

O. F. BALTZLEY.
FEEDING MECHANISM.
APPLICATION FILED MAR. 4, 1920.

1,375,889.

Patented Apr. 26, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

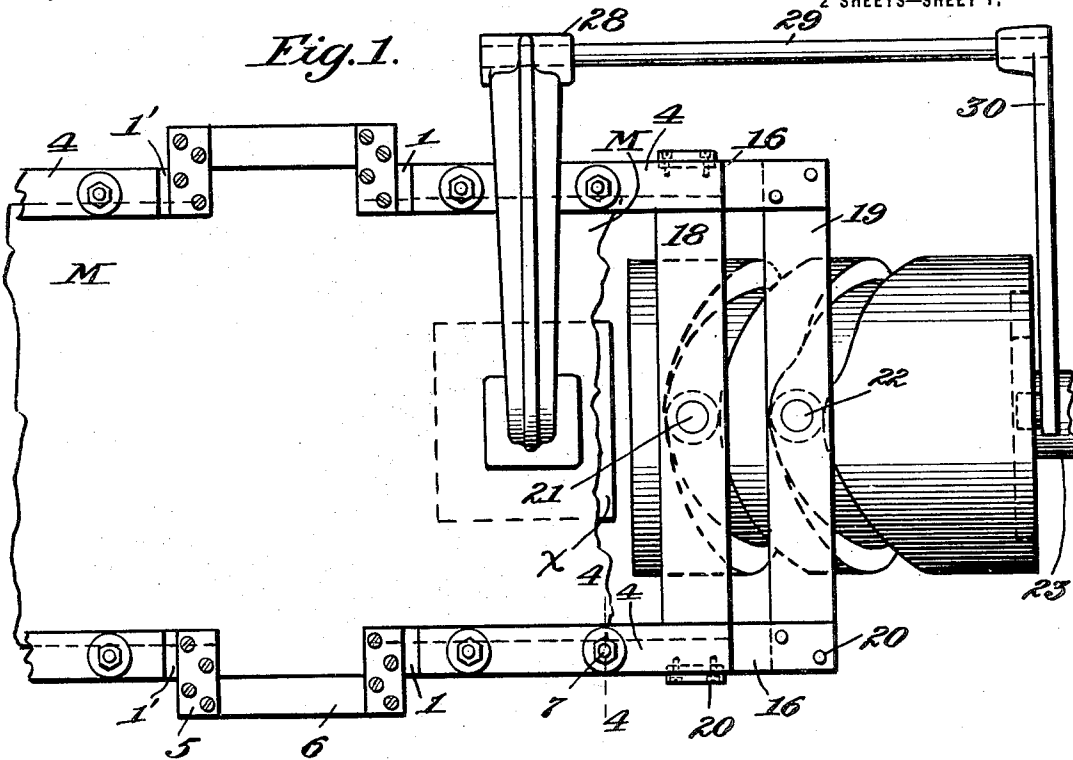


Fig. 2.

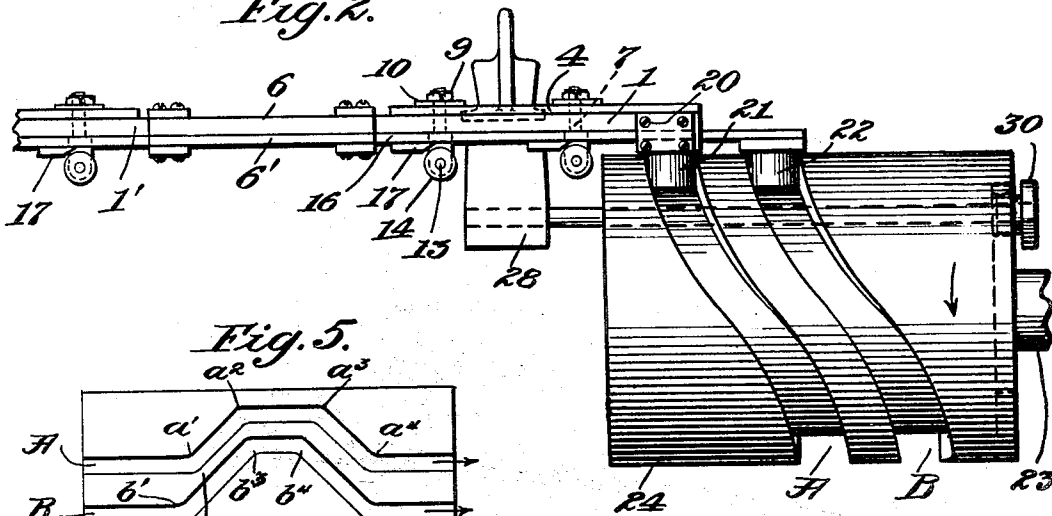
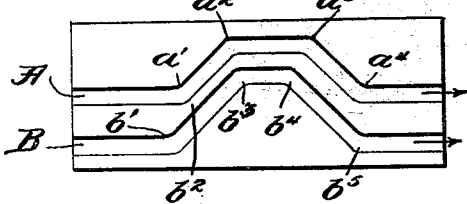


Fig. 5.



Inventor
Oren F. Baltzley,

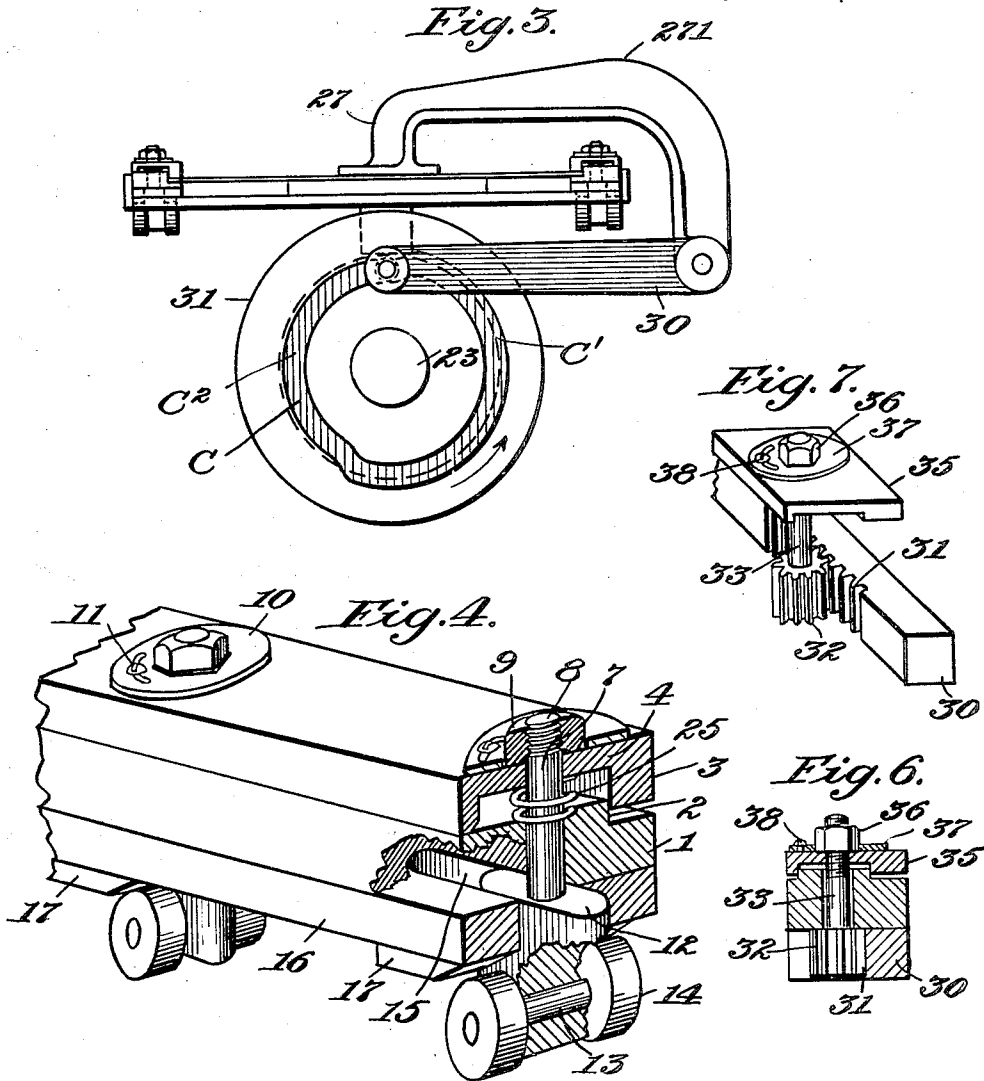
By *Cushman, Payant & Darby*
Attorney

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2 SHEETS—SHEET 2.



Inventor
Oren F. Baltzley,

By *Cushman, Bryant & Darby*
Attorney

UNITED STATES PATENT OFFICE.

OREN F. BALTZLEY, OF HAGERSTOWN, MARYLAND.

FEEDING MECHANISM.

1,375,889.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OREN F. BALTZLEY, a citizen of the United States, residing at Hagerstown, in the county of Washington and State of Maryland, have invented new and useful Improvements in Feeding Mechanism, of which the following is a specification.

My invention relates broadly to a feeding mechanism which may be used generally in connection with machines of special application in which it is desirable to feed intermittently a strip or strips of material upon which the special work is to be performed.

The principal object of my invention is to provide a mechanism which will positively grip and intermittently feed the material in one direction, which is simple and durable in construction and which is operable from a constantly rotating shaft or prime mover having suitable operating means located thereon.

Another object of the invention is a mechanism which may be readily applied to special work machines without material modification of the structure of these machines.

Other and further objects of my invention will be hereinafter pointed out and will become obvious from a reading of the description and the appended claims, wherein my invention is more definitely defined.

The above and other objects of my invention are attained by a construction comprising, broadly, spaced parallel guide rails having located thereon a plurality of clamps which are intermittently moved to and from the guide rails to clamp or release the material. The clamps are provided with pins which extend through the guide rails and are engaged by reciprocating clamping bars, or more particularly, by cams on these clamping bars, which engage the pins when the clamping bars are moved in one direction and thus draw the clamps against the guide rails. With the material gripped as above described, the guide rails and their clamps, together with the clamping bars, are moved in one direction to feed the material, at the limit of which movement the clamping bar is moved in the reverse direction to permit the clamps to disengage the material, whereupon the guide rails and their clamps are moved in the reverse direction to start the feed operation once more. There is also provided a presser foot which engages the

material at the end of the forward feeding movement of the clamps and guide rail and thus prevents the material from being drawn rearwardly upon the reversal of the movement of the guide rail. The entire operation is performed by means of a constantly rotating prime mover having located thereon a roller provided with a plurality of suitably formed peripheral cam tracks.

In the accompanying drawings:

Figure 1 is a plan view of an embodiment of my invention.

Fig. 2 is a side elevational view.

Fig. 3 is an end elevational view.

Fig. 4 is a cross sectional perspective taken on the line 4—4 of Fig. 1 and with a portion of the guide rail broken away.

Fig. 5 is a view showing the development of the cams for moving the clamping bar and guide rails.

Fig. 6 is a true cross sectional view similar to that shown in Fig. 4 but showing a modified form of clamping bar and means for moving the clamps to and from the guide rails.

Fig. 7 is a perspective of a detail of the mechanism shown in Fig. 6, the guide rail being omitted.

Referring to the drawings more in detail, the mechanism, which may be supported in any suitable manner which will permit the reciprocatory movement of the various parts, comprises parallel guide rails 1 provided with rabbeted or shouldered inner longitudinal edges 2 which serve as a guide for the material and also cooperate with depending flanges 3 formed upon clamps 4 located upon the guide rails. In Figs. 1 and 2 each guide rail is shown as formed in two sections 1, 1', separated for a suitable distance and connected by laterally extending plates 5 which are joined by an intermediate bar 6 laterally off-set from and extending parallel to the guide rail sections 1, 1'. This construction is resorted to in order to permit the location of a die of the special work machine, or of any other part of any special machine to which the mechanism is attached, at a point where the full width of the material is presented to the operating mechanism without the interference of the feeding mechanism. It will be observed from an inspection of Fig. 1 that the longitudinal edges of the material will not be gripped at the points where the connecting bars 6 are located.

As shown in the drawings my feeding mechanism is adapted to grip the material M along its longitudinal edges and feeds the same forward intermittently in the manner now to be described. Each of the clamps 4, which, in Fig. 1 are shown as being located upon each of the guide rail sections 1, 1', are superposed upon the guide rails and have attached thereto pins 7, the threaded ends 8 of which are provided with nuts 9 fitting within suitable central sockets or lock washers 10, the washers being secured to the clamps by means of set screws 11. The pins 8 extend through the guide rails 1 and are formed with enlarged heads 12, in which are located transverse pins 13 having rollers 14 upon their ends.

As will be noted from an inspection of Fig. 4, the heads 12 fit within elongated slots 15 which slots are formed in clamping bars 16, the clamping bars being located immediately beneath the guide rails, and have located thereon, at spaced points, suitable cams or wedges 17, for a purpose later to be set forth. It should be understood that the clamping bars are also formed in two sections, corresponding to the sections 1, 1' of the guide rails, and the sections are connected by offset parallel bars or plates 6'. The guide rails 1 are connected at their forward ends by means of cross or tie plates 18, and the clamping bars 16 are also connected in a similar manner, by means of cross or tie plates 19, each of these plates being secured to the guide rails and clamping bars by any suitable means, such as screws 20. The tie plate 18 has located thereon at a central point a roller or cam follower 21, and the tie plate 19 is provided with a similarly located cam follower 22.

In order to impart to the several parts suitable synchronized movement from a central source, which, in the present instance, is in the form of a constantly rotating shaft 23, there is located on this shaft a roller 24 provided with adjacent cam tracks A, B, the former track serving to receive the follower which is connected to the guide rail tie plate 18, and the latter receiving the clamping bar follower 22.

In Fig. 5 there is shown a development of these two cams, but before referring to the cam construction in detail it is thought that a brief description of the operation of the several parts will aid in understanding the function of the two cams. The operation of the mechanism is as follows: Considering the parts to be in the relative position shown in Fig. 1, the clamping bars 16 are first moved to the right relative to the stationary guide rail 1, whereupon their cams or wedges 17 engage the rollers 14 upon the lower ends of the clamping pins 7 thus drawing the clamp flanges 3 against the guide rails and gripping the material.

With the material thus held by the cooperating clamps and guide rails, the movement of the clamping bars is continued, but from this point they are accompanied by the guide rails and clamps which are also moved in the same direction by their cam track A. When the limit of the forward movement of the mechanism has been reached the clamping bars 16 are first moved in the reverse direction, thus withdrawing the cam 17 from engagement with the rollers 14 and permitting the springs 25, which surround the pins 7 and are located between the clamps and guide rails, to raise the clamps from the guide rails and disengage the material. With the material released, the clamping bars 16 in their reversed movement are, from this point, accompanied by the guide rails 1 and their clamps, which are also moved rearwardly by their cam track A.

It will be noted from a casual reading of the above description of operation that my mechanism comprises the imparting of a joint reciprocatory movement to the clamping bars and guide rails, the movement in one direction always resulting in feeding of the material, and a portion of the reciprocatory movement of the clamping bars 16 being relative to the guide rails and clamps.

It may be noted at this point that there is also provided means for holding the material after it has been fed forward and to prevent the same from being carried rearwardly by the guide rails in their reversed or non-feeding movement. This means comprises a presser foot 27 provided with a laterally extending portion 27' which is downwardly curved and formed with an eye 28 which receives a rock shaft 29, to which the presser foot is fixedly secured. The rock shaft also has secured thereto a rocking arm 30 provided at one end with a follower 31 which rides in a cam track C located in the end of the roller 24. It may be observed at this point that this cam track C is formed with two sections c^1 , c^2 , the former portion being located at a radially greater distance from the center of the roller than the latter section.

As shown in Fig. 3 the cam roller 24 is rotated in an anti-clockwise direction, and the follower 31 is about to enter the portion c^1 of the cam track, whereupon the presser foot 27 will be raised to permit the forward feeding movement of the material by the guide rails and cooperating clamps. Continued movement of the roller 24 by its shaft 23 will bring the portion c^2 to the cam follower 31, at which time the presser foot will again be lowered to hold the material against the bed X of the machine so that the material will not be carried rearwardly as the guide rails return to their feeding position.

Referring now to Fig. 5, B indicates the

clamping bar cam and A the cam which moves the guide rails and clamps. It will be noted that at a point b' the cam track B takes a lateral direction and the track A takes a similar direction at a point a' . The track B, it will be observed, is directed laterally at a point in advance of the point a' , the portion of the track B from b' to b^2 being the portion which moves the clamping bars forwardly to draw the clamps against the guide rails, and the movement of the clamping bars from the point b^2 and the point b^3 being accompanied by the clamping guide rails which are moved by the portion of their track from a' to a^2 . The points b^3 and a^2 of the respective tracks are the limit of the forward feeding movement, and from the point b^3 to the point b^4 , and between the points a^2 and the points a^3 there is a dwell in the movement of the clamping bars and guide rails. When the clamping bar follower in the track B reaches the point b^4 the clamping bars are moved rearwardly and the clamps raised by their springs 25, after which release the guide rails are moved rearwardly, this rearward movement being started at the point a^3 of the cam and continuing to the point a^4 , the rearward movement of the guide rail stopping at this point. It will be noted that the rearward movement of the clamping bars continues at greater distance than the similar movement of the guide rails and is caused by the portion of the cam between the point b^4 and the point b^5 . Between the points b^5 and b^1 and the points a^4 and a^1 of the respective cams, there is a dwell in the movement of the several parts, although the prime moving shaft 24 continues to rotate. When the points a^1 and b^1 are once more reached in the rotation of the shaft the above described operation is repeated.

Referring to Figs. 6 and 7, wherein there is shown a modified form of structure, there is indicated at 30 a clamping bar which is provided with rack teeth 31 which take the place of the cams 17 used in the hereinbefore described form of my feeding mechanism. The rack teeth 31 coöperate with and engage pinions 32 located upon the ends of the clamping pins 33. As in the previously described structure, it will be noted that the pins 33 extend through guide rails 34 and clamps 35 and their threaded ends have located thereon nuts 36 which are fixedly secured and held against rotation in central sockets formed in lock washers 37 locked to the clamps by means of set screws 38.

Although but a detail of this construction is shown in Figs. 6 and 7, it will be understood that the construction not shown is in every way identical with the form of my device indicated in Figs. 1 to 5, and that the only difference between the two embodi-

ments of my invention is in the means for actuating and moving the clamps to and from the guide rails. It will be clear from an inspection of Figs. 6 and 7 that reciprocation of clamping bar 30 relative to guide rail 34 and clamp 35 will cause rotation of pin 33 and since the upper end of this pin is threaded in the nut 36 and the latter is secured to the clamp, the clamp will be drawn downwardly toward the guide rail or moved upwardly from the latter, dependent upon the direction in which the clamping bar is moved.

It should be understood that while I have described my construction in detail and illustrated a specific form thereof, my invention is by no means limited to these details, as the same might be embodied in numerous equivalent structures. For instance, while I have shown each of the guide rails and clamping bars as formed in two sections joined together by bars 6 off-set therefrom and extending parallel thereto, this construction is not at all times necessary. Furthermore, although I have shown parallel guide rails and clamping bars, it is not necessary to use this identical construction since it may sometimes be desirable to grip the material along only one edge, in which event, only one guide rail and clamping bar would be used. Again, although I have shown springs 25 whereby the clamps are disengaged from the material, it may sometimes be desirable to employ a more positive means for actuating the clamps in this manner, and in this event it would clearly be within the scope of my invention to locate suitable cams upon the clamping bars for this purpose.

It should be understood that although I have shown my feed mechanism as constructed for use in connection with sheet material, the same could readily be modified for use in feeding lengths of wire and bar material by fashioning the guide roll and grippers as may be necessary to suit the form of the material being fed.

What I claim is:

1. A feeding mechanism comprising in combination a pair of reciprocable grippers, means for opening and closing said grippers comprising a bar independent of and having a reciprocatory movement relative to said gripping members, means on one of the gripping members adapted to be engaged by said bar in its movement, and means for reciprocating said bar and imparting a feeding motion to said grippers.

2. A feeding mechanism comprising in combination a pair of reciprocable grippers, a bar provided with a cam and having a reciprocable movement relative to said grippers, means on one of said grippers adapted to be engaged by said cam to move said grippers to gripping relation, and means for

reciprocating said bar and cam and imparting a reciprocatory feeding motion to said grippers.

3. A feeding mechanism comprising in combination a pair of reciprocable grippers, means for closing said grippers comprising a bar having a reciprocable movement relative to the grippers, a cam on said bar, means on one of the grippers adapted to be engaged by said cam, and cam means for reciprocating said bar and cam and imparting a reciprocatory feeding motion to said grippers.

4. A feeding mechanism comprising in combination a pair of reciprocable grippers, a bar having a reciprocatory movement relative to said grippers, a pin connected to one of said grippers and provided with means adapted to be engaged by said bar in its reciprocatory movement, a rotary shaft, a cam on said shaft, a follower connected to said bar and engaging the cam whereby the bar is moved to actuate said grippers to gripping relation, and a second cam and follower adapted to impart a feeding motion to the grippers after they have been moved to gripping relation.

5. A feeding mechanism comprising in combination a pair of reciprocable grippers, a member connected to one of said grippers and provided with a cam engaging portion, a reciprocable bar having a cam adapted to engage the cam engaging portion of the gripper member when the bar is moved in one direction, a presser foot, and a continuously rotating shaft for moving the bar, grippers and presser foot in timed relation.

6. A feeding mechanism comprising a pair of reciprocable grippers, a bar having a reciprocatory movement relative to said grippers, a member on one of said grippers extending through the complemental gripper, a head on said member, means adapted to urge said grippers apart, means on said bar adapted to engage the head of said member to close said grippers, means for reciprocating said bar relative to said grippers to open and close the latter, a presser foot, a continuously rotating shaft and cams on said shaft adapted to reciprocate said bar, and grippers to actuate said presser foot.

7. A feeding mechanism comprising a pair of grippers, means for opening and closing said grippers comprising a reciprocable bar adjacent said grippers, said bar having an elongated slot therein, a member on one of said grippers and extending through said slot, a cam on said bar and a cam engaging head on said member, said cam being adapted to close said grippers upon movement of the bar in one direction relative to said grippers, and a continuously

rotating shaft and cams thereon for reciprocating said bar and grippers.

8. A feed mechanism comprising parallel spaced guide rails, clamps on said guide rails, means for moving said clamps to and from the guide rails, said means comprising clamping bars adjacent said rails, means on said clamps adapted to be engaged by said clamping bars, means for moving said clamping bars to actuate said clamps, means for connecting said guide rails, means for connecting said clamp bars, and a cam for reciprocating said guide rails.

9. A feeding mechanism comprising spaced parallel guide rails, clamps on said guide rails, means for moving said clamps to and from said rails, said means comprising a clamping bar, means secured to said clamps adapted to be engaged by said clamping bar, means for reciprocating said clamping bar and means for reciprocating said guide rails.

10. A feeding mechanism comprising spaced parallel guide rails, clamps on said guide rails, clamping bars, members on said clamps extending through the guide rails, cams on said clamping bars to engage said members, means to reciprocate said clamping bars relative to the guide rails to draw the clamps against the guide rails, and means to reciprocate the guide rails and their clamps.

11. A feeding mechanism comprising in combination spaced parallel guide rails, clamps on said guide rails, members on the clamps extending through the guide rails, clamping bars, elongated slots in said bars through which said members pass, means to reciprocate said clamping bars to draw the clamps against the guide rails, and means to reciprocate said guide rails and their clamps.

12. A feeding mechanism comprising spaced parallel guide rails, clamps on said guide rails, means connecting said guide rails, a cam to reciprocate said guide rails in unison, means to move said clamps to and from the guide rails, said means comprising members on said clamps extending through said guide rails, clamping bars, means on said clamping bars adapted to engage said members, and means to reciprocate said clamping bars relative to said guide rails.

13. In a feeding mechanism, the combination as specified in claim 12, said means for reciprocating the clamping bars and guide rails comprising a single continuously rotating shaft and cams on said shaft.

In testimony whereof I have hereunto set my hand.

OREN F. BALTZLEY.