

No. 894,465.

PATENTED JULY 28, 1908.

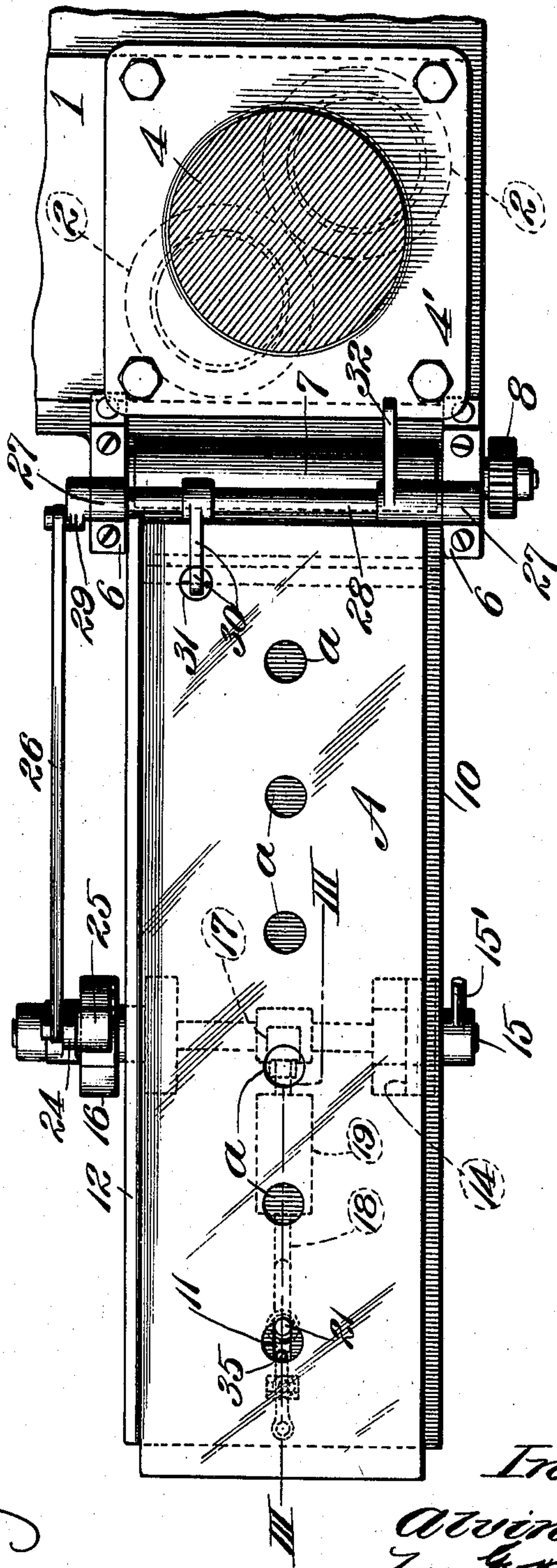
A. RINDERER.

FEED MECHANISM FOR PUNCHING MACHINES.

APPLICATION FILED MAR. 6, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

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3 SHEETS—SHEET 3.

Fig. IV.

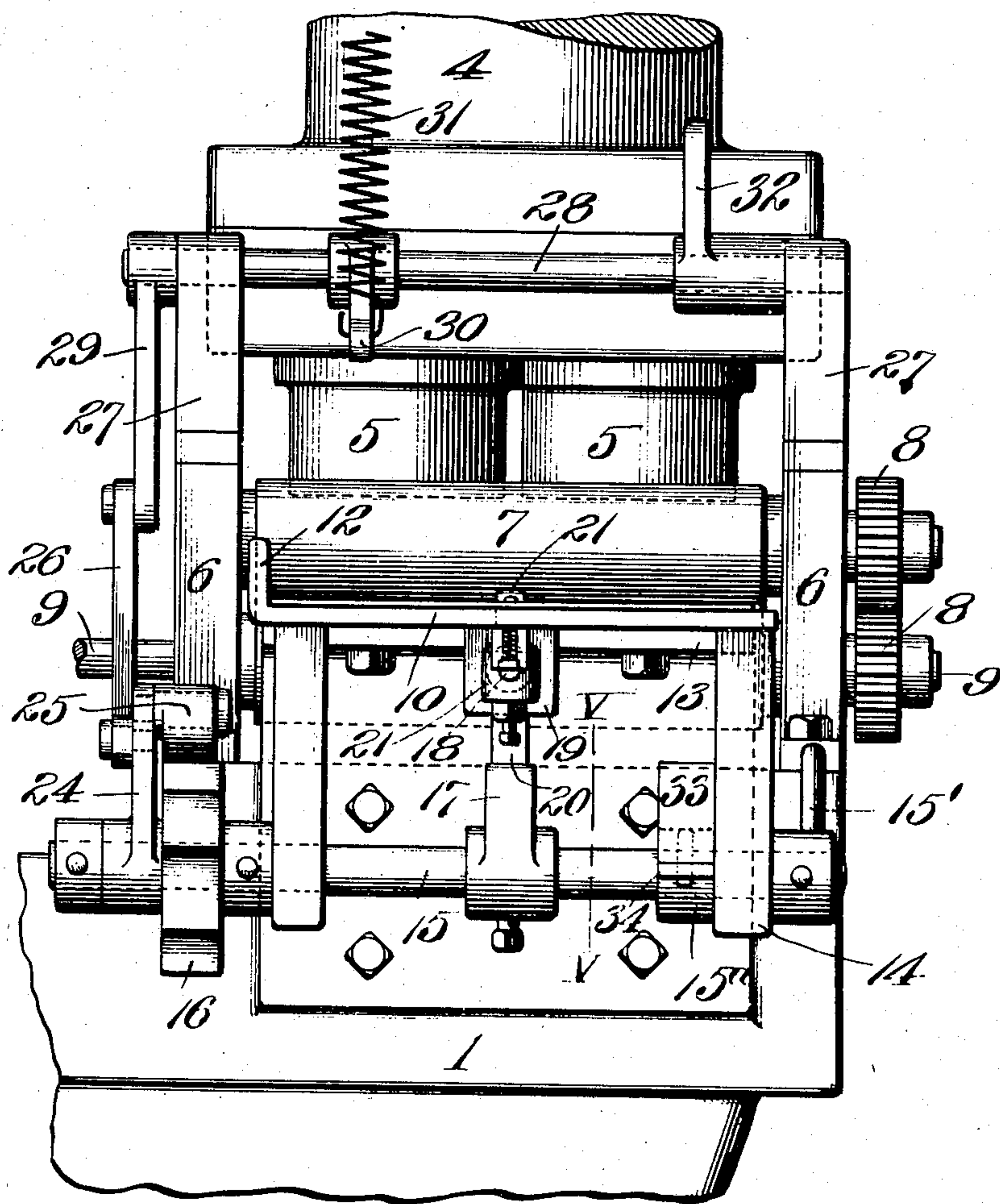
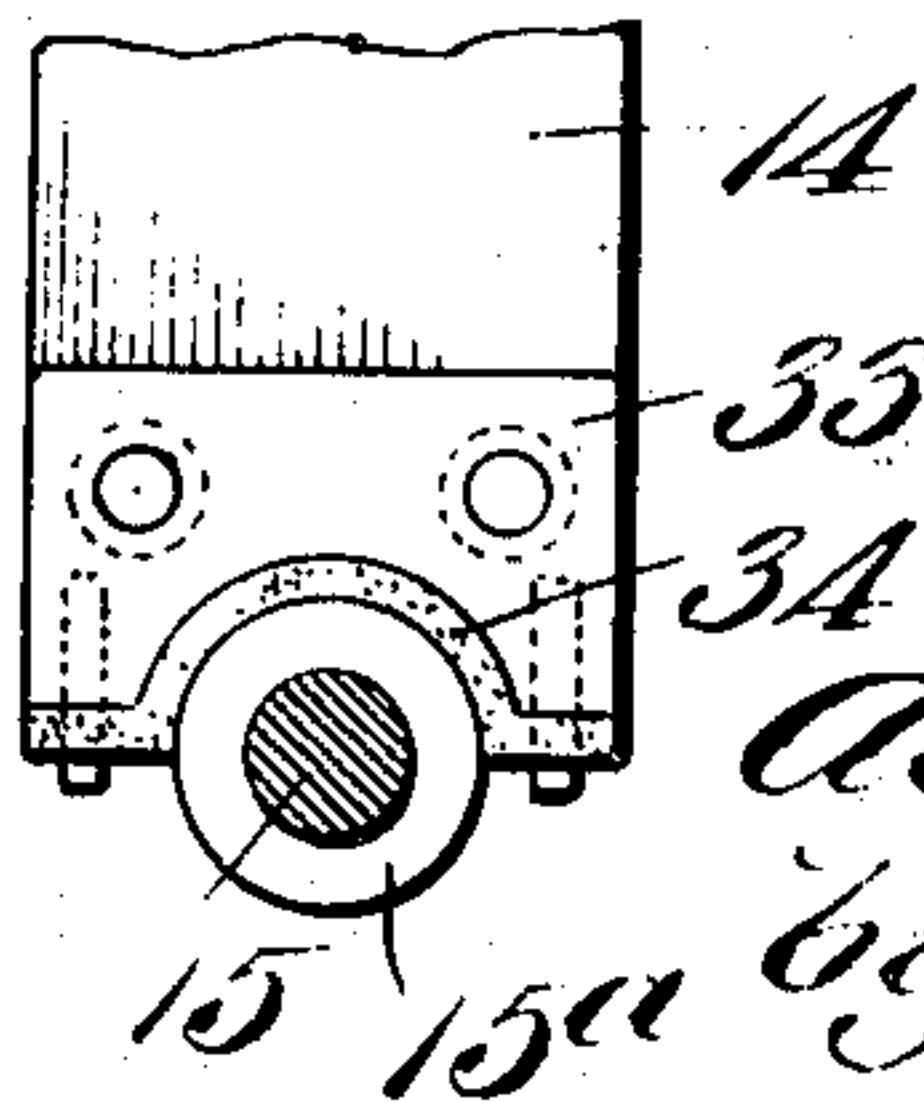


Fig. V.



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# UNITED STATES PATENT OFFICE.

ALVIN RINDERER, OF HIGHLAND, ILLINOIS.

## FEED MECHANISM FOR PUNCHING-MACHINES.

No. 894,465.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed March 6, 1908. Serial No. 419,422.

To all whom it may concern:

Be it known that I, ALVIN RINDERER, a citizen of the United States of America, residing at Highland, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Feed Mechanisms for Punching-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a feed mechanism for delivering sheets of material, such as metal, to the punches and dies of punching machines, the invention having for its object the production of a simple and efficient feed mechanism which is operated intermittently and is controlled by the punch plunger of the punching machine to which the mechanism is applied.

Figure I is a top or plan view of my feeding mechanism with the punch plunger of a punching machine shown in cross horizontal section. Fig. II is a side elevation of the parts shown in Fig. I. Fig. III is an enlarged vertical longitudinal section taken on line III—III, Fig. I. Fig. IV is an end elevation of the feeding mechanism. Fig. V is a vertical cross section taken on line V—V, Fig. IV.

In the accompanying drawings: A designates a sheet of material suitable to be fed by my feeding mechanism and which as illustrated in Figs. I, II and III is provided with a plurality of perforations *a* that are arranged in line with each other longitudinally of the sheet. The perforations are preferably arranged at the transverse center of the sheet, and one or more of these perforations is adapted to receive a part of my feeding mechanism to accomplish a desired movement of the sheet.

1 designates the bed of a punching machine, 2 the dies supported by said bed, 3 a stripper above the dies, and 4 a punch plunger that carries punches 5 adapted to pass through the stripper 3 and enter into the dies 2. Upon the bed 1 adjacent to the dies and punches are posts 6 in which are journaled a pair of feed rollers 7 connected by intermeshing gears 8. One of the rollers is provided with a driving shaft 9, see Fig. IV to which power may be communicated for the purpose of rotating the feed rollers intermittently to advance a sheet of material, to be punched, into a position above the dies 2,

while the punches are elevated from said dies.

All of the parts thus far particularly described are known by me to be old and no invention *per se* is herein claimed for them.

My invention has reference to means whereby the sheets of material to be punched are delivered to the feed rollers in such manner as to provide for the delivery of the sheets by the feed rollers to the dies and punches at the proper time, which proper time is regulated by the provision of suitable mechanism for causing the feed rollers and the punch plunger to operate in harmony, and which is not concerned in my improvement.

Adjacent to the feed rollers 7 and extending in a horizontal direction therefrom is a table 10 that is provided with a slot 11 extending longitudinally thereof, see Figs. II and III, and upon which the sheets A of material to be punched are conducted to the feed rollers. The table 10 is preferably provided with side guard flanges 12 and supported by a bracket 13 that is secured to the bed 1 of the punching machine.

14 designates hangers depending from the table 10 and 15 is a shaft rotatably mounted in said hangers. The shaft 15 has fixed to it at one of its ends a ratchet wheel 16 and it also has fixed to it, intermediate of its ends, a trip arm 17 that has utility to be hereinafter set forth.

18 is a pull rod located beneath the table 10 and extending longitudinally thereof, and transversely relative to the shaft 15. This pull rod is loosely mounted in a box 19 supported by the table and it has fixed to it at its inner end an arm 20 that is adapted to be engaged by the trip arm 17.

21 is a dog located beneath the table and adjustably secured to the pull rod 18 and the upper portion of which is adapted to operate in the slot 11 of the table 10 and to enter into one of the perforations *a* in the sheet of material to be fed forwardly upon the table. The upper end of the dog is preferably beveled, in order that the sheet of material may readily become disengaged from the dog when the sheet of material has been moved forwardly and is gripped by the feed rollers 7. Between the dog 21 and the box 19 in which the pull rod 18 operates is a retracting spring 22 by which the pull rod is moved outwardly after each inward or forward movement thereof in sheet feeding action. Be-



tween the arm 20 and the box 18 is a cushion spring 23 of less strength than the retracting spring 22 and which serves as a shock absorber when the pull rod is moved outwardly by the retracting spring.

24 designates a pawl carrying arm loosely fitted to the shaft 15 alongside of the ratchet wheel 16, and 25 is a pawl pivoted to said arm and arranged in engagement with said ratchet wheel.

26 is a connecting rod pivoted to the arm 24 and extending into juxtaposition with the feed rollers 7.

27 are posts surmounting the posts 6 in which the feed rollers 7 are journaled, and 28 is a rock shaft journaled in the posts 27. The rock shaft 28 extends transversely of the table 10 above the feed rollers 7 and it is provided with a crank arm 29 to which the connecting rod 26 is fitted.

30 is a pull arm fixed to the rock shaft and which is normally upheld or returned to an uplifted position by a lift spring 31.

32 is a trip arm fixed to the rock shaft 28 and which is adapted to be engaged by a part of the punch plunger 4, such as the punch head 4', each time that the punch head is elevated whereby the rock shaft 28 is rotated in one direction during the upward movement of the plunger to be returned in the opposite direction under the influence of the lift spring 31 when the plunger again moves downward.

In the practical use of my feeding mechanism, the sheets of material to be punched, after having been prepared with the perforations *a* therein, are placed upon the table 10, so that the forward ends of the sheet will be in proximity to the feed rollers 7 and the upper end of the dog 21 will extend through one of the perforations in the sheet, as seen in the drawings. It will now be assumed that the trip arm 17 carried by the shaft 15 is in the position shown in Fig. III, being in proximity to the arm 20 of the pull rod 18. The punch plunger 4 being at this time in lowered position moves upwardly and as it so moves it acts to elevate the trip arm 32 with the result of causing a partial rotation of the rock shaft 28 and rearward movement of its crank arm 29. The crank arm 29 is thus caused to exert a pull upon the connecting rod 26, and the pawl carrying arm 24 is moved rearwardly to cause the pawl 25 to impart a partial rotation to the ratchet wheel 16 and the shaft 15. During the partial rotation of the shaft 15, the trip arm 17 is carried to the arm 20 carried by the pull rod 18, and acts by pressure against said arm to impart forward movement of the pull rod, so that the dog 21 will act to feed the sheet A to the feed rollers 7. The feed rollers then immediately grip the sheet for feeding action, and after the trip arm 17 has become disengaged from the arm 20, the pull rod 18 is returned to its normal

position by the retracting spring 22. It is obvious that when the punch plunger partakes of its downward stroke for punching action, the rock shaft 28, the arms carried thereby, the connecting rod 26, and the pawl 25 are returned to their normal positions under the influence of the lift spring 31. It is to be noted that inasmuch as there is only a single trip arm 17 upon the shaft 15, a number of strokes of the punch plunger are permitted before the ratchet wheel 16 is operated sufficiently to again bring said trip arm into operative position, thereby providing for several punching operations before the next sheet of material placed upon the table is advanced to the feed rollers by the dog 21. In order that the trip arm 17 may be manually brought into operative position at any time to avoid delay in feeding action, I apply to the shaft 15 a handle arm 15' by which the shaft may be turned to any desired degree. To provide against retrograde movement of the shaft 15, I apply to said shaft a collar 15<sup>a</sup>, see Fig. V, and attach to one of the hangers 14, a brake block 33 to which is attached a friction strip 34 that may be of leather or any other suitable material and which bears against the collar 15<sup>a</sup>.

It is desirable in the use of my feeding mechanism to place the next succeeding sheet of material, to be punched, upon the table 10 and overlying the preceding sheet after said sheet has been engaged by the feed rollers and in order that the succeeding sheet may not be drawn forwardly due to frictional contact with the preceding sheet, I provide a restraining dog 35 that is pivoted to the table 10 at 36, see Figs. II and III. This dog has a forward arm that is adapted to extend through the slot 11 in the table and enter into one of the perforations in the succeeding sheet to retard it from forward movement when only a slight pull is exerted thereupon. The rear arm of the dog rests against a spring 37 that is adapted to permit pivotal movement of the dog when the sheet of material is drawn forwardly by the dog 21, so that the point of the restraining dog will move downwardly, thus permitting the escape of the sheet of material therefrom.

I claim:—

1. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a feeding dog located beneath the table and adapted to engage the sheets of material placed upon said table to move them to said feed rollers, reciprocally mounted means by which said dog is carried, and means operable by said plunger whereby said dog carrying means is actuated for sheet feeding action, substantially as set forth.

2. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to



said feed rollers, a feeding dog adapted to engage the sheets of material placed upon said table to move them to said feed rollers, spring controlled reciprocally mounted means by which said dog is carried, and means operable by said plunger whereby said dog carrying means is actuated for sheet feeding action, substantially as set forth.

3. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a sheet supporting table adjacent to said feed rollers, a pull rod reciprocally positioned beneath said table, a dog carried by said pull rod and adapted to engage the sheets of material placed upon said table, and means operable by said plunger whereby said pull rod is actuated for sheet feeding action to deliver the sheets to said feed rollers, substantially as set forth.

4. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a pull rod reciprocally mounted beneath said table, a sheet engaging dog carried by said pull rod, a rotatable shaft, means carried by said shaft adapted to impart movement to said pull rod, and means operable by said plunger for imparting rotation to said shaft, substantially as set forth.

5. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a spring controlled pull rod reciprocally mounted beneath said table, a sheet engaging dog carried by said pull rod, a rotatable shaft, means carried by said shaft adapted to impart movement to said pull rod, and means operable by said plunger for imparting rotation to said shaft, substantially as set forth.

6. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a pull rod reciprocally mounted beneath said table, a sheet engaging dog carried by said pull rod, an arm fixed to said pull rod, a rotatable shaft, a trip arm carried by said shaft and adapted to engage the arm carried by said pull rod, and means operable by said plunger for imparting rotation to said shaft, substantially as set forth.

7. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a spring controlled pull rod

reciprocally mounted beneath said table, a sheet engaging dog carried by said pull rod, an arm fixed to said pull rod, a rotatable shaft, a trip arm carried by said shaft and adapted to engage the arm carried by said pull rod, and means operable by said plunger for imparting rotation to said shaft, substantially as set forth.

8. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a sheet supporting table adjacent to said feed rollers, a spring controlled pull rod reciprocally mounted beneath said table, a sheet engaging dog carried by said pull rod, an arm carried by said pull rod, a rotatable shaft, a trip arm carried by said rotatable shaft adapted to engage the arm carried by said pull rod, a ratchet and pawl device associated with said shaft, a spring controlled trip arm adapted to be actuated by said plunger, and means of connection between said last named trip arm and said ratchet and pawl device whereby said shaft is rotated, substantially as set forth.

9. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a feeding dog adapted to engage the sheets of material placed upon said table to move them to said feed rollers, reciprocally mounted means by which said dog is carried, means operable by said plunger whereby said dog carrying means is actuated for sheet feeding action, and a restraining dog supported by said table adapted to engage the sheets of material placed upon said table, substantially as set forth.

10. The combination with the plunger of a punching machine and feed rollers coöperable with said plunger, of a table adjacent to said feed rollers, a feeding dog adapted to engage the sheets of material placed upon said table to move them to said feed rollers, reciprocally mounted means by which said dog is carried, means operable by said plunger whereby the dog carrying means is actuated for sheet feeding action, and a spring controlled restraining dog supported by said table adapted to engage the sheets of material placed upon said table, substantially as set forth.

ALVIN RINDERER.

In the presence of—

WILLIAM F. HEBRANK,  
LOUIS LATZER.