No. 799,321.

PATENTED SEPT. 12, 1905.

A. J. GARDNER.

FEEDING DEVICE.

APPLICATION FILED OCT. 26, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

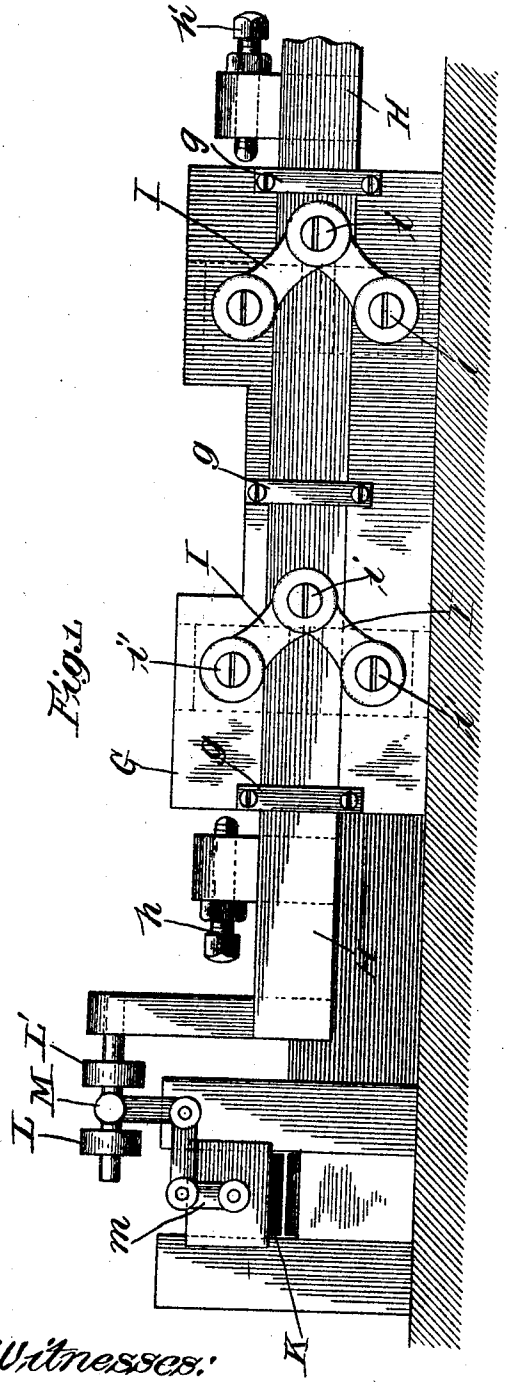
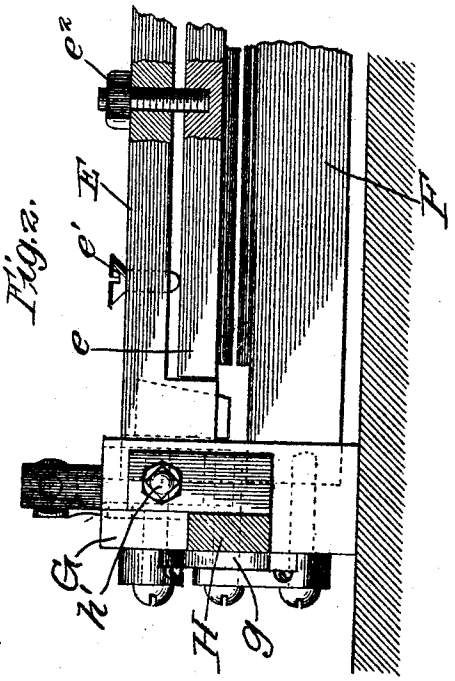


Fig. 2.



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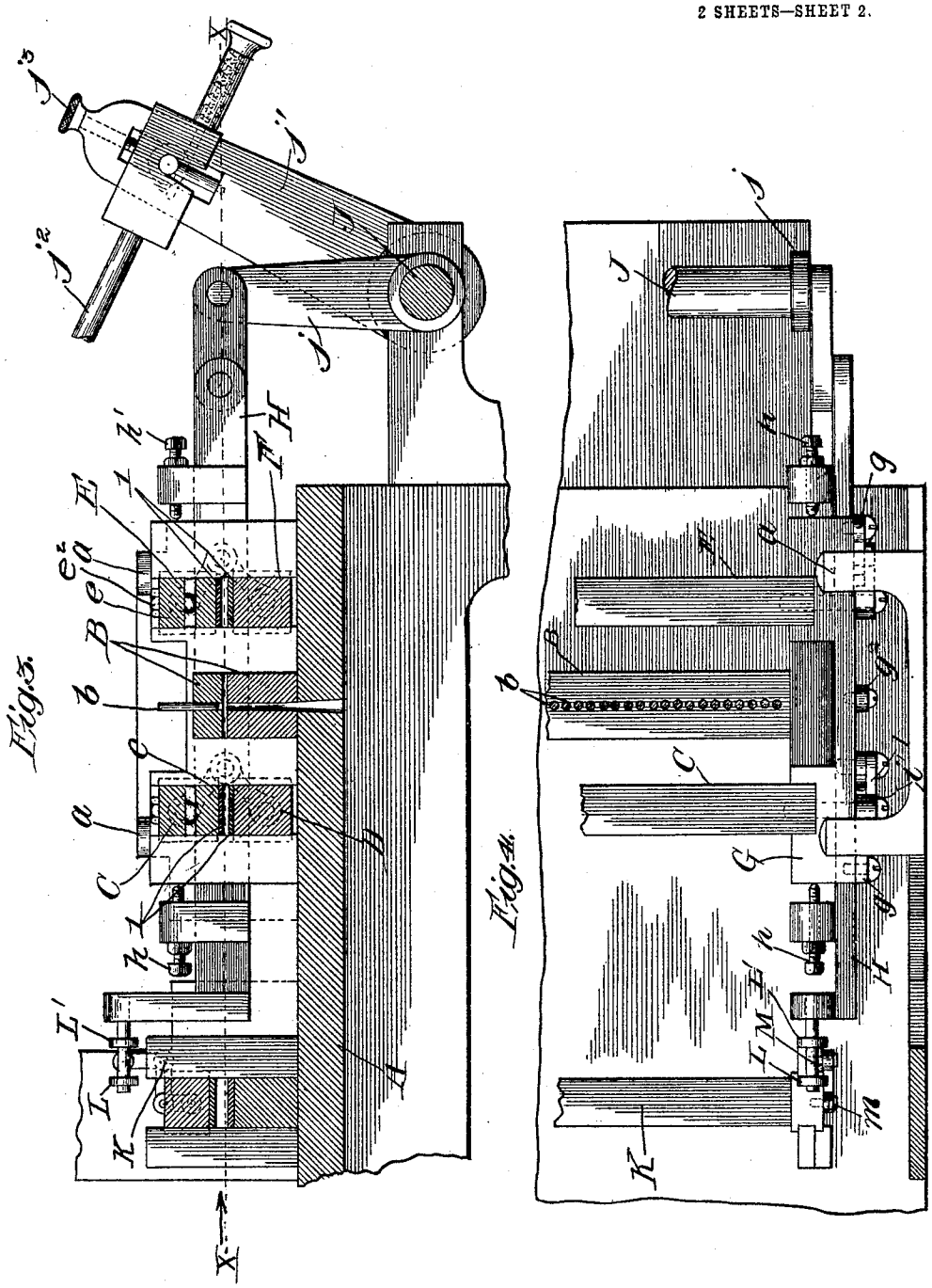
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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FEEDING DEVICE.

No. 799,321. Specification of Letters Patent. Patented Sept. 12, 1905.

Application filed October 26, 1903. Serial No. 178,458.

To all whom it may concern:

Be it known that I, ALBERT J. GARDNER, a citizen of the United States of America, and a resident of Buffalo, Erie county, New York, have invented a certain new and useful Improvement in Feeding Devices, of which the following is a specification.

My invention contemplates the use, in various kinds of machinery, of a reciprocating clamp for feeding various kinds of flat or sheet material—such as sheet metal, paper, boards, and other like materials—and means for automatically opening and closing said clamp, the object being to enable the clamp to first close on the material and by its bodily movement then move the material a certain distance and to then open and move in the reverse direction, the clamp in this way acting as an intermittent feeding device. It further contemplates a second clamp adapted to automatically open and close, but having no bodily shift, the arrangement being such that this second clamp holds the paper while the other clamp is moving back along the material in a direction opposite to the direction of feed. A feeding device of this character is simple and effective, and, as stated, can be employed in various connections for various purposes, and is of such nature as to be useful in various kinds of machinery where it may be necessary or desirable to subject sheet material to an intermittent feeding action.

The nature and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a side elevation of a feeding device embodying the principles of my invention. Fig. 2 is a front elevation of one side of the device shown in Fig. 1. Fig. 3 is a vertical section, on a reduced scale, of the feeding device shown in Figs. 1 and 2. Fig. 4 is a plan of one side of the feeding device.

As thus illustrated, the frame or body of the machine A can be of any suitable or desired character.

As illustrated, my improved feeding device is employed for feeding sheet material, such as paper or sheet metal, between the dies B, provided with the punches *b*. These punches can be for various purposes and can be operated in any suitable known or approved manner. The sheet material is fed along the line X X and in the direction indicated by the arrow in Fig. 3. In connection with a punching device of this character my improved feeding device comprises a pair of clamps arranged at opposite sides of the said dies, one clamp consisting of the separable jaws C and D and the other clamp consisting of a pair of similar jaws E and F. These jaws, it will be observed, consist of horizontally-disposed bars provided on their opposing or clamping surfaces with strips of rubber 1, so as to enable them to take a better grip on the sheet material. The ends of these bars are disposed in vertical grooves or recesses formed on the inner faces of the blocks G, it being understood, with respect to Fig. 4, that the opposite sides of the feeding device are alike and that the parts shown, for example, in Figs. 1, 2, and 4 can be duplicated at each side of the machine. These blocks G are adapted to slide upon the frame or body A and may be held down in place by overhanging portions *a*, the latter being secured to the frame. Each block G is provided on its outer surface with a horizontally-extending groove, and these grooves are adapted to receive and provide bearings for the sliding bars H. The bars H, as illustrated, are connected with the jaws of the two clamps by means of toggle-links I, each pair of links forming a toggle, the middle portion of which is pivotally secured to the adjacent bar H by means of a bolt or screw *i*. The outer ends of the links are connected with the ends of the jaws by means of screws or bolts *i'*, and these screws or bolts can be arranged for vertical shifting movement in slots formed in the blocks G. Straps or cross-pieces *g* can be employed as the means for keeping the bars H properly seated in the grooves in the blocks G. As illustrated, the outer surfaces of the bars H are flush with the outer surfaces of the blocks G. The relative movement between the bars H and the blocks G can be limited in any suitable or desired manner—as, for example, by providing said bars with adjustable stops *h* and *h'* in the form of set-screws adapted to engage the ends of said blocks. Thus the initial movement of the bars H in one direction will close the jaws of the clamps through the medium of the toggles, and immediately upon the clamps being thus made to take a firm grip upon the sheet material the stops *h* then engage the ends of the blocks G, thereby causing said blocks to partake of the shifting movement of said bars. This movement can be produced in any suitable or desired manner, and its extent can be of such a predetermined character as to give the sheet material

the desired amount of feed. An initital reverse movement of the bars H causes the toggles to force the jaws apart, thereby releasing the sheet material, and the movement of the bars then continuing the stops h' then engage the blocks G and cause the latter to carry the jaws back in a direction opposite to the direction of feed. In this way the initial movement of the bars in one direction serves to close the jaws, while the initial movement of the bars in the opposite direction serves to open the jaws. The jaws close and grip the sheet material and the bodily movement of the two clamps then carries the sheet material along in the direction of feed. After the punching is accomplished the jaws then open and the clamps then move back to the other position. It will be seen that with the clamps thus arranged to grip the sheet material at opposite sides of the punching devices or at different points in the length of the sheet material a certain portion of the sheet material is simply gripped and carried bodily the desired distance. In other words, the portion of the sheet material between the two clamps is neither pushed nor pulled, but is simply carried bodily.

The device illustrated for operating the clamps consists of a rock-shaft J, provided with crank-arms j, having suitable link connection with the ends of the bars H. The end of the shaft J is provided with another arm j', which is connected with the end of a pitman or operating-rod j^2. The distance between the center of the shaft J and the point of connection between the rod j^2 and the arm j' can be varied by means of the adjusting-screw j^3, so as to vary the feed.

As a simple and effective arrangement for holding the sheet material while the clamps are moving back in a direction opposite to the direction of feed a third clamp, consisting of a stationary lower jaw and a movable upper jaw K, can be provided and arranged to clamp upon the sheet material at a point in advance of the other clamps. This third clamp can have its movable jaw operated in such manner that it will close and grip the sheet material as soon as the feeding-clamps start to move in a direction opposite to the direction of feed and in such manner that it will then open and release the paper as soon as the feeding-clamps have gripped the sheet material and started to move in the direction of feed. For example, the bars H can be provided with engaging portions L and L', adapted to alternately engage the upper ends of the crank-arms M, which latter have their other ends connected with the jaw K by means of links m. Thus the initial forward movement of the bars H causes the portions L to engage the bell-cranks M, and thereby open the holding-clamp, while a reverse movement of said bars will cause the portions L' to engage the bell-cranks, and thereby force the jaw K down upon the sheet material. Thus there is a lost-motion connection, so to speak, between the bars H and the blocks G and also between the said bars and the bell-cranks M. Consequently, and as explained, the initial forward movement of said bars H operates to open the holding-clamp and close the feeding-clamps, while the initial return movement of said bars operates to close the holding-clamps and open the feeding-clamps. Thus the feeding-clamps can return to a position to take a fresh grip on the sheet material without any liability of causing a back shift on the part of said material.

The upper jaws C and E can be provided with adjustable clamping portions or faces c and e, as shown in Fig. 2 and Fig. 3. Screws or bolts e' and e^2 in the jaw E can be employed for adjusting this portion e, and the same arrangement can be employed in the other jaw. This makes it possible to adjust the jaws accurately and with respect to the various thicknesses of material.

As stated, the feeding device thus constructed for producing an intermittent feed on the part of sheet material or strips of flat material can be employed in various kinds of machinery wherever it may be found suitable for the work to be performed.

What I claim as my invention is—

1. A feeding device comprising an automatically opening and closing and bodily-reciprocating clamp, both jaws of said clamp being positively actuated toward and away from each other and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

2. A feeding device for feeding sheet material, comprising a bodily-reciprocating clamp, and a toggle device for opening and closing said clamp, both jaws of said clamp being positively actuated toward and away from each other and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward

stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

3. A feeding device comprising a bodily-reciprocating clamp, a pair of reciprocating members having a lost-motion connection with said clamp, and toggle devices also connecting said clamp with said reciprocating members, both jaws of said clamp being positively actuated toward and away from each other and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

4. A feeding device comprising a bodily-reciprocating clamp, said clamp comprising a pair of separable jaws, reciprocating blocks in which the ends of said jaws are mounted for vertical movement, reciprocating bars having lost-motion connections with said blocks, and toggles connecting said jaws with said bars, both jaws of said clamp being positively actuated toward and away from each other and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

5. A feeding device comprising a bodily-reciprocating and automatically opening and closing clamp, both jaws of said clamp being positively actuated toward and away from each other and another clamp adapted to hold the material to be fed while the said first-mentioned clamp is moving in a direction opposite to the direction of feed and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

6. A feeding device comprising a reciprocating clamp, both jaws of said clamp being positively actuated toward and away from each other and a stationary clamp adapted to alternately grip the material to be fed and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

7. A feeding device comprising a pair of clamps, reciprocating blocks in which the jaws of said clamps are mounted, reciprocating bars having lost-motion connections with said blocks, toggles connecting said bars with said jaws, a stationary clamp, a bell-crank for opening and closing said stationary clamp, and lost-motion connections between said bell-cranks and said reciprocating bars, substantially as set forth.

8. A feeding device, comprising two oppositely-arranged and parallel members, bars mounted on the outer sides of said members and adapted to have a limited amount of sliding movement thereon, clamping-jaws having their ends mounted for vertical movement in said members, links connecting the ends of the jaws with the said bars, and means for reciprocating said bars and thereby the members, the inward movement of the bars relatively to the said members being sufficient, in each direction, to open or close the jaws before movement is imparted to the said members to move the clamps bodily and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby

the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

9. A feeding device, comprising a pair of bars, a holding-clamp the upper jaw of which has suitable connection with said bars, a feeding-clamp, and suitable connections whereby the reciprocation of said bars serves to both open and close and bodily reciprocate said feeding-clamp and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

10. A feeding device, comprising a pair of parallel reciprocating bars, a holding-clamp having a vibratory upper jaw, lost-motion connection between said upper jaw and bars, a pair of reciprocating parallel members upon which said bars are mounted for limited sliding movement relative thereto, a feeding-clamp comprising jaws having their ends mounted for vertical movement in said members, and links connecting the ends of said last-mentioned jaws with said bars, whereby the inward movement of said bars relative to said members serves to open or close the feeding-clamp, and whereby the balance of the movement of the bars serves to then reciprocate the feeding-clamp bodily and open or close said holding-clamp, substantially as set forth.

11. A feeding device, comprising a bodily-vibratory and automatically opening and closing feeding-clamp, a rock-shaft suitably connected for opening and closing and bodily reciprocating said clamp, an arm on said shaft, a pitman connected with the outer end of said arm, and an adjusting device for varying the distance between said shaft and the point of connection between said pitman and arm, and thereby vary the feeding movement of the clamp and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

12. A feeding device, comprising a pair of oppositely-arranged parallel reciprocating members, a feeding-clamp comprising jaws having their ends mounted for vertical movement in said members, bars having lost-motion connection with said members, links connecting the ends of said jaws with said bars, a rock-shaft connected to reciprocate said bars, an arm on said rock-shaft, a pitman connected with the outer end of said arm, and an adjusting device for varying the distance between said shaft and the point of connection between said arm and pitman, thereby varying the feeding movement of the clamp, substantially as set forth.

13. A feeding device, comprising a bodily-reciprocating and automatically opening and closing feeding-clamp, a holding-clamp having its upper jaw mounted for up-and-down movement, a pair of bars and suitable connections for bodily reciprocating and opening and closing said feeding-clamp, and lost-motion connection between said bars and the upper jaw of the holding-clamp, substantially as set forth.

14. A feeding device, comprising means for intermittently feeding the sheet material, a holding-clamp having a vibratory upper jaw, and lost-motion connection between said jaw and the said feeding means and structural means whereby the lost motion necessarily existing between the means for gripping the sheet material and the means for operating said gripping means may be varied or adjusted for the purpose of insuring a positive grip on the material by the vibratory gripping means before bodily motion is communicated to the vibratory gripping means, and for insuring a positive grip on the material by the stationary gripping means before the vibratory gripping means reverses its motion at the end of its forward stroke, and whereby the stroke or bodily motion of the vibratory gripping means may be varied at will, substantially as set forth.

15. A feeding device, comprising a pair of oppositely-arranged parallel reciprocating members, a pair of bars mounted to slide on said members, adjustable stops to limit the relative movement between said bars and members, a feeding-clamp comprising jaws having their ends mounted for up-and-down movement in said members, links connecting the ends of said jaws with said bars, and means for reciprocating said bars, and thereby bodily reciprocating and opening and closing said feeding-clamps, substantially as set forth.

Signed by me at Buffalo, Erie county, New York, this 19th day of October, 1903.

ALBERT J. GARDNER.

Witnesses:
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WHITNEY E. BUNDY.