R. B. LEWIS.

MACHINE FOR PUNCHING AND TRIMMING METAL STAY STRIPS FOR BOXES.

APPLICATION FILED MAY 15, 1905.

901,358.

Patented Oct. 20, 1908.

3 SHEETS—SHEET 1.

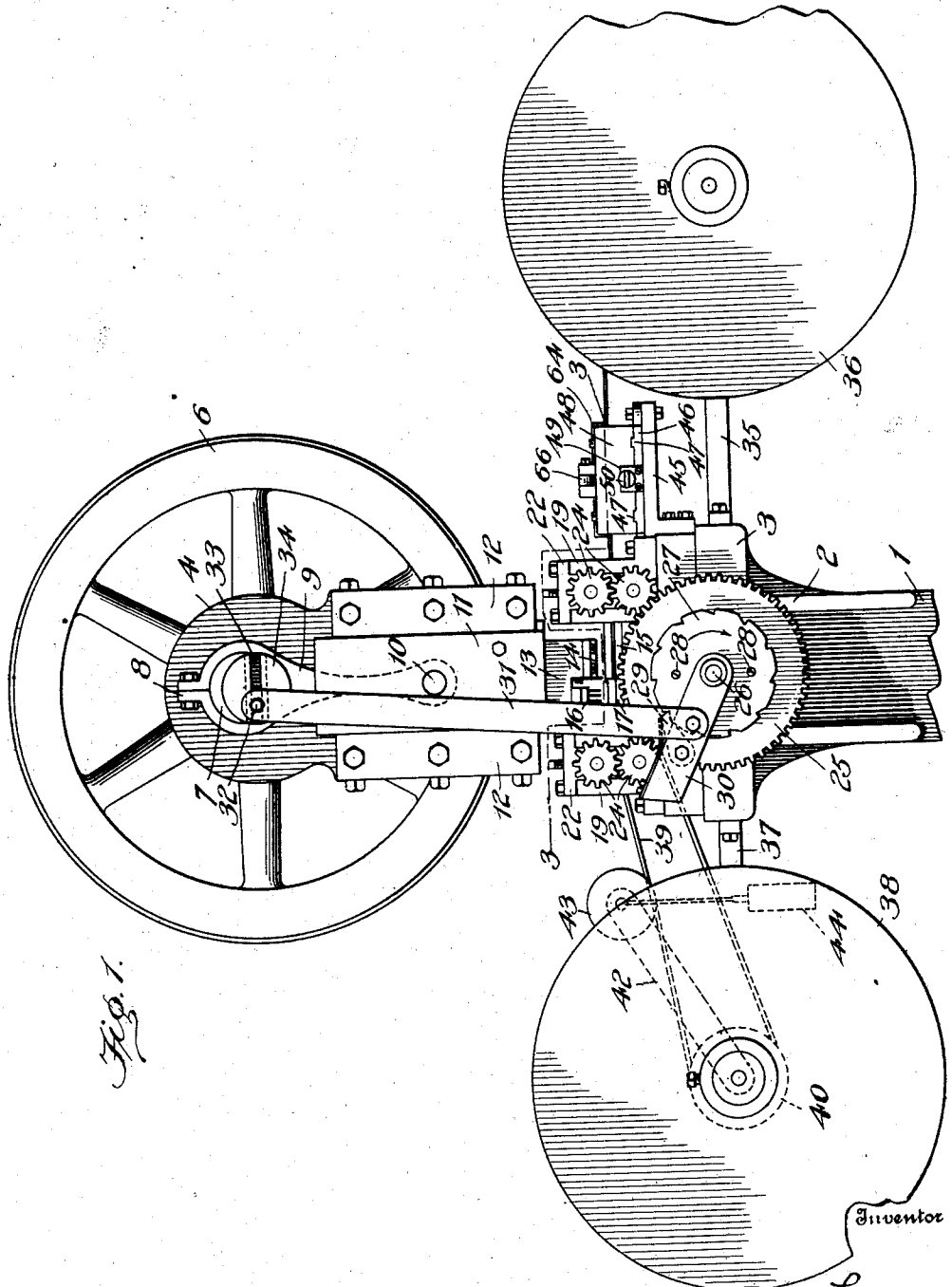


Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 5.

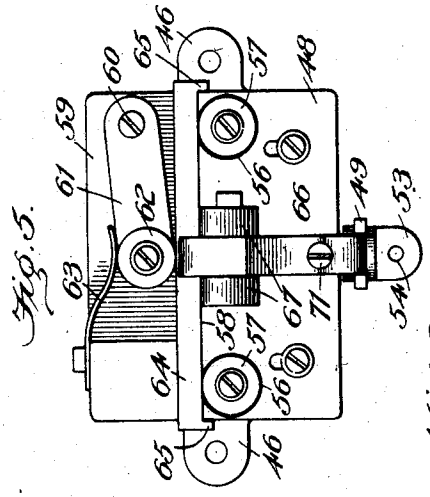


Fig. 6.

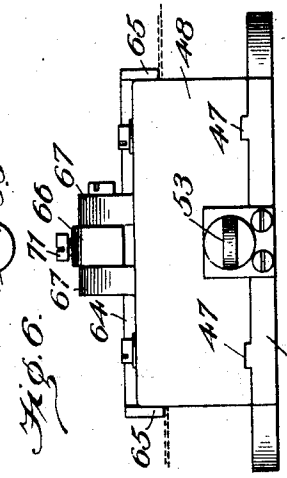


Fig. 7.

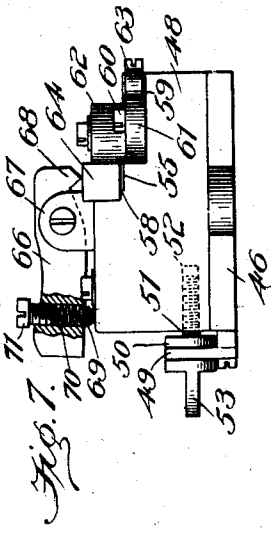
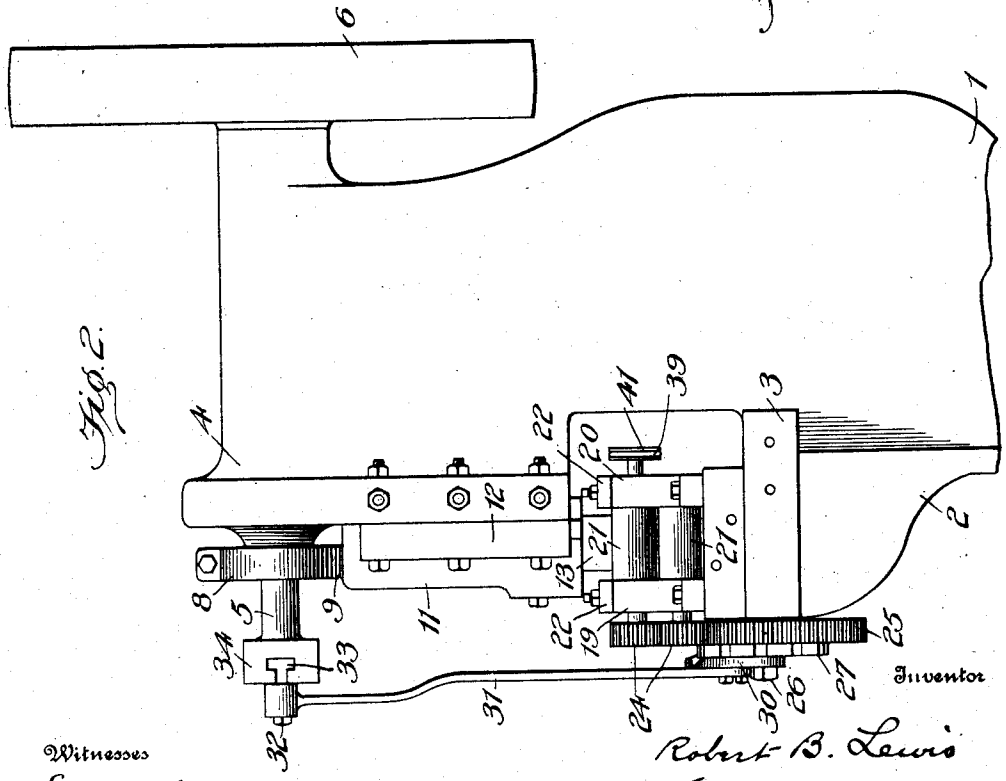


Fig. 2.



Witnesses

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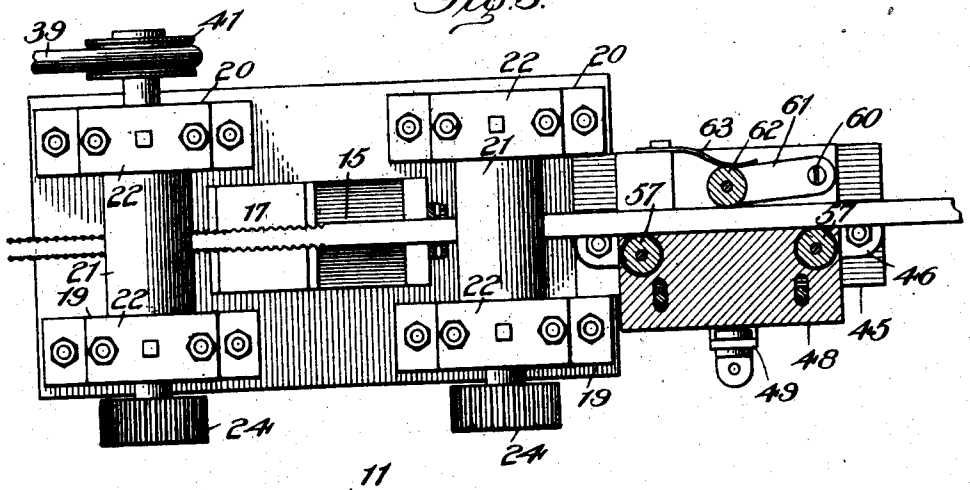
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3 SHEETS—SHEET 3.

Fig. 3.



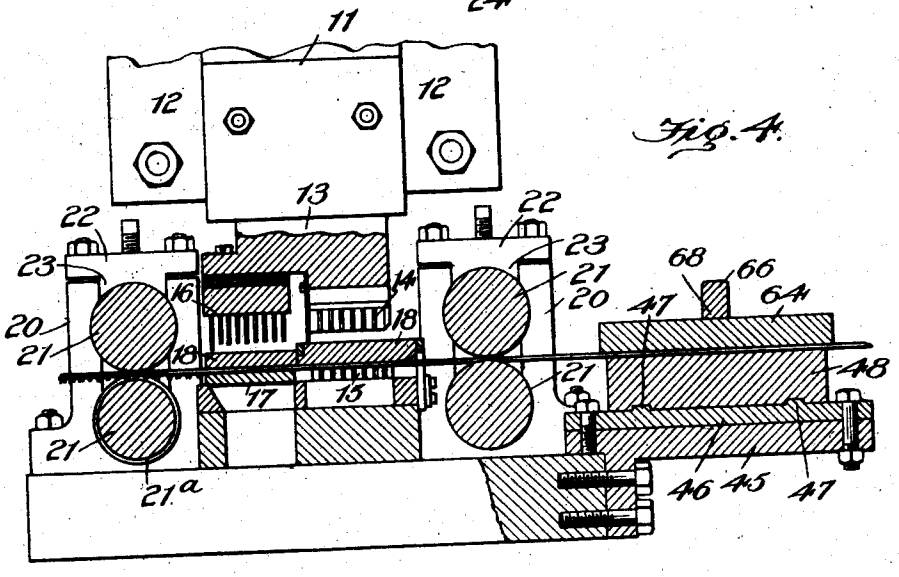


Fig. 4.

Fig. 9.

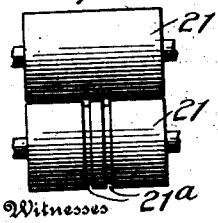
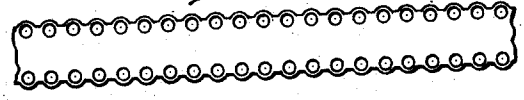


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

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MACHINE FOR PUNCHING AND TRIMMING METAL STAY-STRIPS FOR BOXES.

No. 901,358. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed May 15, 1905. Serial No. 260,412.

To all whom it may concern:

Be it known that I, ROBERT B. LEWIS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Machines for Punching and Trimming Metal Stay-Strips for Boxes, of which the following is a specification.

My invention has relation to new and useful improvements in machines for punching and trimming metal stay strips for boxes, and more especially to machines of the type constructed to operate progressively and successively upon a strip or band of metal of indefinite length to trim the side edges thereof and punch up from the body of the strip burs by means of which the strip is secured to the material comprising the box, in connection with which the strip is to be used.

The primary object of the invention is to provide a machine of the character mentioned, which will be comparatively simple in construction, accurate and sure in its functions, which will be automatic in operation and require but little care or attention on the part of the attendant.

A further object is to provide in a machine of this character, means for accurately feeding the strip to the trimming and punching dies so that the strip will always be in the correct position to be acted upon by said dies.

A further object is to provide means for holding the strip taut or under tension during the feeding of the strip and during the operation of the machine, so as to assure the successive operations of the dies being at equal intervals.

A further object of the invention is to provide an improved means for intermittently feeding the strip to the dies, said feeding means being so constructed that the length of the strip portion intermittently presented to the dies may be varied as desired.

I have fully and clearly illustrated my invention in the accompanying drawings to be taken as a part of this specification and wherein—

Figure 1 is a view in front elevation of the complete machine embodying my present invention. Fig. 2 is a view in side elevation of the machine, looking at the right hand side of Fig. 1, with the supply reel and guiding means removed. Fig. 3 is a section taken on the line 3—3 of Fig. 1. Fig. 4 is a vertical central section through the guiding, feeding and forming means. Fig. 5 is a top plan view of the guiding means. Fig. 6 is a front elevation of the guiding means. Fig. 7 is a view in end elevation of the guiding means. Fig. 8 is a plan view of a section of the finished strip produced by the machine. Fig. 9 is a detail view in front elevation of the feed rolls through which the strip passes after being trimmed and punched.

Referring to the drawings 1 designates a standard or frame upon which the several elements of the machine embodying my invention are supported and arranged in operative combination. This standard is provided at a point approximately midway of its height with a laterally projecting bracket 2, which supports the bed-plate 3 of the machine, and from the upper portion of the standard projects an overhanging arm 4, said arm extending over the bed-plate as clearly shown in Fig. 2.

Located at the upper part of the standard is a horizontal bearing extending from front to rear thereof and in which is journaled a driving shaft 5 from which motion is transmitted to the various moving elements of the machine, the shaft carrying at its rear end a pulley 6, which is driven by a belt (not shown) connected with any suitable source of power. The front end of the shaft 5 projects in advance of the front face of the arm 4 and carries an eccentric 7, engaged by an eccentric strap 8 on one end of a connecting link 9, the other end of which is pivotally connected, as at 10, to a vertically sliding block or head 11, arranged to have, during the operation of the machine, a continuous vertical reciprocating movement in guides 12 on the arm 4, owing to the eccentric connection with the shaft 5, which rotates continuously during the operation of the machine. Carried by the lower end of the head 11 is a die-block 13 which is formed on its under face with a female die 14 for trimming the side edges of the strip, said female die coöperating with a male die 15 mounted upon the bed-plate 3, directly beneath said female die. The female die above referred to covers only a portion of the lower face of the die block and is located on the por-

tion of the said face nearest to the point from which the strip is fed to the machine. Upon the face portion of the die block unoccupied by the female trimming die, is arranged a male die 16 for punching up the burs on the strip, said male die coöperating with a female die 17 on the bed plate of the machine. Arranged between both sets of cooperating dies are stripper blocks 18, which prevent the strip being lifted by the dies when the head 11 moves upwards. By the arrangement of trimming and punching dies as above described, it will be seen that the former operates to trim the side edges of a portion of the metal strip and that the punching dies at the same time strike up the attaching burs from the body of the strip portion already trimmed.

I will now proceed to describe the means for feeding the metal strip to the dies and for maintaining the same taut during the feeding operation and while being trimmed and punched. Securely bolted to the bed-plate of the machine upon both sides of the dies are sets of vertical spaced pillars 19, 20, and in each set of pillars is rotatably mounted a pair of horizontal feed rollers 21, arranged one above the other and in facial contact, between which rolls the metal strip passes, as clearly shown in Figs. 3 and 4 of the drawings. The rollers are maintained in position between the pillars by means of bearing blocks or brasses 22, which are adjustably bolted to the upper ends of said pillars and provided with depending extensions 23, engaging the journals of said rolls, whereby the pressure exerted by the rollers on the strip may be regulated so as to provide for the positive feed of the latter.

At their front end portions each pair of rolls is provided with intermeshing pinions 24, so as to provide for the simultaneous rotation of the rolls. The rolls are rotated by means of a large gear wheel 25 mounted upon a shaft 26, journaled upon the bed-plate at the front portion of the machine, said gear meshing with the pinion on the lower feed roll of each set, as shown clearly in Fig. 1 of the drawings, whereby both sets of feed rolls rotate simultaneously. Secured upon the face of the gear 25 is a ratchet disk 27, screws 28 serving as the means for securing the same in position. This ratchet disk is engaged by a pivoted, spring actuated pawl 29, mounted on a swinging pawl-arm 30, which has one end loosely hung upon the shaft 26, and this pawl-arm is connected to one end of a vertically extending pitman 31, the opposite end of which is pivoted to a bolt 32, adjustably mounted in a groove 33, formed in the face of a disk 34 carried by the forward end of the shaft 5, said bolt being so adjusted in said groove as to make the connection of said pitman to the shaft 5 eccentric to the latter, the connection being such that when the pitman is reciprocated by the rotation of the shaft 5, the arm 30 is swung on its pivot, and through its pawl 29 imparts rotation to the disk 27 and gear 25. It will be noted that the groove 33 in the disk 34 is so arranged with relation to the eccentric 7 that the pitman is actuated to impart movement to the feeding means at a time when the head 11 is raised to separate the trimming and punching dies so that the strip is moved when the dies are separated.

By a simple arrangement of the devices above described, I provide means whereby the feeding devices may be regulated to change the length of the strip fed to the dies and this consists in making the ratchet disk 27 interchangeable, in order that disks having teeth spaced at various intervals may be employed, so that the degree of rotation given to the gear 25 may be varied. Of course, when disks of various forms are employed the upper end of the pitman 31 will have to be adjusted on the disk 34 so as to vary the throw of the pawl arm to correspond to the distance between the notches or teeth on the ratchet disk.

Extending laterally from one side of the bed-plate 3 is a bracket 35, upon the outer end of which is rotatably mounted a reel 36, which carries the metal strip to be fed to the machine, and from the opposite side of said bed plate projects a similar bracket 37, carrying a rotatable take-up reel 38, upon which the finished strip is wound after passing through the machine. This take-up reel is positively rotated by means of friction or slipping a belt 39, which passes over a pulley 40 on the end of the shaft carrying said reel, as shown in dotted lines in Fig. 1, and a pulley 41 carried by the journal of one of the feed rollers. It will therefore be seen that when the feed rolls are intermittently driven that the reel 38 will be rotated to take up the finished strip, and that during the periods at which said rolls are not driven, the take-up reel will be at rest. Suitable means is provided for maintaining the belt 39 taut, which consists of an arm 42 pivoted at one end to the shaft of the take-up reel and carrying at its end a roller 43 which rests upon the upper turn of the belt 39, said arm being forced downwardly by a weight 44 hung to the free end thereof. From the above description it will be apparent that the supply reel is free to rotate whenever the feed rolls and the take-up reel are rotated to advance the strip.

While I have shown sets of feed rolls arranged on both sides of the die cutting and punching mechanism, I desire it to be understood that either one of said sets, particularly that arranged adjacent the take-up reel, may be dispensed with and a single set of feed rolls employed for drawing the metal strip from the supply roll and presenting it to the

dies. In cases where the set of rolls adjacent the feed roll is employed, it is necessary to groove one of the rolls, shown at 21ª to receive the burs on the completed strip, so that said burs will not be crushed or mashed down and the strip thereby spoiled. It will be understood that when the set of rolls just mentioned is dispensed with that the take-up roll will be driven from the set of rolls retained. It is not necessary that the take-up roll be automatically driven as it may be turned manually by any suitable means, but care must be taken that the reel be rotated so that the strip is at all times held taut during the operation of the machine.

Means is provided for adjusting the strip laterally so as to be fed properly to the trimming and punching dies, said means being preferably, but not necessarily, located between the supply reel and the dies, and including means for frictionally engaging the metal strip so that the passage thereof into the machine will be somewhat retarded so that the action of the feed rolls and take-up reel will operate to pull the strip taut.

Proceeding with a detailed description of the means as above generally referred to, 45 designates a supporting shelf or bracket bolted to one side of the bed plate and projecting into the space between the first set of feed rolls and the supply reel. Upon the upper side of this shelf is rigidly secured by means of bolts, a horizontally disposed plate 46, formed with transverse ribs 47, and upon the plate is arranged a block 48 having grooves on its underside, to receive the ribs 47, on the plate 46, the latter being provided with a vertical bracket 49, in which is rotatably mounted a screw member 50, the threaded portion 51 of which engages a threaded opening 52 in the block 48. The outer end of the screw member is provided with a head 53 having an opening 54 to be engaged by a suitable tool whereby the screw may be turned and the block 48 adjusted across the face of the plate 46, the sliding movement of the block being transverse to the line of feed of the metal strip. At its rear portion the block 48 is provided with stepped ledges of which the upper one 55, constitutes a support for the metal strip, and in recesses 56 formed in the upper part of the block are rollers 57, arranged to rotate on vertical axes, and having their peripheries flush with the vertical wall 58 rising from the ledge 55, and against which rollers one edge of the strip travels in passing into the machine. Upon the lower ledge 59 of the stepped portion of the block is pivoted as at 60, one end of a swinging bar 61, the opposite end of which carries a roller 62, said bar being forced toward the strip by means of a spring 63, so that the roller 62 engages the outer edge of the strip and moves the latter toward the rollers 57, so that the opposite edge of said strip is kept in constant alinement with said rollers 57.

Disposed upon the upper side of the strip is a drag bar 64, which extends the full length of the block 48 and has lateral projections 65 at the ends thereof engaging the end portion of the block to prevent longitudinal movement of the bar, so that the movement of the strip through the block will not carry the drag bar along with it and dislodge said bar from position on the block. Means is provided for pressing the drag bar into strong frictional engagement with the strip, which consists of a lever 66 fulcrumed between ears 67 on the upper side of the block 48, and having a nose 68 which is held in engagement with the top side of the drag-bar by means of an expansion spring 69 one end of which abuts the block 48, the opposite end being seated in an opening 70 in the rear end of the lever and abutting the screw 71 threaded into the said opening, said screw serving as a convenient means for regulating the tension of the spring. It might be stated that the nose of the lever continuously engages the drag-bar during the operation of the machine, but should it be desired for any reason to relieve the frictional engagement of said bar with the strip, it is only necessary to press downward upon the rear end of the lever 66, which will raise the toe of the lever from engagement with the bar and permit the same to ride loosely upon the surface of the strip.

It will be seen that the block 48 may be easily moved or adjusted transversely of the line of feed to assure the strip passing in a direct line into the center line of the die.

It will be seen that if desired, instead of locating the guiding means between the supply reel and the first set of feed reels, said means may be located between the feed rolls and the dies, this arrangement of course, necessitating the rolls being located at a point further away from the dies than in the arrangement first mentioned. It will also be apparent that a second guiding means may be located between the dies and the take-up roll should it be so desired.

The operation of the machine is as follows: The metal strip having been threaded through the machine and the guiding means adjusted to present the strip properly to the center line of the dies, the shaft 5 is set in motion and rotates the eccentric 7 to move the head 11 downwards to bring the trimming and punching dies into engagement with the strip to trim and punch the latter. The dies having operated as just stated, the continuous operation of the shaft 5 and eccentric 7 serves to elevate the head 11, and while the head is being raised the feeding mechanism is intermittently operated through the gear 25, pawl 29, pawl-arm 30, and pitman 31, to advance the strip so as to

feed the same into the machine such a distance as to present the trimmed but unpunched portion of the strip to the punching dies, and a new portion of the strip to the trimming dies to be trimmed. Simultaneously with the operation of the feed rolls, the take-up roll 38 is rotated to take up the strip which has been finished. During this operation it will be seen that the drag-bar 64 is in frictional engagement with the strip and tends to retard the passage of the latter to the machine, so that the pull exerted by the feed rolls and take-up reels on the strip is opposed to the action of the drag bar and the strip between the guide and the take-up reel is held taut during the trimming and punching operation.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged respectively on opposite sides of the die mechanism, feed rolls to either side of said dies for drawing the strip from the supply reel and presenting the same to the die mechanism, said feed rolls being inter-geared whereby to hold the strip rigid upon the die mechanism, a means for retarding and guiding the strip to said feed rolls, means for intermittently driving said rolls, and means for intermittently driving said take-up reel.

2. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged respectively on opposite sides of the die mechanism, feed rolls for drawing the strip from the supply reel and presenting the same to the die mechanism, means for intermittently driving said rolls, and connections between said rolls and reel whereby they are rotated simultaneously.

3. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged respectively on opposite sides of the die mechanism, feed rolls for drawing the strip from the supply reel and presenting the same to the die mechanism, and means for intermittently and simultaneously driving said rolls and take-up reel.

4. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged on opposite sides of the die mechanism, feed rolls for drawing the strip from the supply roll and presenting it to the die mechanism, said feed rolls and take-up reel being inter-geared to operate in unison, and adjustable means in the line of feed of the strip for guiding and tensioning the same to the rolls.

5. In a machine of the character described, a die mechanism for trimming and punching a metal strip, feed rolls for tensioning said strip upon the die mechanism, a supply reel and a take-up reel for the strip arranged on opposite sides of the die mechanism, and adjustable means in the line of feed of the strip for guiding the same to the rolls, said means being adjustable transversely of the line of feed.

6. In a machine of the character described, a die mechanism for trimming and punching a metal strip, feed rolls therefor, a supply reel and a take-up reel for the strip arranged on opposite sides of the die mechanism, a guide for the strip, independent resilient means engaging the strip for retarding the movement of the strip to the dies and means for intermittently rotating the take-up reel and feed rolls in unison.

7. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged on opposite sides of the die-mechanism, feed rolls for drawing the strip from the supply reel and presenting it to the die mechanism, means for intermittently driving the feed rolls, and the take-up reel, and a guide for the strip adjustable transverse to the line of feed of the latter.

8. In a machine of the character described, a die mechanism for successively and intermittently trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged on opposite sides of the die mechanism, feed rolls for drawing the strip from the supply reel and presenting it to the die mechanism, means for intermittently driving the feed rolls, a guide for the strip adjustable transverse to the line of feed of the latter, and resilient means forming part of the guide for retarding the passage of the strip.

9. In a machine of the character described, a die mechanism for successively and intermittently trimming and punching a metal strip, a supply reel and a take-up reel for the strip arranged on opposite sides of the die mechanism, feed rolls for intermittently drawing the strip from the supply reel and presenting it to the die mechanism, and resilient means coöperating with the feed rolls for maintaining the strip taut during the trimming and punching operation.

10. In a machine of the character described, a die mechanism for successively and intermittently trimming and punching a metal strip, a supply reel and a take-up reel for the strip on opposite sides of said die mechanism, feed rolls for drawing the strip from the supply reel and presenting it to the die-mechanism, a guide for the strip intermediate said supply reel and the die-mechanism, a drag bar on the guide in fric-

tional engagement with the strip; and resilient means for maintaining said bar in said engagement.

11. In a machine of the character described, a die mechanism for successively and intermittently trimming and punching a metal strip, intergeared feed rolls arranged on opposite sides of said mechanism for feeding the strip thereto, means for tensioning and guiding the strip to said feed rolls, and means for imparting a simultaneous intermittent rotation to said rolls.

12. In a machine of the character described, a die mechanism for trimming and punching a metal strip, sets of intergeared feed rolls on opposite sides of said mechanism, to feed the strip thereto, a gear meshing with the gear of both sets of feed rolls, a ratchet disk carried by said gear, a pawl arm, carrying a pawl to engage with said disk, a drive shaft, and a pitman connected to said pawl-arm and having an eccentric connection to said shaft.

13. In a machine of the character described, a die mechanism for trimming and punching a metal strip, a supply reel and a take-up reel for the strip on opposite sides of said mechanism, feed rolls for drawing the strip from the supply reel and presenting it to the die mechanism, means for driving the feed rolls, a guide for the strip, including an adjustable block carrying a plurality of stationary rollers against which one edge of strip engages, and an arm pivoted on the block provided with a roller at one end to engage the opposite edge of the strip from that above mentioned, and a spring to move the arm so that the roller thereon will engage the strip.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT B. LEWIS.

Witnesses:

CHESTER A. SAYBOLT,

FRANK HALEY.