Dec. 22, 1953 E. GRIMM 2,663,566

SLIDE FEED MECHANISM

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Fig. 1.

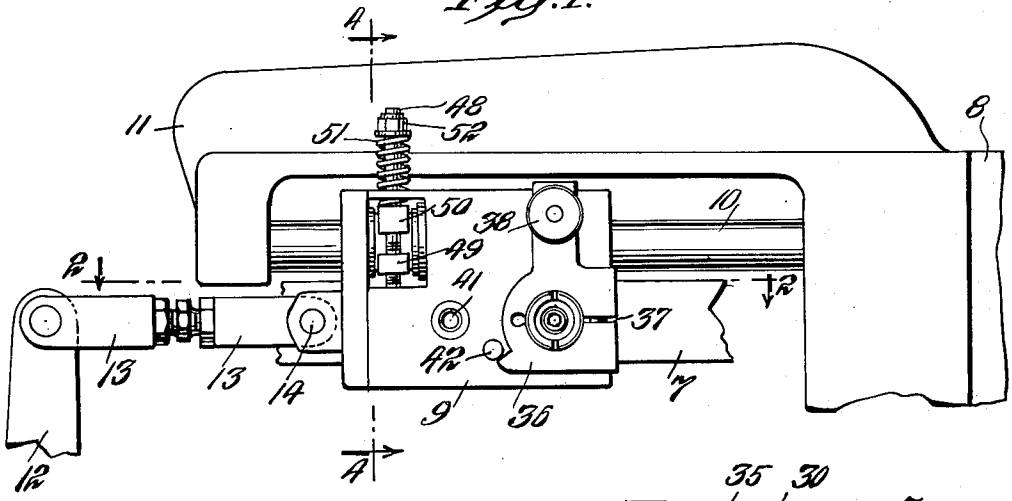
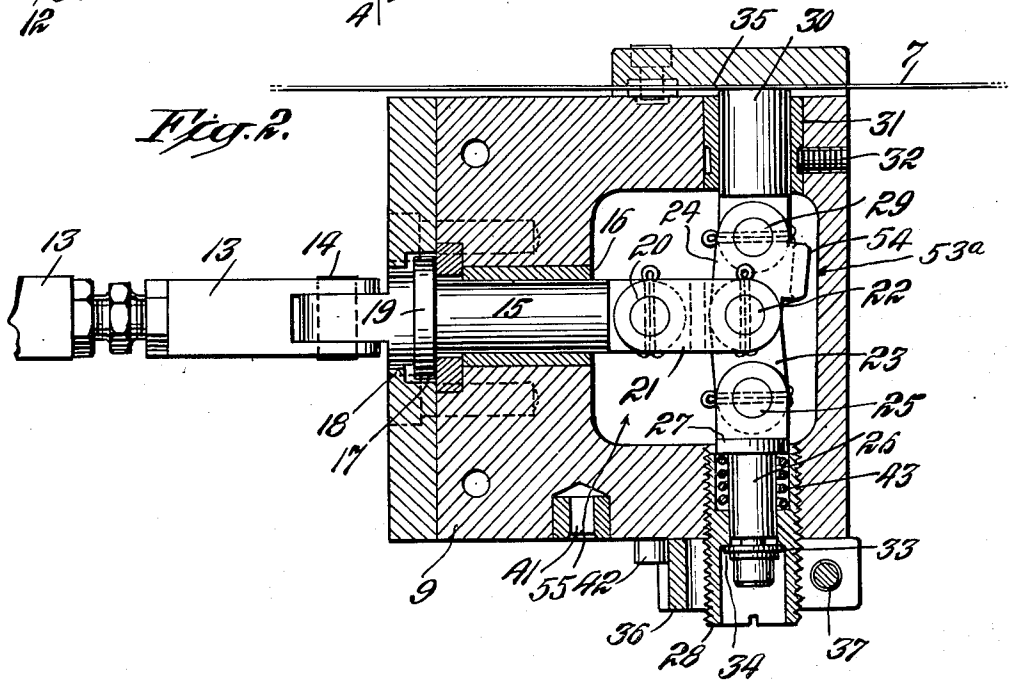


Fig. 2.



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Fig. 3.

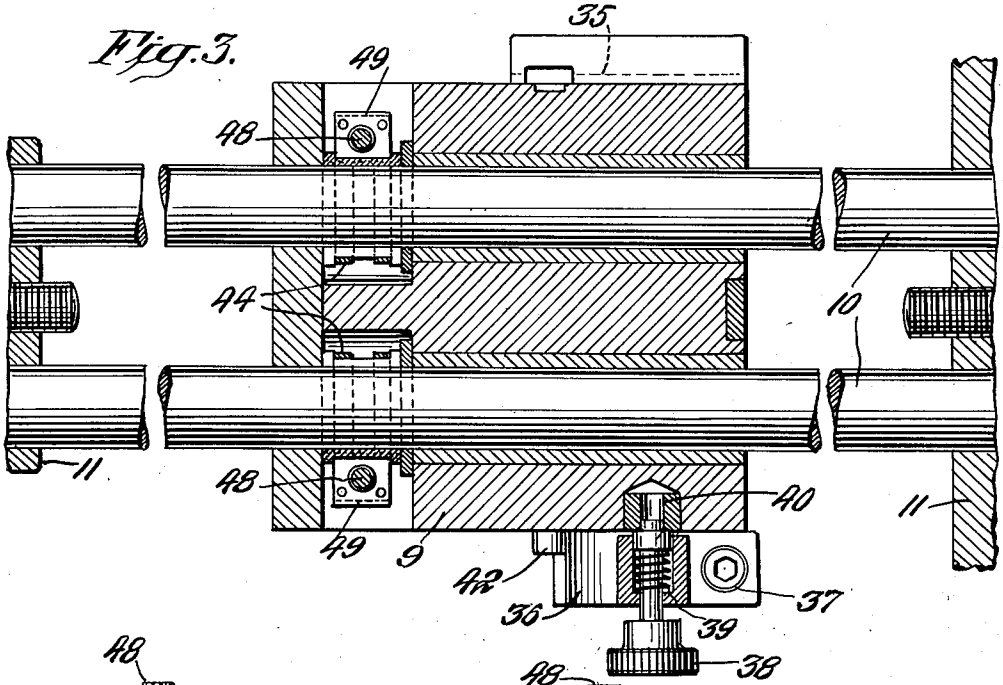
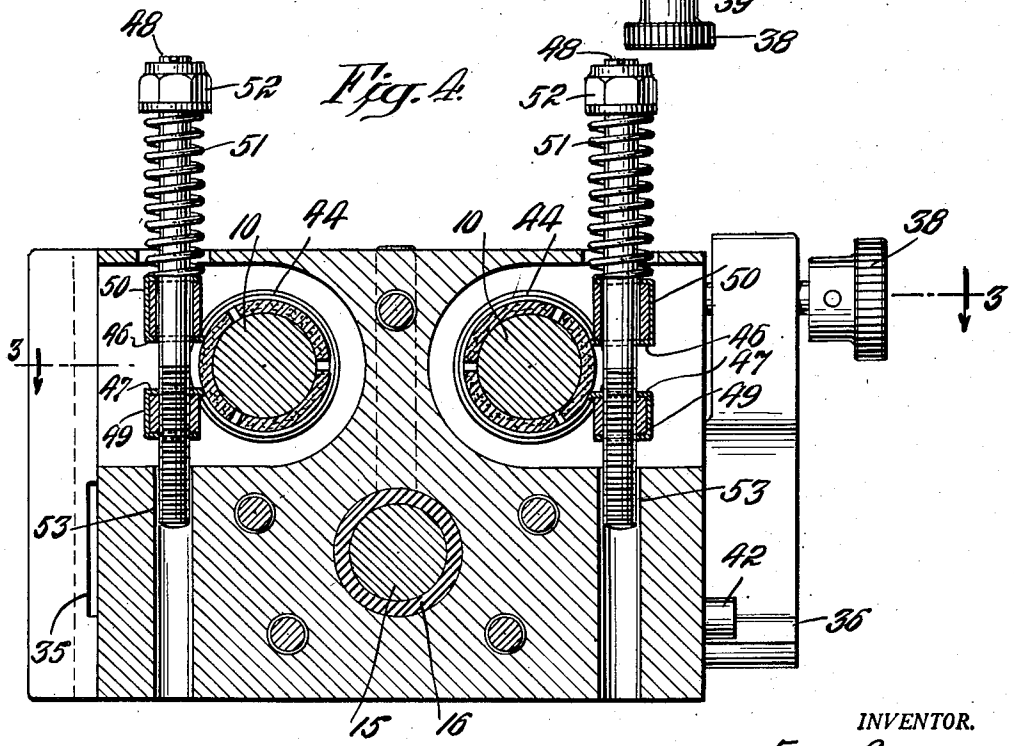


Fig. 4.



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SLIDE FEED MECHANISM

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Application February 9, 1951, Serial No. 210,238

10 Claims. (Cl. 271—2.5)

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The invention herein disclosed relates to apparatus for feeding strip stock into punching and forming machines.

Special objects of the invention are to simplify and improve the stock gripping means and the brake means controlling the movements of the slide block.

Further special objects of the invention are to arrange the support for the guide rods on which the slide block operates in a manner to provide better clear space for operation of that block.

Other desirable objects and the novel features through which all purposes of the invention are attained are set forth or will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates a present commercial embodiment of the invention. Structure, however, may be modified and changed, all within the true intent and scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a broken side elevation of one of the new slide feeds;

Fig. 2 is an enlarged horizontal sectional view as on substantially the plane of line 2—2 of Fig. 1;

Fig. 3 is a broken horizontal sectional view across the slide block and guide rods as on substantially the plane of line 3—3 of Fig. 4;

Fig. 4 is a vertical sectional view across the slide block and brakes, as on substantially the plane of line 4—4 of Fig. 1.

In the present illustration, strip stock represented at 7 is being fed into a machine for operating on the same, at 8, by a feed block 9 sliding on parallel spaced guide rods 10.

These guide rods are shown supported by an overhead bracket 11 attached to or forming part of the operating machine.

This overhead arrangement leaves the space at the sides of and below the slide block 9 clear for other mechanism or portions of the machine.

Reciprocation of the slide block is effected by a crank-driven or otherwise operated oscillating lever 12 to which there is pivotally connected a push-pull link 13 pivoted at 14 to a plunger 15 longitudinally slidable in a guide 16, Fig. 2, in the block.

Movement of plunger 15 is limited in the feed block by spaced annular shoulders 17, 18, at the outer end of the guide 16 between which the annular shoulder 19 on the plunger is located.

To the inner end of the sliding plunger there is pivotally connected, at 20, a short link 21 which in turn is pivotally connected at 22 with the meeting ends of the toggle links 23, 24.

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The first of these links is pivotally connected at 25 with a stud 26 shouldered at its inner end 27 to bear against the inner end of a bushing 28 screwed in the side of the feed block, and the other toggle link 24, is pivotally connected at 29 with the stock gripping plunger 30 carried by guide bushing 31 secured by said screw 32 in the opposite side of the feed block.

The screw bushing 28 is shown as countersunk in its outer end to provide an internal annular shoulder at 33 for the annular screw flange 34 on the outer end of the stud 26 so that with in and out turning adjustment of screw bushing 28 the stud may be shifted inward or outward to effect adjustment of the stock gripping plunger 30 with respect to the fixed abutment wall 35 with which said plunger cooperates to grip the stock.

Turning of the screw bushing 28 to trip the feed at any time may be effected by means of a hand lever 36 having a split portion adjustably clamped at 37 over said screw bushing, said lever having a knob 38 for shifting the same and a spring projected detent, as indicated at 39 in Fig. 3, to engage in angularly separated retainer openings 40, 41, to keep the stock gripping toggle mechanism in functioning or non-functioning condition.

A stop pin 42 is shown in Fig. 1 positioned to limit the swing of the throw-off handle in opposite directions.

A buffer spring 43 may be positioned in the inner end of the screw bushing in back of shoulder 27, as illustrated in Fig. 2, to counter-balance and cushion the powerful stock gripping action of the toggle and to compensate for possible slight variations in thickness of the stock.

The sliding movement of the feed block on the rods is uniformly and smoothly controlled in the present invention by flexible elastic brake bands 44, Figs. 3 and 4, surrounding the rods and holding annular segments 45 of braking material in engagement about the rods.

Opposite ends of the brake bands are shown as extended angularly at 46, 47, about bolts 48 set in the block at opposite sides of the rods 10. The end extensions 47 are shown held by nuts 49 screwed on the inner end portions of the bolts and the other end extensions, 46, are shown caught over the sleeves 50, slidable over the outer end portions of the bolts and engaged by the tension springs 51 under adjustment of nuts 52.

By turning the bolts in their screw seats 53 in the block, the nuts 49 may be shifted to position the inner ends 47 of the brake bands, and

the nuts 52 on the outer ends of the bolts may be adjusted to regulate the tension applied through springs 51 to the outer ends 46 of the brake bands.

These brake bands can be constructed to substantially completely encircle the rods and hence to apply braking effect to substantially the complete circumference of the rods. With this contracting binding engagement about the rods, a relatively light compressive force will be sufficient for feed block control purposes. And this, because of the relatively light surface pressure applied to the brake rods, will not effect objectionable heating or wear on the roads.

While the wear on the brake band material, because of the extended distribution about the circumference of the rods, is relatively slight, this material may be readily removed at any time by simply removing the spring tensioning nuts 52 and taking out the stud bolts 48.

With this construction there is no side thrust on the rods, the power is applied centrally of the block through the longitudinally sliding plunger and the stock is clamped with a straight transverse motion of the stock gripping plunger. The toggle action provides quick, firm grip and release of the stock under a relatively slight longitudinal movement of the toggle actuating plunger. The contracting band brakes with the radially renewable brake linings take up but small space at one end of the block and the toggle grip mechanism takes up but small space at the opposite end of the block, all providing for a compact, well balanced unit.

The overstanding mounting bracket for the guide rods keeps the over-all width of the machine down to a minimum. Fig. 1 shows how this bracket need have a height above the rods only sufficient to clear the top of the slide block and be narrow enough for the brake band studs to stand up at opposite sides of the same.

To prevent movement of the toggles in the straightening direction past a desired point, companion stops on the block and one of the toggle levers may be provided, as indicated at 53*a* and 54 in Fig. 2. The stop 53*a* may be on the internal wall of the cavity 55 in the block within which the toggle links and connecting elements are disposed. The links of the toggle may be of the same or different length so that in referring to them as connected at their mid-point to the plunger it is not intended to restrict the structure to one with toggle links of equal length.

The brake band adjusting screws may be located at the outer sides of the guide rods, or between the guide rods, or one between and the other at one side of the rods, and be exposed at the top, at the bottom or at the sides of the slide block, all to meet any special design requirements.

While separate adjustments for the two bands are here shown, it is contemplated that through the medium of suitable equalizers a single adjustment may be employed.

What is claimed is:

1. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links and means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block.

2. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links and means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block, said abutment for the one toggle link being a screw bushing adjustable in and out in the block in line with the toggle links and a stud connected with said toggle link and rotatably received in said adjustable screw bushing.

3. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger sliding mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links and means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block, said abutment for the one toggle link being a screw bushing adjustable in and out in the block in line with the toggle links, a stud connected with said toggle link and rotatably received in said adjustable screw bushing and a cushion spring in said bushing in back of said rotatably seated stud.

4. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and

away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links and means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block, and companion stops on said block and one of said toggle links for positively limiting the straightening movement of the toggle.

5. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links and means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block, said abutment for the one toggle link being a screw bushing adjustable in and out in the block in line with the toggle links, a stud connected with said toggle link and rotatably received in said adjustable screw bushing, a hand lever adjustably clamped on the outer end of said screw bushing and a spring pressed detent knob for retaining the hand lever and screw bushing in different positions of adjustment.

6. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links, means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block and contracting band brakes on said slide block in cooperative engagement with said rods.

7. A slide feed of the character disclosed comprising in combination, parallel guide rods, a feed block sliding on said rods and having a fixed stock gripping abutment wall, a toggle actuating and block sliding plunger having a limited reciprocating sliding movement in said block toward and away from said fixed abutment wall, parallel to said guide rods and in the direction of feed, toggle links disposed transversely of the line of feed and connected at their mid-point with the inner end of said toggle actuating and block sliding plunger, a reciprocating stock gripping plunger slidingly mounted in the block in line and connected with and actuated by one of said toggle links, an abutment for the other of said toggle links, means connected with the outer end of said toggle actuating and block sliding plunger for imparting both reciprocating stock feeding sliding movement to said block and stock gripping and releasing action to said toggle links and companion stops for limiting the sliding movement of said toggle actuating and block sliding plunger in said block and contracting band brakes on said slide block in cooperative engagement with said rods, said band brakes being located at one end of the block at opposite sides of said actuating plunger and said toggle links being disposed transversely at the opposite end of the block.

8. A slide feed comprising a feed block having a cavity with longitudinal and transverse openings extending thereinto, an actuating plunger having movement in said longitudinal passage, a stock gripping plunger in one of the transverse passages, a fixed stock gripping abutment wall on the block opposed to and in cooperative relation to said stock gripping plunger, an abutment member disposed in the other transverse passage, pivotally connected toggle levers pivotally connected at their free ends with said stock gripping plunger and abutment, respectively, and a connecting link between the inner end of the actuating plunger and the pivotal connection between the two toggle levers.

9. A slide feed comprising a feed block having a cavity with longitudinal and transverse openings extending thereinto, an actuating plunger having movement in said longitudinal passage, a stock gripping plunger in one of the transverse passages, a fixed stock gripping abutment wall on the block opposed to and in cooperative relation to said stock gripping plunger, an abutment member disposed in the other transverse passage, pivotally connected toggle levers pivotally connected at their free ends with said stock gripping plunger and abutment, respectively, a connecting link between the inner end of the actuating plunger and the pivotal connection between the two toggle levers and companion stop abutments on the inner wall of said cavity and on one of said toggle levers.

10. A slide feed comprising guide rods, a slide block operating on said rods, stock gripping means carried by said block, rod encircling contracting band brakes carried by and travelling with said slide block, bolts screwed on the block at the sides and transversely of the guide rods, nuts on said bolts securing the inner ends of the contracting band brakes and adapted by relative adjustment of the bolts and nuts to set the inner end of the band brakes toward or away from the guide rods, sleeves on the outer end portions of the bolts and engaging the outer ends of the contracting band brakes, springs surrounding the outer end portions of the bolts and tensioning said

sleeves toward said nuts and adjustable tensioning nuts adjustable on the outer ends of the bolts for adjustably tensioning said springs.

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