Apr. 17, 1923.

1,452,308

E. B. MILLER

MATERIAL BLANKING OPERATION

Filed Feb. 15, 1921

3 Sheets-Sheet 1

Fig. 1.

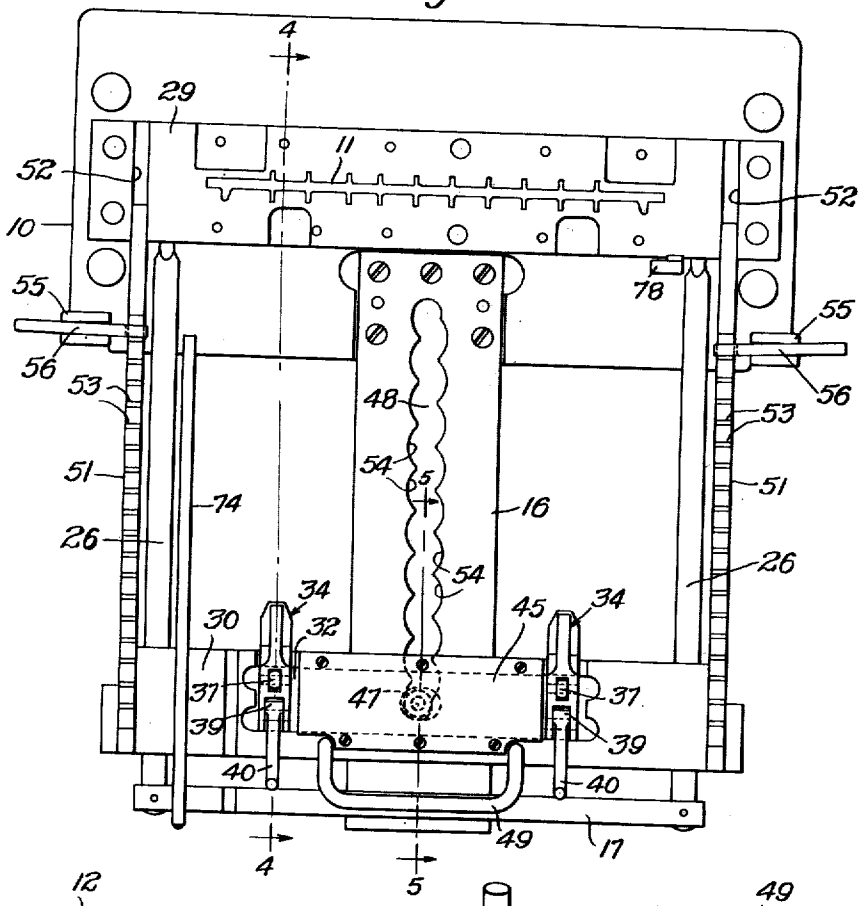
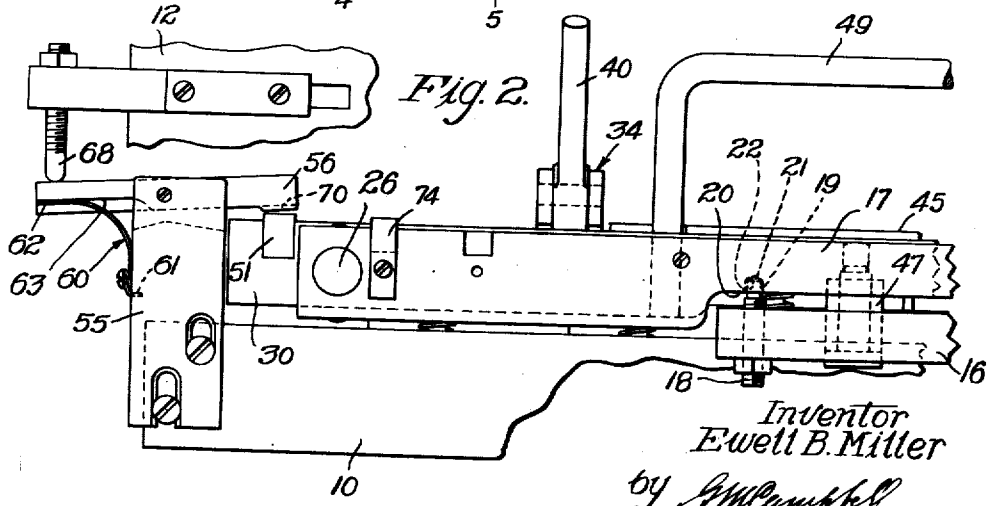


Fig. 2.



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3 Sheets-Sheet 2

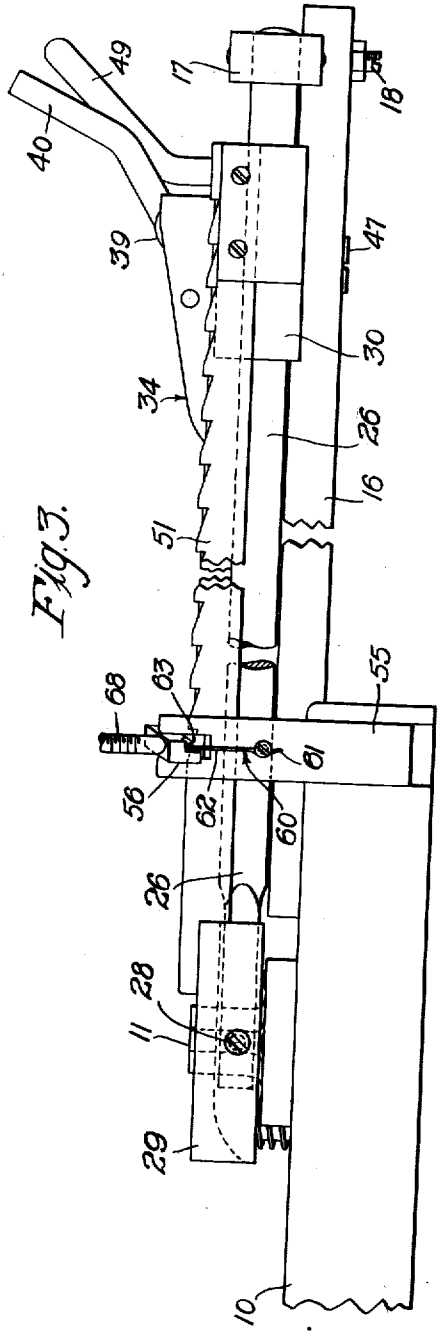


Fig. 3.

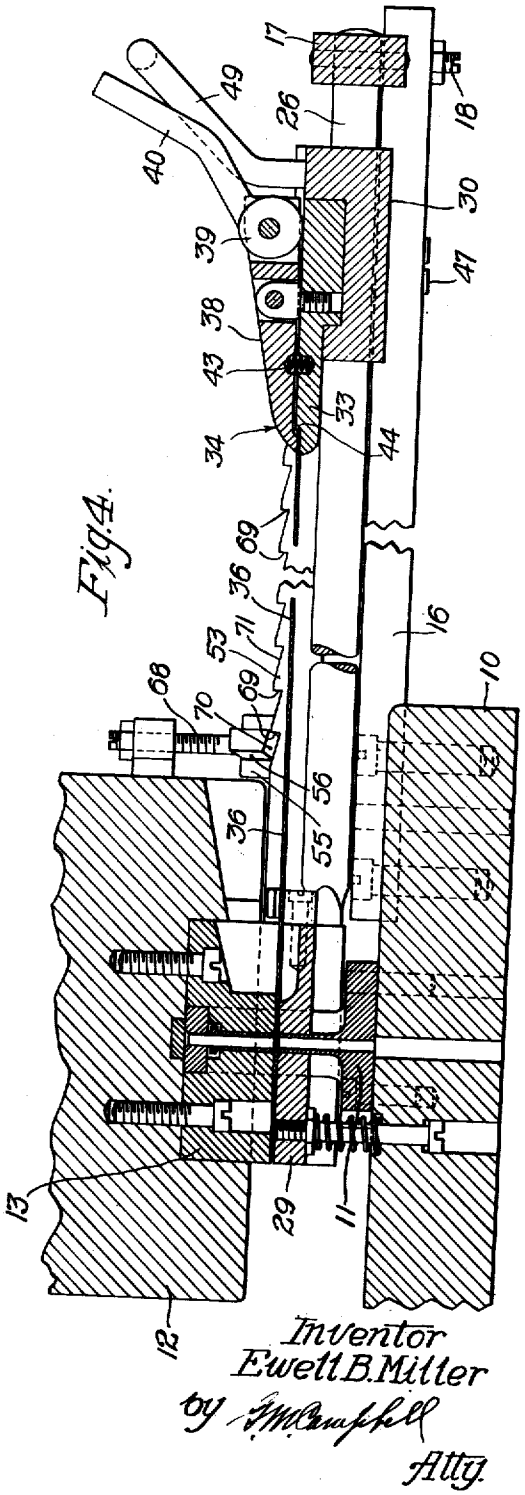


Fig. 4.

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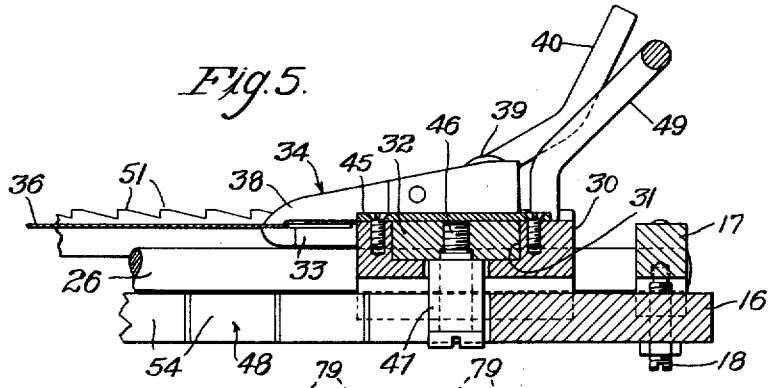
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MATERIAL BLANKING OPERATION

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Fig. 5.



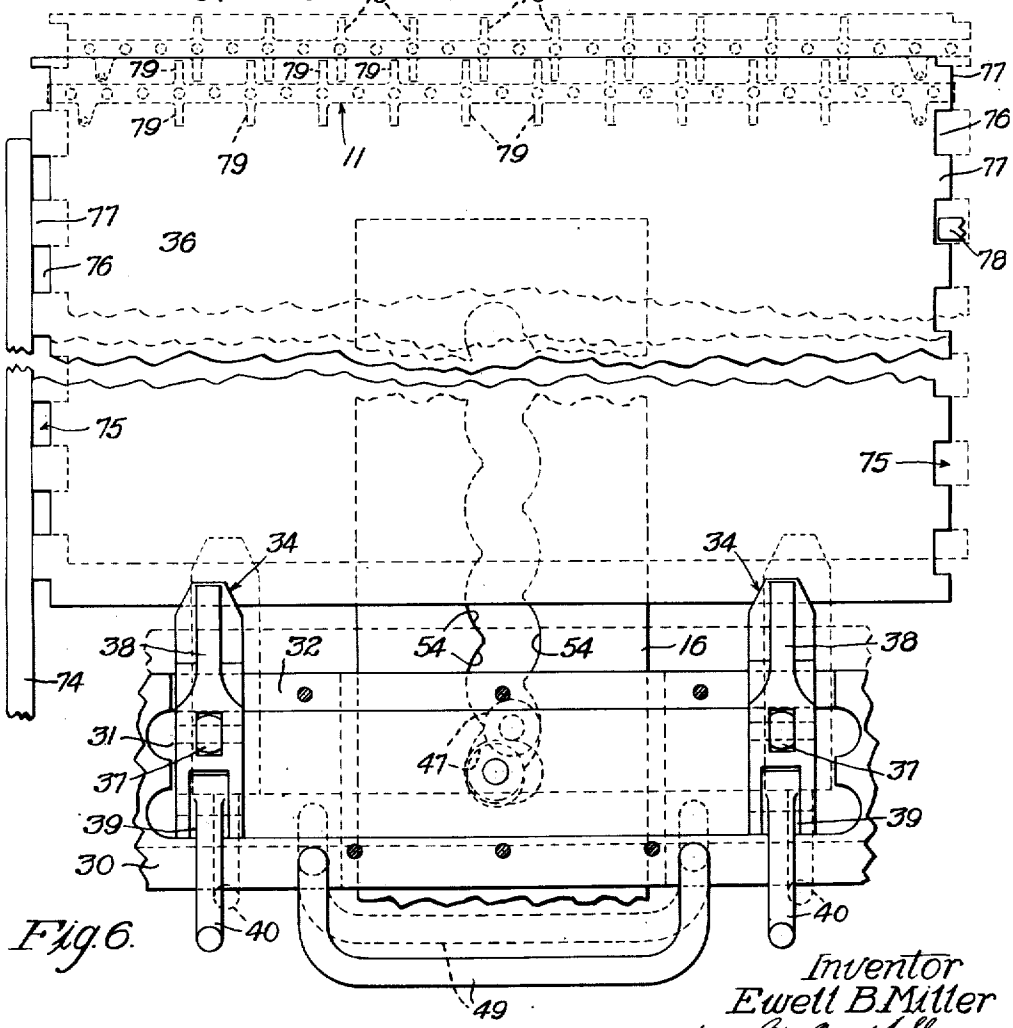


Fig. 6.

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Patented Apr. 17, 1923. 1,452,308

UNITED STATES PATENT OFFICE.

EWELL BALFOUR MILLER, OF CICERO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MATERIAL-BLANKING OPERATION.

Application filed February 15, 1921. Serial No. 445,251.

To all whom it may concern:

Be it known that I, EWELL BALFOUR MILLER, a citizen of the United States, residing at Cicero, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Material-Blanking Operations, of which the following is a full, clear, concise, and exact description.

This invention relates to material blanking operations, and more particularly to the blanking from metal sheets of strips having oppositely extending projections such as terminal strips used in connection with telephone apparatus.

The object of this invention is to provide a simple and convenient mechanism for advancing the stock into blanking position whereby a minimum amount of material will be wasted in the operation of punching a given number of strips from a sheet of given dimensions.

In accordance with the general features of this invention means are provided for moving the stock or sheet longitudinally of the blanking tools as the strip is advanced, whereby the projections on one terminal strip will be blanked from the material lying between the projections of the adjacent strips instead of the material beyond the ends of the projections of the adjacent strips.

In the mechanism by means of which the feeding movement of the sheet material is accomplished there is a clamping mechanism for engaging the sheet carried by a supporting frame which is movable toward the blanking tools, the clamping mechanism being laterally movable with respect to the frame and adapted to be moved to the right or left at each forward step of the supporting frame.

Stops are provided for limiting the step-by-step forward movement of the supporting frame which are controlled by the movement of the reciprocating member of the punch press.

In the drawings:

Fig. 1 is a plan view of an attachment for punch presses embodying the features of my invention and shown mounted on the punch holder of a punch press;

Fig. 2 is an enlarged partial front view of Fig. 1 showing a portion of the upper or reciprocating part of the punch press;

Fig. 3 is an enlarged side view of Fig. 1 with portions broken away;

Fig. 4 is an enlarged longitudinal vertical section taken on the line 4—4 of Fig. 1 with portions broken away and with the reciprocating die holder and die carried thereby shown in section;

Fig. 5 is an enlarged vertical section taken on the line 5—5 of Fig. 1, and

Fig. 6 is an enlarged partial plan view of Fig. 1 with a sheet of material shown clamped in position. The dotted outline of portions of the attachment and the sheet clamped thereto shows their position after being fed forward and after the first punching, with the outline of the punch shown by dotted lines.

In the drawings the punch press proper has not been shown, but merely portions of the punch holder indicated at 10 with the punch 11 mounted thereon which is suitably carried on the bed of the punch press. Above the punch holder is a die holder 12 which is secured to and moves with the reciprocating member of the press and carries a die 13 which cooperates with the punch 11 to stamp or punch out the parts from the sheet material as it is fed into position by the feeding attachment. (See Fig. 4). A supporting plate 16 is secured to the punch holder 10 and extends forward thereof and at its end carries a bar 17 which extends transversely thereof. The bar 17 extends over each side of the plate 16 and rests upon adjustable pins 18 which project from the top surface of the plate 16 and into depressions 19 formed in a lower surface 20 of the bar. The pins 18 are cone shaped at their ends, as indicated at 21, and engage cone shaped surfaces of greater angle, forming the bottom of the depression 19, indicated at 22, thereby allowing the bar 17 to rock about the stationary pins 18. Secured to the bar 17 at each end thereof are circular shaped rails 26 which extend back and are pivoted at 28 to a stripper plate 29 of the punch 11 and move up and down therewith when the press is operating. The movement of the stripper plate 29 being very slight—about the thickness of the material being punched—the movement transmitted to the bar 17 will be even less, due to the leverage therebetween.

Suitably mounted to slide upon the rails 26 is a carriage 30 (see Fig. 5) which carries within a depression 31 formed in its top surface and equidistant between the rails

26 a slide 32, as clearly shown in Fig. 1. Forming a part of the slide 32 are stationary lower jaws 33 of a clamp 34 provided for holding the material, indicated at 36, which is to be operated upon. Studs 37 screw-threaded into the slide 32 each pivot an upper jaw 38 of the clamp 34. Pivoted to the rear end of each jaw 38 within a fork shaped opening therein is a cam 39 equipped with an operating handle 40. Suitably positioned between the jaws 33 and 38 forming each clamp 34 is a compression spring 43 which functions to hold the jaws apart when the cam 39 is released. The lower jaw 33 is provided with a shouldered surface 44 against which the material 36 is positioned before being clamped. The lower surface of the upper jaw 38 is suitably spaced from the lower jaw 33 and tapered upward from the stud 37 toward its forked end to allow for a movement downward thereof when the handle 40 is moved to the left, as viewed in Fig. 4, to release the cam 39, which movement downward is caused by the action of the spring 43. A retaining plate 45 is positioned above the slide 32 and secured to the carriage 30. Secured to the under side of the slide 32 by a shouldered stud 46 is a roller 47 which rides in a cam slot or groove 48 formed in the supporting plate 16. (See Figs. 5 and 6). The length and shape of the cam slot 48 will vary according to the length of the material from which the parts are punched and the length and width of the projections on the part punched. The cam slot is formed to move the work sideways to the right or left as it is moved forward to allow the projections on the side of one part to interlock the projections on one side of a part just punched, or to move the material over so that the projections on the side of a part about to be punched will be punched from the waste material lying between the projections on one side of a part just punched.

Suitably secured to the carriage is a handle 49 for moving the carriage forward to feed the material to the press. At each end of the carriage 30 and suitably secured to its sides are racks 51 which at their opposite ends ride in slots 52 formed in the stripper plate 29 of the punch 11 when the carriage is moved forward. The spacing of the teeth 53 of the rack 51 is the same as the distance between the centers of the cam surfaces 54—54 forming the slot 48, and the spacing of which will vary like the shape of the slot 48 according to the shape of the strip to be punched. At each end of the work holder 10 is a support 55 provided with a forked end within which is pivoted a latch 56 which engages the teeth 53 in the rack 51 and acts as a stop for the carriage carrying the work when the rack 51 has advanced forward one tooth, which movement will simultaneously move the carriage sideways due to the roller 47 riding in the cam slot 48.

The latch 56 is pivoted to the forked end of the support 55 in such a manner, and the inside surfaces forming the fork are so beveled, that the latch is adapted to have a slight movement at right angles to its movement up or down when disengaging or engaging the rack. A spring 60 with one end 61 secured to the support 55 and its other end 62 bearing upward within a slot 63 formed in the lower surface of the outside end of the latch 56 tends to force the opposite end of the latch into engagement with the rack 51. The end 61 of the spring is coiled in such manner that the opposite end 62 which is in the form of a leaf spring which bears within the slot 63 acts to turn the outside end of the latch in a counter clockwise direction in addition to the force exerted upward against the outside end of the latch. The result of this action of the spring 60 is to force the inside end of the latch into engagement with the rack and to turn it in a clockwise direction at right angles to its downward movement. The beveled surfaces on the inside surfaces of the forked ends of the supports 55 allow for this movement of the latches. Adjustably mounted on the reciprocating member of the press and above each latch 56 is an adjustable trip pin 68 which acts to trip the latch 56 from engagement with the vertical engaging faces 69—69 of the teeth 53 when the die 13 has reached its lowermost position or after the part has been punched. When the reciprocating member of the press moves up, the pin 68 releases the latch 56, and the spring 60 then acts to move the inside end of the latch 56 in a clockwise direction to move the beveled lower surface 70 thereof forward of the vertical engaging face 69 of the next tooth. (See Fig. 4). When the carriage is moved forward again to feed the material for the punching operation the latch 56 will ride down the top surface 71 of the tooth 53 and engage the vertical face 69 of the next tooth and act as a stop for the carriage. The latch moves down due to the action of the spring 60. A gauge or locating strip 74 which is secured to the bar 17 acts with the shouldered surface 44 of the lower jaw of the clamp 34 to correctly position the material on the carriage 30.

The operation of this mechanism while feeding material to the punch press is as follows:

In the drawings the parts to be punched, as an example, are shown as terminal strips which are used in connection with telephone apparatus. The sheet material 36 is preferably notched as indicated at 75 along two sides before being clamped onto the feeding

mechanism with a notch 76 on one side, being opposite a projecting portion 77 on the opposite side. This allows the strips which are to be punched to have an equal length of material extending endwise at each end from the last projection thereon. To insure that the operator inserts the sheet correctly with the first full projection 77 in the right-hand corner, a gauge 78 is provided which projects into the second notch 77 in the right hand corner. The gauge 78 is suitably supported on the stripper plate 29. Referring to Fig. 6, it will be seen by referring to the dotted outline of the punch 10 that the part consists of a strip with terminal projections 79—79 on both sides, with the projections on one side opposite those on the other side. When the sheet of material 36 is to be secured in place on the carriage 30 to be fed to the press the carriage is moved on the rails 26 away from the punch and into position with the latches 56 resting on the top surface 71 of the tooth 53, as shown in Figs. 1 and 4. The material 36 is then correctly located against the gauge 74 at its left-hand side and against the shouldered surface 44 on the clamp 34 at its near side, as viewed in Fig. 6. In this position the material is in position between the punch and die for the first operation, after which the reciprocating member of the press moves up and the operator moves the carriage 30 forward by taking hold of the handle 49 and pressing forward. In moving the carriage forward the roller 47 riding in the cam slot 48 will cause the slide 32 with the material clamped thereto to move to the right, as viewed in Fig. 6, which will allow the projections 79—79 on one side of the next part punched to interlock the projections 79—79 on the adjacent side of the first part punched, thereby using part of the waste material lying between the projections which would ordinarily be wasted if the parts were punched with the projections end to end. This movement of the carriage and the slide with the material is clearly shown in dotted outline in Fig. 6. In moving the carriage forward to punch the third part the roller 47 will cause the slide to move to the left which will allow the projections on one side of the third part to interlock the projections 79—79 on the adjacent side of the part punched before.

In stepping the carriage forward each time the latches 56 function to stop the carriage when the roller 47 on the slide 32 is positioned in the center of one of the right or left hand cam surfaces 54—54 which form the cam groove 48.

What is claimed is:

1. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking tools, two carriages, one of said carriages having means for supporting the sheet material, said carriages movable independently and also as a unit to feed the sheet material toward said blanking tools with a combined forward and sideway movement whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

2. In a machanism for punching strips with oppositely extending projections from sheet material, blanking tools, a carriage for supporting the sheet material, said carriage movably supported upon a second carriage, said carriages movable independently and also as a unit so as to feed the sheet material toward said blanking tools with a combined forward and sideway movement whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

3. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking mechanism, means for feeding the sheet material toward said blanking mechanism, and means operated in the feeding movement of said feeding means for moving the sheet material laterally on the feeding means and longitudinally of the blanking mechanism whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

4. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking tools, means for feeding the sheet material toward said blanking tools, combined means for positioning the sheet material on said feeding means and clamping it thereto, and means operated in the feeding movement of said feeding means for moving the sheet material laterally on the feeding means and longitudinally of the blanking tools whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

5. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking tools, two carriages, of said carriages having means for supporting the sheet material, said carriages movable independently and also as a unit to feed the sheet material toward said blanking tools with a combined forward and sideway movement whereby the projections on the strips will be cut from the material between the projections of adjacent strips, and means actuated by the reciprocating member of the blanking mechanism for controlling the movement of one of said carriages.

6. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking mechanism, means for feeding the sheet material toward said blanking mechanism with a combined forward and sideway movement thereof where-

by the projections on the strips will be cut from the material between the projections of adjacent strips, and means actuated by the reciprocating member of the blanking mechanism comprising spring operated latches cooperating with rack bars carried by said feeding mechanism for limiting the feeding movement of said feeding mechanism.

7. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking mechanism, a supporting frame adapted to be moved toward the blanking mechanism, a sheet material clamping means carried on said supporting frame and adapted to be moved laterally thereon, a roller associated with said clamping means, and a stationary member provided with a cam slot which cooperates with said roller to move said clamping means and the sheet laterally on the supporting frame as it is moved toward the blanking mechanism whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

8. In a mechanism for punching strips with oppositely extending projections from sheet material, blanking tools, a carriage for supporting the sheet material, said carriage movably supported upon a second carriage, said carriages movable independently and also as a unit so as to feed the sheet material toward said blanking tools with a combined forward and sideway movement whereby the projections on the strips will be cut from the material between the projections of adjacent strips, and means actuated by the reciprocating member of the blanking mechanism for controlling the movement of the second carriage.

9. In a mechanism for punching strips with oppositely extending projections from sheet material blanking tools, a carriage combined means for positioning the sheet material on said carriage and clamping it thereto, said carriage movably supported upon a second carriage, said carriages movable independently and also as a unit so as to feed the sheet material toward said blanking tools with a combined forward and sideway movement whereby the projections on the strips will be cut from the material between the projections of adjacent strips.

In witness whereof, I hereunto subscribe my name this 31st day of January, A. D. 1921.

EWELL BALFOUR MILLER.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,452,308, granted April 17, 1923, upon the application of Ewell Balfour Miller, of Cicero, Illinois, for an improvement in "Material-Blanking Operations," an error appears in the printed specification requiring correction as follows: Page 3, line 113, claim 5, before the word "of" insert the word *one;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of December, A. D., 1923.

[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.