, a cylinder, connections between said cylinder and said compressed air chamber, means for admitting compressed air from
45 said chamber into said cylinder, a piston in said cylinder adapted to be operated by said compressed air, one end of said piston extending through said cylinder and in contact with the die-arm carrying said die-head whereby admission of compressed air in said
50 cylinder will force said piston against said die-arm thereby pressing said die upon said bed-plate.

3. In a machine of the class described, a frame, a bed-plate, a die-arm, a die-head, a die, a compressed air chamber, a cylinder, a piston in said cylinder, one end of said piston extending outside of said cylinder and in contact with said die-arm, an
55 opening from said compressed air chamber,

pipes connecting said compressed air chamber with said cylinder, a rotary plate in said compressed air chamber, an opening through said rotary plate adapted to allow the air to pass from said chamber through
60 said pipes into said cylinder, a foot pedal attached to said frame, means for moving said rotary plate by said foot pedal whereby pressure upon said foot pedal will operate said die-head, substantially as described.

4. In a machine of the class described, a frame, a bed-plate mounted upon said frame, a die-arm hinged upon said frame, a die-head attached to said die-arm, a die attached to said die-head, folder-plates mounted upon
65 said frame and adapted to fold the edges of the cloth upon said bed-plate over the edges of said die, a compressed air chamber, a rotary plate located in said compressed air chamber, two cylinders mounted in said frame operating a single piston, pipes leading from said compressed air chamber to each of said cylinders, openings through said rotary plate adapted to allow compressed
70 air to pass through said pipes alternately into each of said cylinders, a foot pedal attached to said frame, connections between said foot pedal and said rotary plate whereby pressure upon said foot pedal will operate said rotary plate so as to allow the compressed air to pass into one of said cylinders and exhaust from the other and the withdrawal of pressure from said foot pedal will allow the air to be exhausted from that cylinder and the compressed air to pass into the other cylinder, a piston adapted to be operated in alternate directions from said cylinders, intermediate connections between said piston and said folder-plates whereby the pressure upon said foot pedal will close
75 said folder-plates and the removal of pressure will open said folder-plates.

5. In a machine of the class described, a frame, a bed-plate, a die, folder-plates adapted to fold goods over said die upon
80 said bed-plate, a pressure chamber, separate cylinders adapted to operate said die and folder-plates respectively, pipes adapted to conduct compressed air from said chamber to said cylinders, a rotary-plate within said chamber covering the openings to said pipes, a port in said rotary-plate adapted to allow compressed air to pass through said rotary-plate, passageways under said rotary-plate, one of said passageways adapted to allow
85 compressed air to pass from said port to the pipes leading to the said cylinders and the other passageway adapted to allow the exhaust from said cylinders to escape, and means for turning said rotary-plate to successively open and close said openings.

6. In a machine of the class described, a frame, a bed-plate, a die, folder-plates adapted to fold goods over said die upon
90 said bed-plate, a pressure chamber, separate

cylinders adapted to operate the various actuating parts of said die, pipes adapted to conduct compressed air from said chamber to said cylinders, a rotary-plate within said chamber covering the openings to said pipes, a port in said rotary-plate adapted to allow compressed air to pass through said rotary-plate, passageways under said rotary-plate, one of such passageways adapted to allow compressed air to pass from said port into the pipes leading to said cylinders and the other passageway adapted to allow the exhaust from said cylinders to escape, a stem attached to said rotary plate, a valve lever attached to said stem, a foot pedal mounted upon the frame of said machine, connections between said foot pedal and said valve lever whereby the rotary-plate may be operated by said foot pedal to successively open and close said openings.

7. In a machine of the class described, a frame, a bed-plate, a die, folder-plates adapted to fold goods over said die upon said bed-plate, a pressure chamber, separate cylinders adapted to operate the various actuating parts of said die, pipes adapted to conduct compressed air from said chamber to said cylinders, a rotary-plate within said chamber covering the openings to said pipes, a port in said rotary-plate, passageways under said rotary-plate, one of such passageways adapted to allow compressed air to pass from said port into the pipes leading to said cylinders and the other passageway adapted to allow the exhaust from said cylinders to escape, a stem attached to said rotary-plate, a valve lever attached to said stem, a foot pedal mounted upon the frame of the machine, a rod connecting said foot pedal with said valve lever, yielding means adapted to normally force said foot pedal in a raised position whereby pressure upon said foot pedal will turn said rotary-plate, allowing compressed air to pass successively into the various operating cylinders in said machine, and the removal of said pressure will return said foot pedal to its original position reversing the movements of said rotary-plate thereby operating the actuating mechanism of said machine successively.

8. In a machine of the class described, a frame, a bed-plate, a die-arm, a die-head, a die, folder-plates, a compressed air chamber, a rotary plate within said chamber, a port through said rotary plate adapted to allow the compressed air to pass from said chamber into the compressed air cylinders adapted to severally and successively operate the actuating mechanism of said machine, a foot pedal pivoted upon said frame, a stem attached to said rotary plate, a lever attached to said stem, a rod connecting said foot pedal with said lever, yielding means for forcing said foot pedal in a raised position when no pressure is applied, means

for conducting the compressed air through the port of said rotary plate into the cylinder adapted to normally hold said folder-plates open, intermediate connections between said chamber and said operating cylinders whereby the downward pressure upon said foot pedal will turn said rotary plate thereby successively admitting compressed air into said cylinders and causing said die to descend upon the bed-plate, the folder-plates to close and the bed-plate to be pressed upward, and the removal of pressure from said foot pedal will remove the pressure from said bed-plate, open the folder-plates and raise the die.

9. In a folding machine adapted to be operated by pneumatic pressure, a frame, a bed-plate, folder-plates, a die-arm hinged to said frame, a die-head, a die attached to said die-head adapted to descend upon said bed-plate, a compressed air chamber, a rotary-plate, a stem attached to said rotary-plate, a valve lever attached to said stem, a foot pedal pivoted to said frame, means for operating said valve lever by said foot pedal, a notch in said valve lever, a dog attached to said frame and adapted to enter said notch, a port through said rotary-plate adapted when at normal position to allow compressed air from said chamber to pass into a connecting cylinder, a cylinder adapted to receive the compressed air from said chamber which said cylinder is connected with and adapted to operate the folder-plates, whereby compressed air entering into said cylinder will open said folder-plates and hold them open by means of said dog entering said notch.

10. In a machine of the class described adapted to be operated by pneumatic pressure, a frame, a vertically movable bed-plate, a die-arm hinged to said frame, a die-head, a die attached to said die-head and adapted to press upon said bed-plate, folder-plates adapted to close over said die upon said bed-plate, a compressed air chamber, means for operating said folder plates by compressed air from said chamber, means for pressing said bed-plate upward by compressed air from said chamber, a rotary plate located in said compressed air chamber, a stem attached to said rotary plate, a valve lever attached to said stem, a foot pedal pivoted to said frame, means for operating said valve lever by said foot pedal, a notch in said valve lever, a dog attached to said frame, and means for operating said dog by parts of the mechanism of the machine actuated by compressed air from said chamber.

11. In a folding machine, a frame, a die-arm hinged to said frame, a die-head attached to said die-arm, a die attached to said die-head, means for operating said die-arm, a bed-plate, folder-plates adapted to

close inwardly over the die upon said bed-plate, a crank adapted to operate in a plate attached to said folder-plates, a plate attached to said folder-plates, an opening in
5 said plate adapted to receive the driving crank pin, a guide slot in said plate adapted to receive the central pin of said crank and means for operating said crank.

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE H. BROWN.

Witnesses:

RETA VAN DER VOLGEN,
WALTER E. WARD.