

Aug. 22, 1939.

F. KLINGLER

2,170,289

MECHANISM FOR FEEDING SHEET MATERIAL AND THE LIKE

Filed Sept. 23, 1937

3 Sheets-Sheet 1

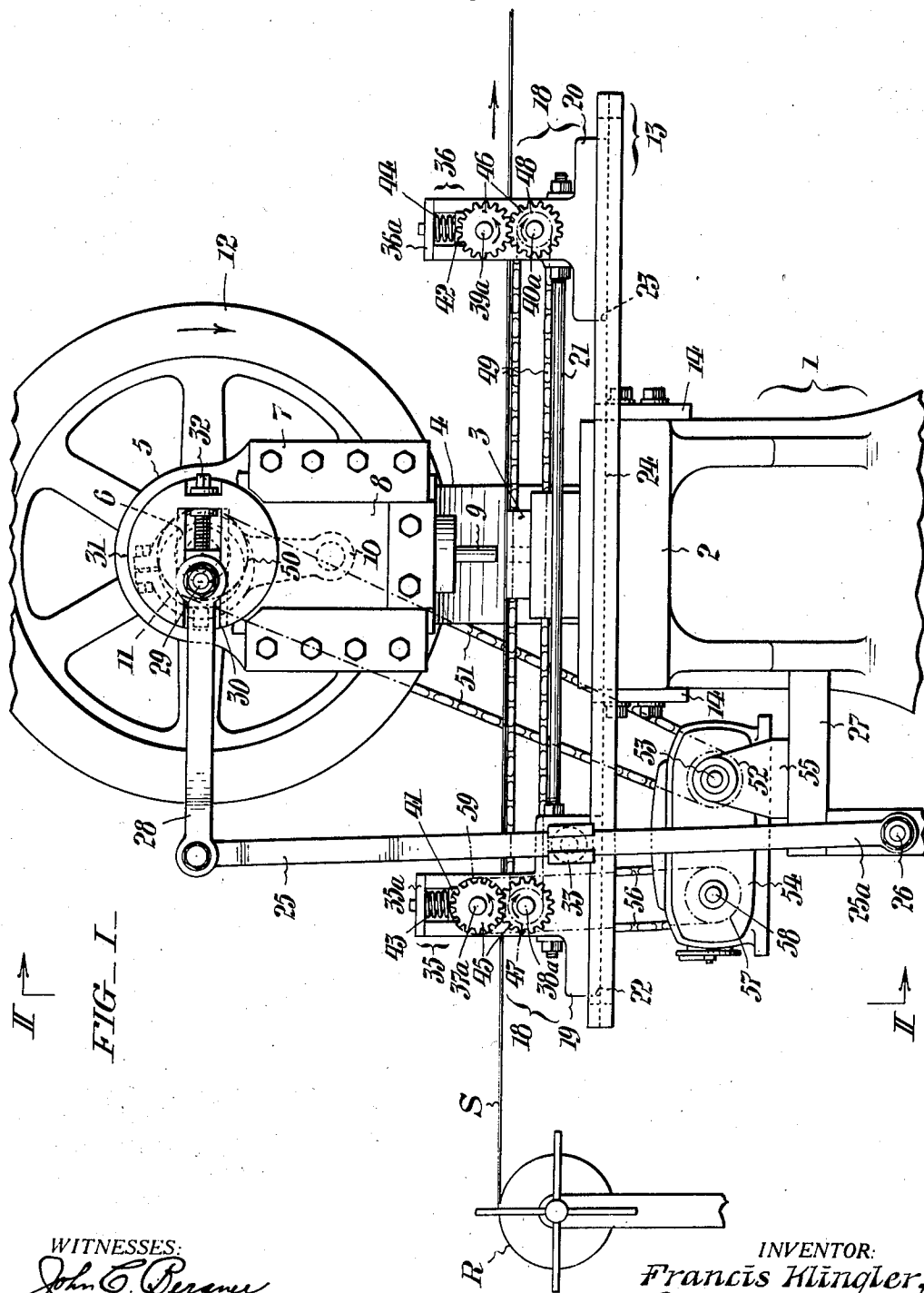


FIG. I.

WITNESSES:

John C. Bergner
Herbert Sachs

INVENTOR:

Francis Klingler,

BY

Paul Paul

ATTORNEYS.

Aug. 22, 1939.

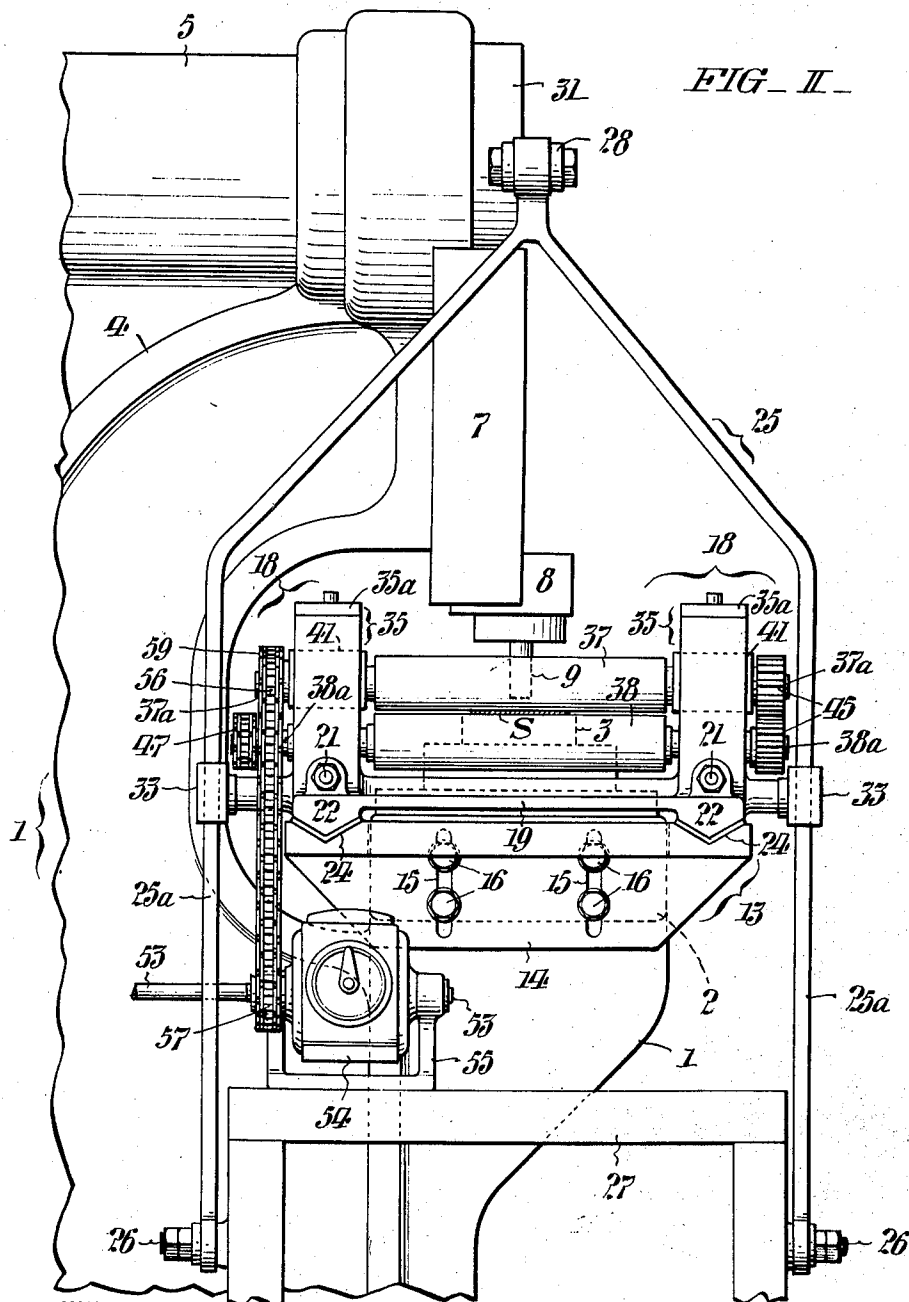
F. KLINGLER

2,170,289

MECHANISM FOR FEEDING SHEET MATERIAL AND THE LIKE

Filed Sept. 23, 1937

3 Sheets-Sheet 2



WITNESSES:

John C. Berger
Hubert Fuchs

INVENTOR:

Francis Klingler,

BY

Paulo Paul

ATTORNEYS.

Aug. 22, 1939.

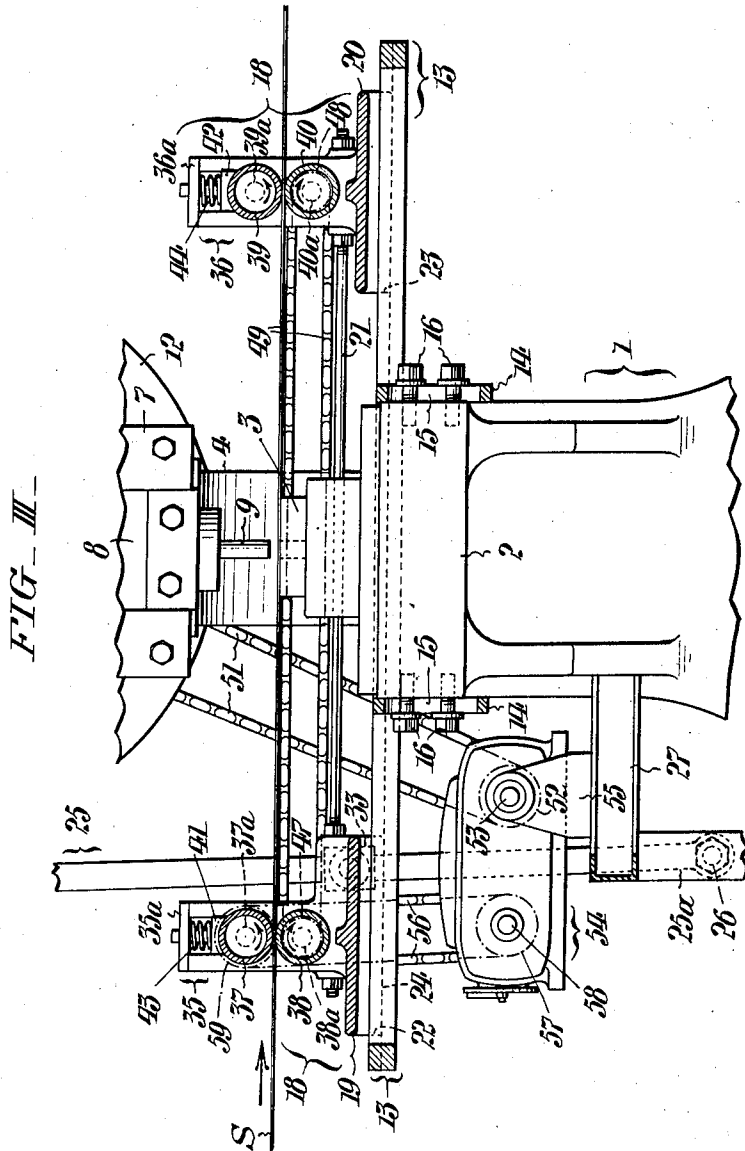
F. KLINGLER

2,170,289

MECHANISM FOR FEEDING SHEET MATERIAL AND THE LIKE

Filed Sept. 23, 1937

3 Sheets-Sheet 3



WITNESSES:

John C. Berger
Hubert Suchs

INVENTOR:

Francis Klingler,

BY

Paul Paul

ATTORNEYS.

UNITED STATES PATENT OFFICE

2,170,289

MECHANISM FOR FEEDING SHEET
MATERIAL AND THE LIKEFrancis Klingler, Riverside, N. J., assignor to
Super Speed Press Corporation, New York,
N. Y., a corporation of Delaware

Application September 23, 1937, Serial No. 165,279

14 Claims. (Cl. 164—88)

This invention relates to mechanism for feeding sheet material and the like; and it has reference more particularly to feeding mechanism useful with punching, blanking and embossing machines to intermittently advance the material relative to the dies of such machines.

My invention has for its chief aim to make it possible to intermittently feed continuous sheet material and the like accurately and uniformly without attendant slipping. This advantage I attain in practice as hereinafter more fully disclosed, through provision of feeding mechanism wherein one or more pairs of opposing feed rollers respectively adapted to engage the material from opposite sides, are bodily reciprocated in the line of feeding and at the same time positively rotated continuously in such manner that during bodily movement in one direction, they assist in advancing the material but, during bodily movement in the other direction, roll idly along the material without imparting motion thereto.

In connection with feeding mechanism characterized as above, it is a further aim of my invention to provide for adjustment of the bodily reciprocatory movement of the rollers as well as of the rotative speed of the rollers so that the extent to which the material is advanced each time may be varied.

Other objects and advantages will appear from the following description of the attached drawings, wherein Fig. I is a fragmentary view in side elevation of a punching machine or press conveniently embodying my improved feeding mechanism.

Fig. II is a fragmentary view looking as indicated by the arrows II—II in Fig. I, and showing the front end elevation of the machine; and

Fig. III is a fragmentary view showing the machine in longitudinal section.

The punching machine which I have chosen for convenience of illustration herein is generally of well known construction in that it has a frame 1 with a table or shelf portion 2 whereon a female die member or matrix 3 is supported, and with an upper over-reaching portion 4 which provides a bearing 5 for the drive shaft 6 of the machine, and in addition, a vertical guideway 7 for a reciprocating slide 8 which carries a male die member or punch 9. The slide 8 is actuated through a strap link or pitman 10 from an eccentric 11 on the drive shaft 6, which latter is provided as usual, with a weighted balance wheel 12. The machine may be driven in any convenient way, as for example, through a belt (not shown) from an electric motor or other prime mover.

The feed mechanism with which the present invention is more especially concerned includes a horizontally-arranged bed 13 which extends longitudinally of the machine and which has pendant flanges 14 abutting opposite ends of the shelf portion 2 of the machine frame 1. From Figs. II and III, it will be observed that the flanges 14 are vertically slotted at 15 for passage of the shanks of headed securing bolts 16 which engage tapped holes in the frame 1. Mounted for horizontal reciprocation on the bed 13 is a carriage 18 whereof the transverse end members 19 and 20 are connected by a pair of longitudinal tie rods 21 and respectively formed with pendant runners 22, 23 (Fig. II) which slidably engage longitudinal grooves 24 along opposite sides of said bed.

The means provided for reciprocating the carriage includes a vertical yoke member 25 whereof the arms 25a extend downwardly of opposite sides of the bed 13 and at their lower ends engage transversely-aligned fulcrum studs 26 projecting from a stationary bracket 27 at the forward end of the frame 1. At its top, the yoke member 25 is coupled, through the medium of a link 28, with a crank pin 29 (see Fig. I) which is shiftable in the diametric slot 30 of a crank disk 31 on the shaft 6 of the machine by means of an adjustable screw 32. Pivotaly connected to opposite sides of the forward transverse member 19 of the carriage 18 are swivel blocks 33 in which the pendant arms 25a of the yoke 25 slidably engage, so that, as the latter swings back and forth under the action of the crank 29, said carriage is correspondingly moved on the bed 13 longitudinally of the machine and parallel with the line of feeding of the material S.

Upstanding from opposite ends of the transverse members 19 and 20 of the carriage 18 are bearing pedestals 35 and 36 for opposing pairs of feed rolls 37, 38 and 39, 40 which respectively engage the material S being operated upon from above and from beneath and which assist in horizontally drawing said material from a supply reel shown at R in Fig. I, so as to advance it relative to the die elements 3 and 9 in a manner which will be more definitely explained later herein. The shafts 38a and 40a of the lower feed rolls 38 and 40 are directly journaled in the pedestals 35 and 36; while the shafts 37a and 39a of the upper feed rolls 37 and 39 are journaled in blocks 41 and 42 confined to vertical slots in said pedestals. Helical springs 43 and 44 in compression between the blocks 41, 42 and the cap plates 35a, 36a of the pedestals 35, 36 serve to yieldingly urge the upper rolls 37 and 39 downward toward

the lower rolls 38 and 40 so that a firm grip is at all times maintained upon the material S. At the ends nearest the observer in Fig. I, the shafts of the rolls 37, 38 and 39, 40 are connected by intermeshing spur pinion couples 45 and 46, and, at the ends remote from the observer, the shafts 38a and 40a of the lower rolls are provided with sprocket pinions 47 and 48 which are connected by a chain 49. This arrangement insures positive rotation of the feed rolls in unison under propulsion of the drive means about to be described.

Secured to the far end of the shaft 6 of the machine in Fig. I is a sprocket wheel 50, which, by means of a chain 51, is connected to a sprocket pinion 52 on the corresponding end of the input shaft 53 of a horizontally-arranged regulatable speed device 54 which may be one of any of the well known commercial types available on the market. In order that the device 54 may move up and down as the carriage 18 reciprocates, its input shaft 53 is engaged in a bearing bracket 55 which is bolted or otherwise rigidly secured to the top of the stationary bracket 27 of the frame 1. At its free end, the variable speed device 54 is supported in suspension by a chain 56 which connects a sprocket wheel 57 on the output shaft 58 (which is longitudinally spaced from the output shaft 53) of said device with a sprocket wheel 59 on the shaft 37a of the upper feed roll 37 at the forward end of the carriage 18.

The operation of the machine is as follows:

By the drive connections just described, the upper and lower feed rolls 37, 38 and 39, 40 of the two sets are always positively driven in the direction of the arrows indicated on them in Figs. I and III, and by their rotation draw upon the material S as the carriage 18 is moved to the right in Fig. I to advance said material relative to the die members 3 and 9. During the return stroke of the carriage 18 (toward the left in Fig. I) however, the rolls 37-40 merely roll along the material in consequence of being rotated in the directions indicated, without inducing movement in said material. Due to the setting of the crank pin 29 on the shaft 6 at 180 degrees from the eccentric 11, as shown in Fig. I, the meeting of the die members 3 and 9 occurs just after the carriage reaches the end of its advance of rearward stroke when the material S is stationary, so that there is no interference with the action of said die members. By regulating the variable speed device 54, it is possible to accurately synchronize the speed of the feed rolls 37-40 with the movement of the carriage 18 and so prevent impartation of retractive movement to the material S by said rolls during the return of the carriage. Further, by adjusting the crank pin 29 in the slot 30 of the crank disk 31, the movement of the carriage may be increased or decreased to vary the extent of material advanced each time with the assistance of the rolls and to correspondingly vary the spacing of the punchings or markings made by the die members 3 and 9. It will be understood of course that such changes in the throw of the carriage 18 will necessitate regulation of the variable speed device 54 for the purpose of synchronization of the rolls in the manner already understood. My improved feeding means is thus adaptable to changes in the rate of feeding necessitated by dies of different kinds or sizes, and allows a very close spacing of the punchings or markings in the material. This is highly advantageous in blanking operations, for example, since it precludes unnecessary waste in the stock material. Whenever required in order to adapt the machine for dies

of different sizes, the bed 13 may be raised or lowered relative to the table 2 within the limit of the vertical slots 15 in its pendant flanges 14.

While, for the purposes of exemplification, I have herein shown and described my improved feeding mechanism in association with a punch press, it is to be understood that the same is not restricted to such application, since, by suitable modifications within the scope of the attached claims, the mechanism is obviously adaptable to other kinds of machines designed for operation upon sheet or other continuous material.

Having thus described my invention, I claim:

1. Mechanism for feeding sheet material and the like, comprising a pair of opposing feed rolls for respectively engaging the opposite sides of the material, means for bodily reciprocating the rolls in the line of feeding, and means for concurrently driving the rolls so that they cooperate in advancing the material as they are bodily moved in one direction but roll idly along the material as they are bodily moved in the other direction.

2. Feeding mechanism according to claim 1, including means whereby the bodily reciprocatory movement and the speed of the rolls may be compensatively varied to correspondingly vary the amount of material advanced each time.

3. Feeding mechanism according to claim 1, wherein the drive means is regulatable for synchronization of the rotative speed of the rolls with their bodily reciprocative movement.

4. Mechanism for feeding sheet material and the like, comprising a pair of opposing feed rolls for respectively engaging the opposite sides of the material, a carriage in which the rolls are journaled, means for guiding the carriage for reciprocation along the line of feeding, means for reciprocating the carriage, and means for concurrently rotating the rolls so that they cooperate in advancing the material during travel of the carriage in one direction but roll idly along the material during travel of the carriage in the other direction.

5. Mechanism for feeding sheet material and the like, comprising a pair of opposing feed rolls for respectively engaging the opposite sides of the material, a carriage in which the rolls are journaled, means for guiding the carriage for reciprocation along the line of feeding, means for actuating the carriage including an oscillating member having a sliding connection with the carriage, and means for concurrently rotating the rolls so that they cooperate in advancing the material during travel of the carriage in one direction but roll idly along the material during travel of the carriage in the other direction.

6. Mechanism for feeding sheet material and the like, comprising a pair of opposing feed rolls for respectively engaging the opposite sides of the material, means connecting said rolls for positive rotation in unison and in opposite directions, means for bodily reciprocating the rolls in the line of feeding, and means for driving the rolls so that they cooperate in advancing the material as they are bodily moved in one direction but roll idly along the material as they are bodily moved in the other direction.

7. Mechanism for feeding sheet material and the like, comprising a pair of opposing feed rolls for respectively engaging the opposite sides of the material while the latter is confined to travel in the horizontal plane, a carriage in which the rolls are journaled, means for guiding the carriage for reciprocation parallel with the material, means for reciprocating the carriage, and means for con-

currently driving the rolls so that they cooperate in advancing the material during travel of the carriage in one direction but roll idly along the material during travel of the carriage in the other direction, said drive means including a horizontally-arranged regulatable variable speed device with longitudinally-spaced input and output shafts, means whereby the device is supported with capacity for up and down rocking movement about the axis of its input shaft, and a suspension chain connecting a sprocket wheel fast on the output shaft of said device with a sprocket wheel fast on the shaft of one of the feed rolls.

8. In a machine for blanking or embossing, die mechanism including a shaft with means for reciprocating a movable die relative to a fixed die; feed mechanism including a pair of opposing feed rolls by which strip material to be punched passes, a mounting supporting the rollers with capacity for bodily reciprocation in the line of feeding of the material; means whereby the rolls are driven to advance the material as they are bodily moved in one direction at the time of separation of the dies but roll idly along the material as they are bodily moved in the opposite direction at the time of meeting of the dies; and means for bodily reciprocating the rolls in the manner set forth, including a rocker arm, means connecting the roll mounting to the arm at a point intermediate its fulcrum and swinging end, and a rotary actuator on the shaft of the die mechanism whereto the swinging end of the arm is connected.

9. A blanking or embossing machine according to claim 8, including means whereby the bodily movement of the rolls may be increased or decreased and the speed of the rolls compensatively varied.

10. In a machine for blanking or embossing, die mechanism including a shaft with means for reciprocating a movable die relative to a fixed die; feed mechanism including a pair of opposing feed rolls by which strip material to be punched passes, a mounting supporting the rollers with capacity for bodily reciprocation in the line of feeding of the material; means whereby the rolls are concurrently driven from the shaft of the die mechanism so that they cooperate in advancing the material as they are bodily moved in one direction at the time of separation of the dies, but roll idly along the material as they are bodily moved in the opposite direction at the time of meeting of the dies; and means for bodily reciprocating the rolls relative to the movements of the dies in the manner set forth including a rocker arm, means connecting the roll mounting to the arm at a point intermediate its fulcrum and swinging end, and a rotary actuator on the shaft of the die mechanism whereto the swinging end of the arm is connected.

11. In a machine for blanking or embossing, die mechanism including a shaft with means for reciprocating a movable die relative to a fixed die; feed mechanism including a pair of opposing feed rolls by which strip material to be punched passes, a mounting supporting the rollers with capacity for bodily reciprocation in

the line of feeding of the material; regulatable variable speed means actuated from the shaft of the die mechanism, whereby the rolls are driven to advance the material as they are bodily moved in one direction at the time of separation of the dies but revolved idly along the material at the time of meeting of the dies; and means for bodily reciprocating the rolls in the manner set forth including a rocker arm, means connecting the roll mounting to the arm at a point intermediate its fulcrum and swinging ends, and a rotary actuator on the shaft of the die mechanism capable of adjustment for throw, whereto the swinging end of the arm is connected.

12. In a machine for blanking or embossing, die mechanism including a shaft with means for reciprocating a movable die relative to a fixed die; feed mechanism including two spaced pairs of opposing feed rolls between which strip material to be punched passes, respectively in advance of and to the rear of the dies, a mounting for supporting the rolls with capacity for bodily reciprocation in the line of feeding of the material, means whereby the rolls of both pairs are synchronously driven to advance the material as they are bodily moved in one direction at the time of separation of the dies but roll idly along the material as they are bodily moved in the opposite direction at the time of meeting of the dies; and means for bodily reciprocating the two roll sets in the manner set forth including a rocker arm, means connecting the roll mounting to the arm at a point intermediate its fulcrum and swinging ends, and a rotary actuator on the shaft of the die mechanism whereto the swinging end of the arm is connected.

13. A blanking or embossing machine according to claim 12, including means whereby the bodily reciprocatory movement of the rolls may be increased or decreased and the rotative speed of the rolls compensatively varied.

14. In a machine for blanking or embossing, die mechanism including a shaft with means for reciprocating a movable die relative to a fixed die; feed mechanism including two spaced pairs of opposing feed rolls between which strip material to be punched passes, respectively in advance of and to the rear of the dies, a mounting for supporting the rolls with capacity for bodily reciprocation in the line of feeding of the material, and a regulatable variable speed device actuated from the shaft of the die mechanism whereby the rolls of both pairs are synchronously driven to advance the material as they are bodily moved in one direction at the time of separation of the dies but roll idly along the material as they are bodily moved in the opposite direction at the time of meeting of the dies; means for bodily reciprocating the two roll sets in the manner set forth including a rocker arm, means connecting the roll mounting to the arm at a point intermediate its fulcrum and swinging ends, and a rotary actuator on the shaft of the die mechanism capable of adjustment for throw, whereto the swinging end of the arm is connected.

FRANCIS KLINGLER.