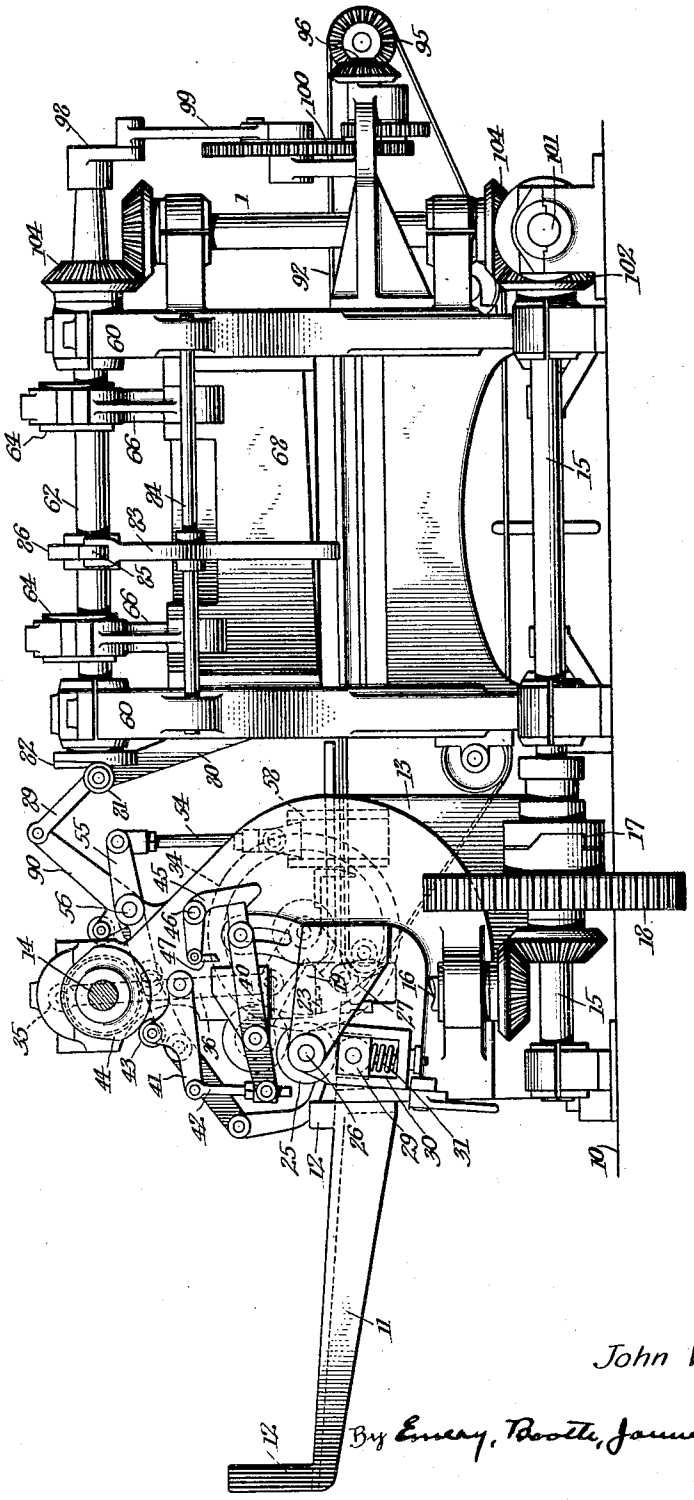
March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 1

Fig. 1.



Inventor

John W. Free.

By Emery, Booth, Jouney & Warney

his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 2

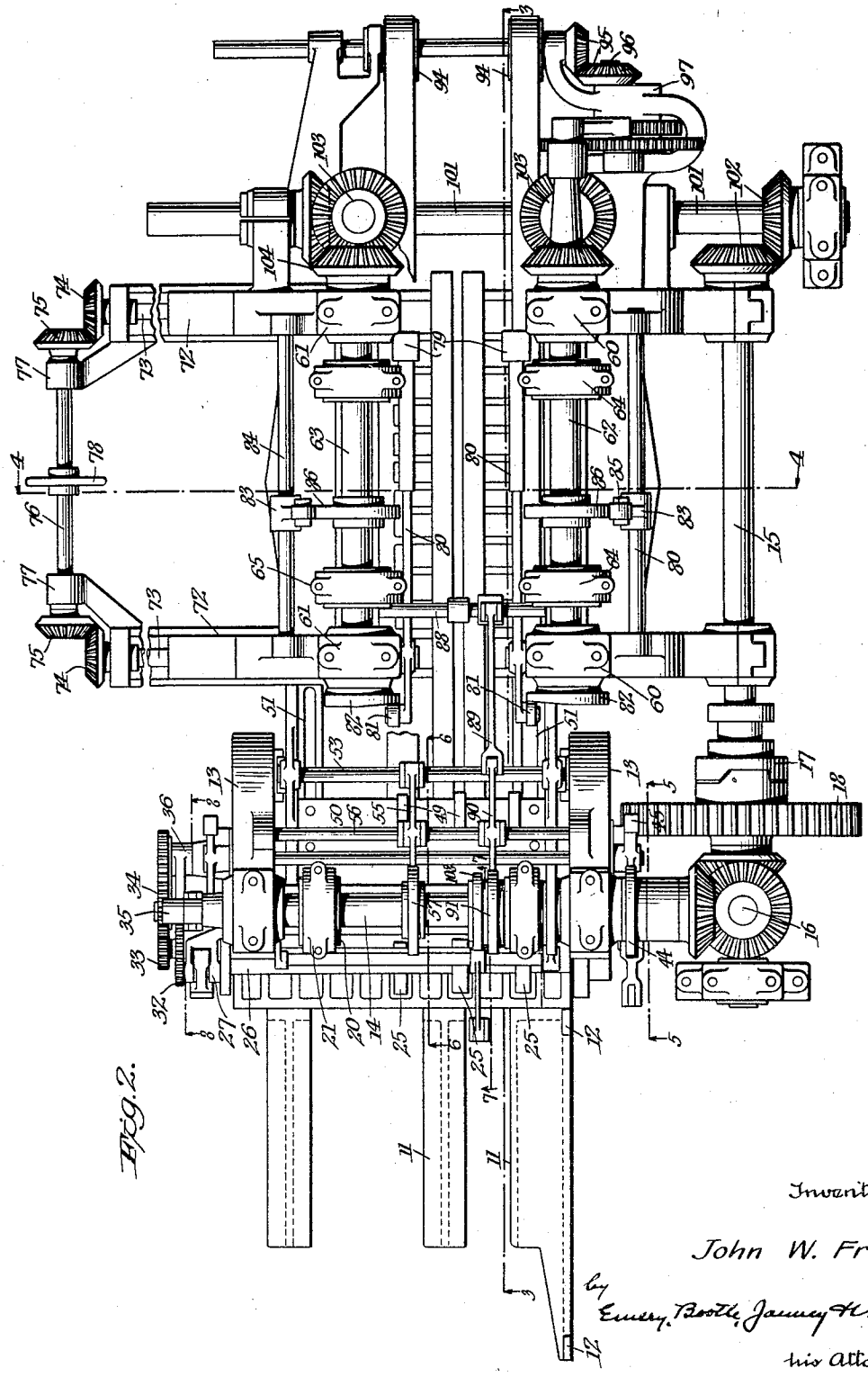


Fig. 2.

Inventor

John W. Free.

by Emery, Booth, Janney & Varney

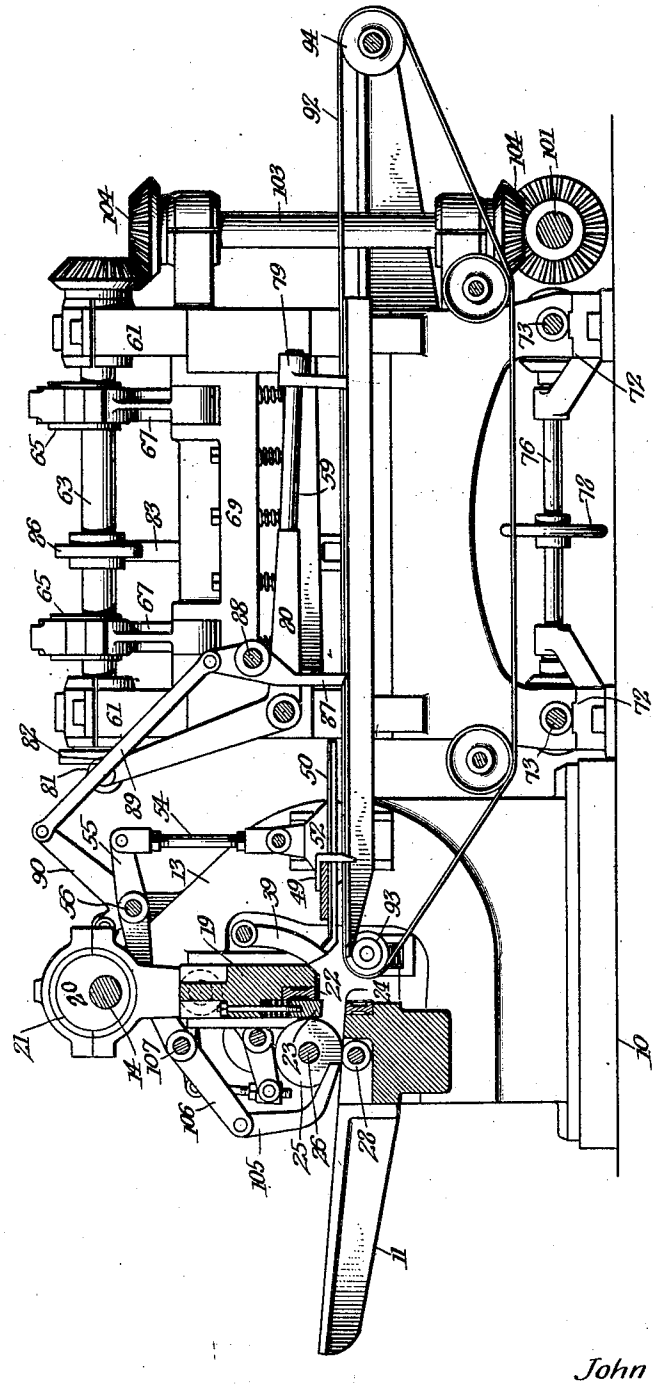
his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 3

Fig. 3.



Inventor

John W. Free.

By Emery, Booth, Janney & Varney

his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 4

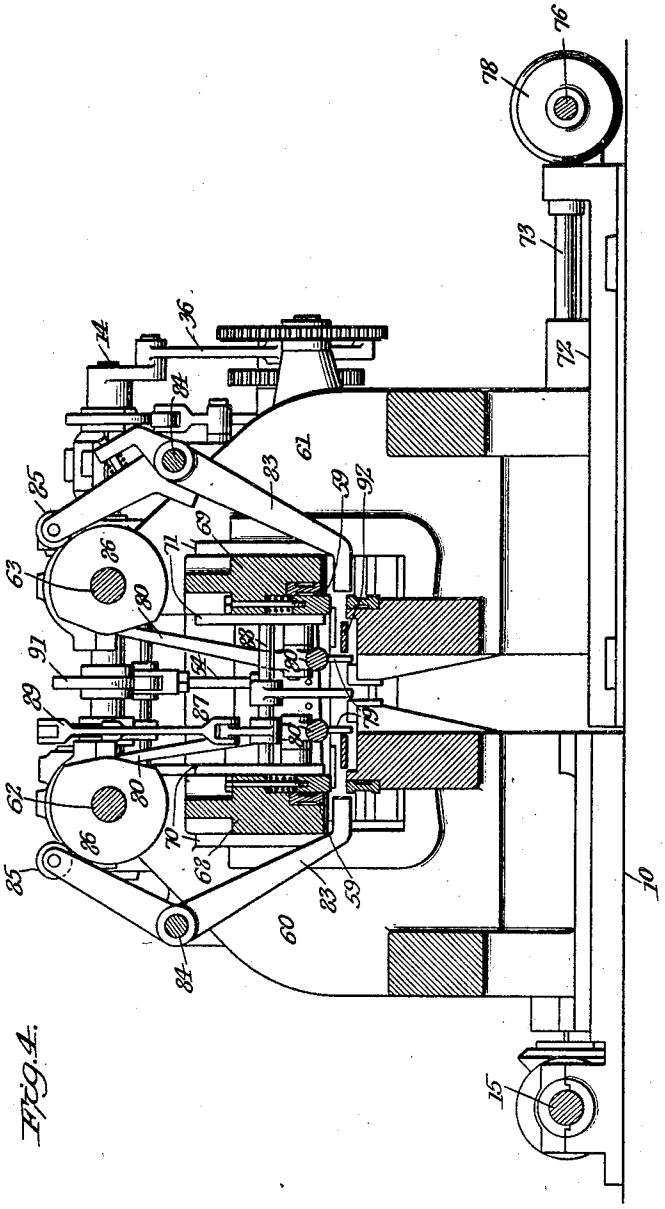


Fig. 4.

Inventor

John W. Free.

By Emery, Booth, Janney & Varney

his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 5

Fig. 6.

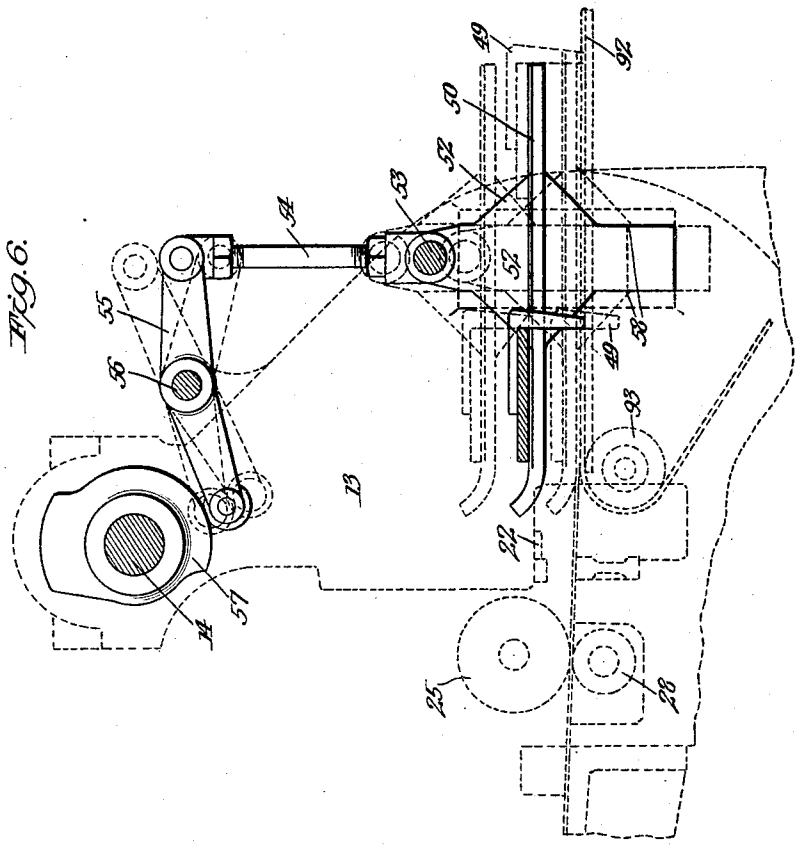
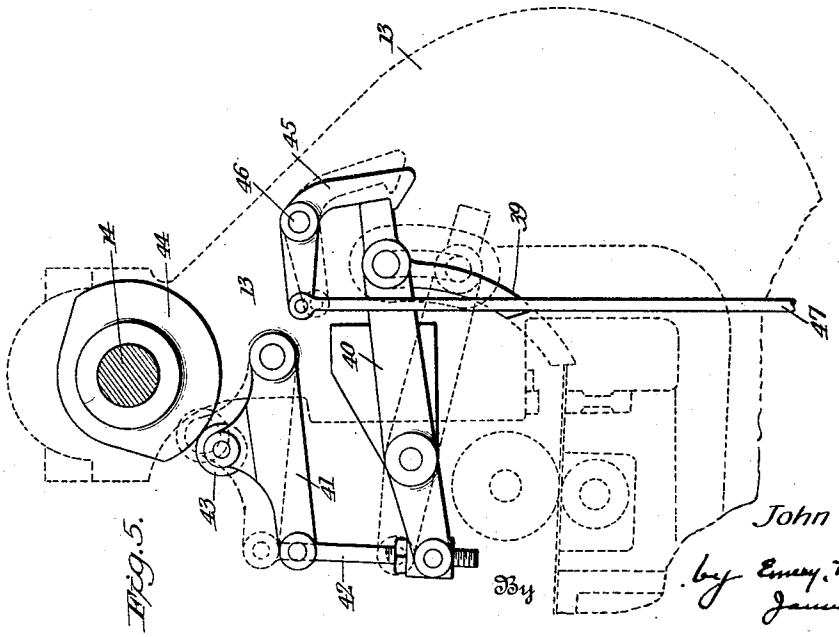


Fig. 5.



Inventor

John W. Free.

By by Emery, Booth, Janney & Varney

his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 6

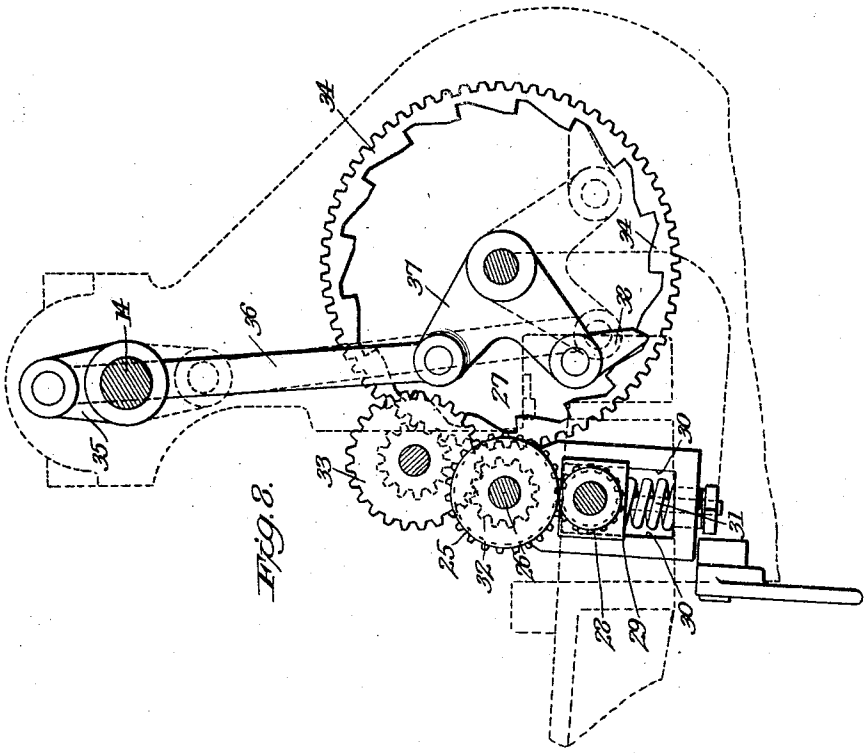


Fig. 8.

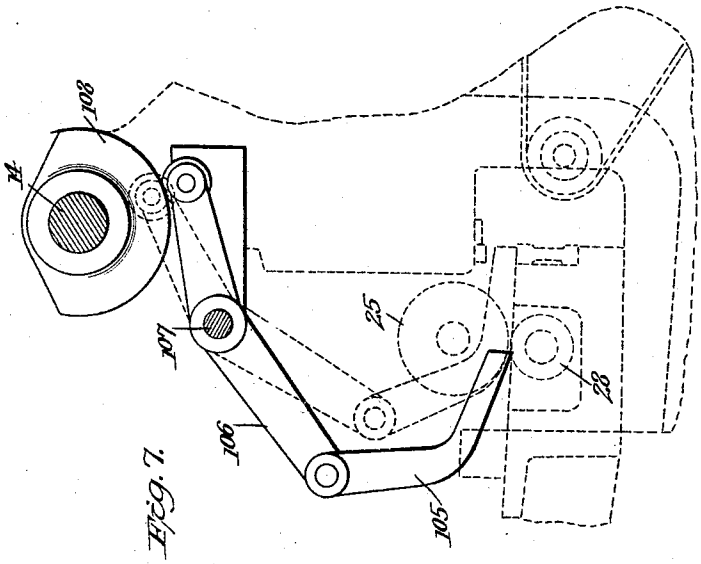


Fig. 7.

Inventor

John W. Free.

By Emery, Booth, Janney & Varney

his Attorneys

March 24, 1931. J. W. FREE 1,798,017

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT MILL SHEETS OR THE LIKE

Filed June 24, 1926 7 Sheets-Sheet 7

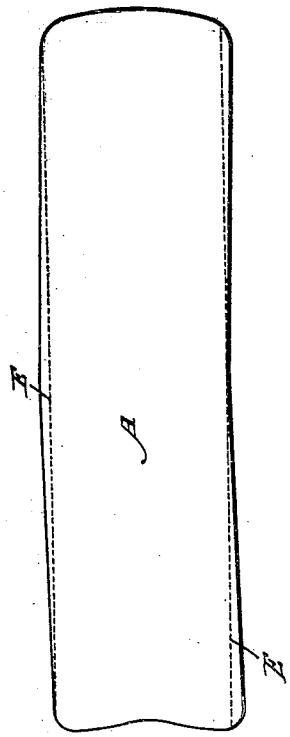


Fig. 9.

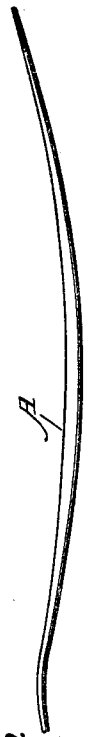


Fig. 10.

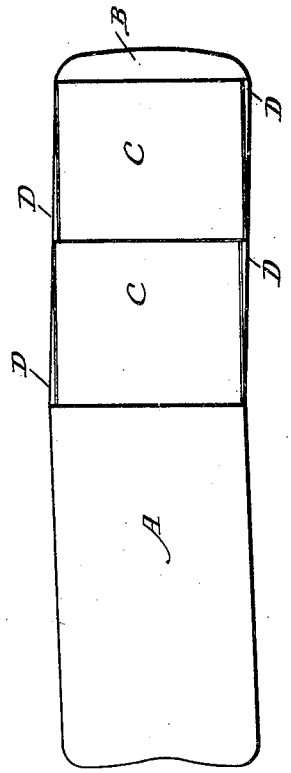


Fig. 11.

Inventor

John W. Free.

By Emery, Booth, Janney & Varney

his Attorneys

Patented Mar. 24, 1931

1,798,017

UNITED STATES PATENT OFFICE

JOHN W. FREE, OF WOODLAWN BOROUGH, PENNSYLVANIA, ASSIGNOR TO JONES & LAUGHLIN STEEL CORPORATION, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

METHOD OF AND APPARATUS FOR SHEARING PACKS OF HOT-MILL SHEETS OR THE LIKE

Application filed June 24, 1926. Serial No. 118,317.

This invention relates to the shearing of metal packs or sheets and aims generally to improve the method of and apparatus for shearing hot mill packs into sections of predetermined size after rolling preparatory to finishing the sheets.

I have selected for descriptive purposes and shown in the accompanying drawings a shearing machine illustrating the invention as applied to shearing hot mill packs for tin plate, black plate, etc., wherein the packs are first slitted cross-wise, and then the edges are trimmed.

In the drawings:

Fig. 1 is a side elevation of the machine;

Fig. 2 is a top plan view thereof;

Fig. 3 is a longitudinal sectional view of the machine taken on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view on the line 4—4 in Fig. 2;

Fig. 5 is a fragmentary sectional view of the machine taken on the line 5—5 of Fig. 2 showing the mechanism for stopping the pack preparatory to initially trimming or squaring off one end;

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 2, showing the device for flattening the pack longitudinally;

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 2, illustrating the details of the ejector;

Fig. 8 is a fragmentary sectional view taken on the line 8—8 of Fig. 2 showing the actuating mechanism for the feed rolls;

Figs. 9 and 10 are a plan view and a longitudinal edge view, respectively, of a pack; Fig. 9 illustrating the old manner of slitting in automatic shearing machines; and

Fig. 11 is a plan of a pack, illustrating the improved manner of slitting.

Hot mill packs of sheet steel, as they are delivered from the rolling mill, vary from 14 to 33 inches wide and from five to eight feet long, comprising two, four or eight sheets rolled together and adhering to each other. These packs usually have a very pronounced bow or curve in both the longitudinal and transverse directions, the curve in the length of the pack amounting to six or seven inches and the curve or bow transversely of the pack often amounting to one inch. Many of the packs are also cambered lengthwise, that is, curved in the horizontal plane of the pack as shown in Figs. 9 and 11. In prior combination machines for cross cutting and edge trimming it has been the practice to shear or trim the longitudinal edges of the packs first, in order to square them and thereby to eliminate the camber, prior to cutting the packs transversely into sections of predetermined size. Such practice causes considerable waste of metal trimmed from the sides of the pack and materially reduces the size of the sheets that may be cut from any given pack.

According to my invention, the packs that are delivered from a mill are transferred to a suitable work table, and are sheared transversely into sections while being held flat under tension of a transverse presser so that the cuts will be square and accurate. The sections of the packs thus cut are then transferred to shears where their untrimmed side margins, which may now be the ends of the sections, are then trimmed also under a presser, thus forming a truly squared section.

In the form of a machine for carrying out the invention shown in the drawings, the base 10, which may be of suitable design, supports on the forward side, a work receiving table 11, provided with stops 12, with which the packs may contact to center them prior to being fed into the machine, and transversely disposed end frames 13 in the upper ends of which is journaled a cross-shaft 14 which is adapted to be rotated intermittently or continuously from the main driving shaft 15 by means of a suitable shaft 16 and angle bearing (see Figs. 1 and 2). The main shaft is connected by a clutch 17 to the driving gear 18, which may be driven by a motor or other power means. The cross-shaft 14 is adapted to actuate a reciprocating cutter head 19 periodically by means of eccentrics 20 mounted upon the shaft and connecting straps 21 secured to the cutter head 19 (see Fig. 3). Intermittent or continuous rotation of the shaft 14 will, therefore, intermittently or continuously reciprocate the cutter head. The cutter head is provided with a knife-

blade 22 and presser member 23 (see Figs. 1 and 3), the latter being adapted to cooperate with an anvil 24, thereby to flatten the pile of sheets transversely so as to permit of an even square cut by the knife blade.

According to my invention, provision is made to feed the pack lengthwise intermittently a predetermined distance after each crosswise cut in order that the packs may be cut into sections of predeterminad length prior to the edge trimming. As shown in Figs. 2 and 8 of the drawings, the upper feed rolls 25 are secured to a shaft 26 journaled in suitable brackets 27, and are geared to rotate with and adapted to cooperate with the lower feed rolls 28, which are journaled in bearings 29 slidable in guides 30 formed in the brackets 27, and normally resiliently urged into contact with the feed rolls 25 by means of springs 31. The feed rolls are rotatable only in one direction, so as to feed the material forwardly, and for this purpose the shaft 26 may be provided with a gear 32, connected through suitable intermediate gearing 33, to a gear member 34 rotatably mounted upon one end frame 13 so as to be rotated intermittently by means of suitable mechanism operated from the crank arm 35 on one end of the shaft 14. In the illustrative example, ratchet mechanism is provided for actuating the gear 34, as for example, comprising a connecting rod 36 and bell crank lever 37, having a pawl 38 working in the internal ratchet of the gear, so as to rotate the feed rolls to feed the work forwardly only upon each upward stroke of cutter head 19.

For the purpose of stopping the forward feed of the pack preparatory to trimming off the front or curl (see Figs. 3 and 5) I may provide a stop member 39 carried by a lever 40 pivoted to the end frames 13, and adapted to be actuated by means of a lever 41 connected to the lever 40 by means of a link 42. The lever 41 is provided with a roller or other contact member 43 adapted to contact with a suitable cam 44 on the cam shaft 14. Preferably the link 42 is adjustably connected to the lever 40 in order to adjust the operative position of the stop member 39. After the end of the pack has been sheared or trimmed off, the stop member 39 is not further required until the next pack is fed into the machine, and as shown in Fig. 5, I have provided suitable means for holding the stop member in its inoperative position. In the form of holding means shown, a latch member 45, which is pivoted to the end frames 13, as at 46, is provided with an actuating rod 47 adapted to be operated by suitable means, as for instance, a treadle (not shown). The lower end of the latch member is weighted, so that it normally assumes a position to engage under and support the lever 40 in raised position, as shown in full lines in Fig. 5. As is obvious, when the rod 47 is actuated to unlatch the lever 40, the right hand end of the lever (as viewed in Fig. 5) will move downwardly under its own weight as the cam 44 is revolved to present its low surface to the roller 43, as is shown in dotted lines. The cutter head 19 is then lowered to clamp and trim the end of the pack, and the scraps are permitted to fall through the space between the end frames, into a suitable receptacle (not shown).

After one end of the pack has been trimmed in the manner just described, the pack is advanced forwardly by means of the feeding mechanism described above, until its trimmed edge contacts with the gauge stop members 49 (see Figs. 3 and 6), the stop member 39 now being supported in raised position out of the path of the pack, by means of the latch member 45, as shown in full lines in Fig. 5. The gauge stop members 49 may be suitably mounted upon the frame of the machine, but preferably are mounted upon spaced presser feet 50 of suitable dimensions for flattening the bowed packs longitudinally of the machine. The gauge stop members 49 may be, and preferably are, adjustably mounted upon the presser feet 50, as by bolts passing through slots 51 (see Fig. 2) so as to adjust accurately the limit of feeding of the pack past the transverse cutter 22 to cut sections of desired length from the pack. The presser feet 50 are mounted upon slide blocks 52 which are connected by a shaft 53 and moved by an adjustable rod 54 pivotally suspended by one end of the lever 55 mounted on a cross-shaft 56 supported upon the end frames 13, and which lever is adapted to be actuated by a cam 57 mounted on the shaft 14, the arrangement being such that during feeding of the pack the presser feet 50 will be raised so as not to obstruct the passage of the pack, but when the pack is at rest, the presser feet will be lowered to flatten the pack longitudinally and transversely. The slide blocks 52 which support the presser feet 50 preferably are arranged to slide in guideways 58, formed in the end frames 13, as is clearly shown in Figs. 1, 2 and 6.

My invention further contemplates the conveying of the cut sections to a squaring and longitudinal edge trimming or shearing mechanism for the purpose of properly preparing the packs prior to the finishing operations. In the machine illustrated in the drawings, I have provided two edge cutting mechanisms in the form of reciprocating knives 59 arranged on opposite sides of the pack and in a direction longitudinally of its path of movement. Each of the edge cutting mechanisms respectively comprises end frames 60 and 61, supporting in the upper ends thereof shafts 62 and 63, which are adapted to actuate through suitable connections, as for instance eccentrics 64 and 65

and straps 66 and 67, the vertically reciprocating knife blocks 68 and 69, slidably mounted in suitable guides 70 and 71 in the end frames. Preferably the cutting mechanisms are adjustable toward and from each other for the purpose of accommodating packs varying in width for trimming the edges of packs of different widths to form sections of various lengths. As shown in the drawings, the end frames 60 may be fixedly mounted upon the base 10 and the end frames 61 are mounted for adjustment transversely of the path of movement of the packs, being mounted to slide in horizontal tracks 72, secured to the base 10, and provided with screw operated adjusting means consisting of screw shafts 73 mounted for rotation in the slides. The outer ends of the shafts 73 are provided with bevel gears 74 meshing with gears 75 fast to a shaft 76 journaled in brackets 77 carried by the tracks 72. A hand wheel 78 fastened to the shaft 76 provides means whereby the latter may be rotated, thereby to rotate the screw shafts 73 to effect adjustment of the cutter housings 61 toward and away from the cutter housings 60.

The successive sections which have been cut from the pack by means of the knife 22 are automatically presented to the edge cutters by a suitable feed mechanism so as to be positioned or centered with reference to the knives 59 to insure trimming them with sides and ends truly square and parallel, and all to like maximum size. As shown, I have provided stop members 79 mounted upon the ends of bell crank levers 80 pivoted to the end frames 60 and 61 so as to be moved intermittently into and out of the path of the packs by suitable cam operated mechanism. As shown in Figs. 1, 2, 3 and 4, opposite ends of the levers 80 are provided with rollers or other contact members 81 adapted to engage operatively with the surface of cams 82 on the shafts 62 and 63. The arrangement is such that as the sections of the pack are carried between the knives 59, the stop members will be brought into the path of the cut sections, thereby to engage and square the end of the section being fed into position with respect to the knives. Side positioning members 83 are pivoted upon fulcrum members 84 carried by the end frames 60 and 61, the upper ends of the levers 83 having contact devices 85 adapted for contact with cams 86 on shafts 62 and 63. The side positioning members 83 are thus moved inwardly simultaneously to position and center the section of the pack with reference to the knives 59. The sections thus centered are held in this position, tightly against the stop members 79, by means of a positioning member 87 pivotally supported from the end frames 60 and 61, for instance as by a bar 88. The positioning member 87 is operatively connected, as by a link 89, with a bell crank lever 90 or other device having operative association with a cam 91 mounted on the shaft 14 (see Figs. 1 and 2). Thus it will be clear that the cut sections will be centered and so held during the trimming of their longitudinal edges.

For the purpose of conveying the cut sections of the pack to the edge cutters 59 and then delivering them to a suitable support or conveyor, I have provided a conveyor 92, extending forwardly under the presser device 50 and rearwardly past the cutters 59. The conveyor may be of any suitable construction adaptable for the purpose, and preferably is of the endless type. As shown, the endless conveyor 92 is trained over an idle pulley 93 journaled on the end frames 13 of the transverse shears, and also over a rear driven pulley 94 to the rear of the longitudinal shears. The driven pulley 94 is designed to be intermittently rotated, and as shown (Figs. 1 and 2) it is connected by gearing 95 to a stub shaft 96 supported in a bracket 97. The stub shaft 96 is actuated by means of a suitable operative connection, such as a crank 98 and lever 99 connected, preferably through a ratchet and gear connection 100 similar to that which operates the feed rolls 25 to permit of rotation only in one direction to feed the work forwardly. Preferably the conveyor 92 is moved intermittently and in synchronism with the feed rolls 25, and for this purpose all of the several mechanisms are driven by means of gearing connected to a common source of power.

In the embodiment of the invention illustrated in the drawings, power is applied to rotate the pulley or gears 18 adapted to periodically drive the power shaft 15 through the medium of the clutch 17 which is under the control of the operator. The power shaft 15 is adapted to drive the shaft 14 through the vertical shaft 16 and gearing, and is further designed to rotate the shafts 62 and 63 through a cross-shaft 101 connected to the power shaft by angle gearing 102. The cross-shaft 101 is operatively connected to the shafts 62 and 63 by means of vertical shafts 103 and suitable gearing connections 104, as shown, the arrangement being such that the shafts 14, 62 and 63 are driven synchronously. The gearing connection between the shaft 101 and the shaft 63 is preferably carried by the end frame 61 and is capable of movement longitudinally of the shaft 101, so as to drive the shaft 63 in any of the adjusted positions of the frames 61 crosswise of the machine.

In cutting the packs transversely into sections according to my invention, there are often small ends or sections remaining in the machine between the feed roll 25 and the anvil 24 which are too narrow to be used. For the purpose of clearing the machine of these pieces of scrap, I have provided an ejector bar 105 (see Figs. 1, 2 and 7) having a

forwardly curved finger adapted to extend between the spaced feed rolls 25 and rolls 28. The ejector bar 105 (see Fig. 7) is supported by one end of a lever 106 fulcrumed on a shaft 107 carried by the end frames 13, and the other end is provided with a contact device for contact with an actuating cam 108 mounted on the shaft 14. As is clearly illustrated by dotted lines in Fig. 7, rotation of the cam 108 permits the ejector bar 105 to move downwardly and forwardly whereby the finger may be moved forwardly between the feed rolls 25 and rolls 28 to discharge any remnants of the pack through the opening between the frames. The ejector bar 105 is also used for moving forward and holding the last section against the gauge stop 49 after it has passed through the feed rolls.

The operation of the machine for cutting off and trimming and squaring sections is illustrated in Fig. 11. A hot mill pack A is shown as it is delivered from a mill, showing to an exaggerated extent the curvature and camber produced by rolling. The pack is delivered to the shearing machine upon the feed table 11, where it is ready to be fed to the cross-cutting shears in a direction parallel to its longitudinal edges. The latch 45 is tripped to release the lever 40 to permit the stop member 39 to fall into the path of the pack where it will limit the initial feed of the pack for the purpose of trimming one end B thereof squarely with a minimum of waste. Further rotation of the cam shaft 14 actuates the contact member 41 to lift the stop member 39 out of the path of the pack, to permit the feed rolls 25 and 28 to feed the pack into the machine a predetermined distance or until the pack is stopped by the stop members 49. Continued rotation of the shaft 14 actuates the cutter head 19 to cut the pack transversely to form the first section C (Fig. 11) of the desired length. During the cutting of this section the pack is held in its flattened condition by means of the pressers 23 and 50 so as to insure a square cut of the pack. Next the cut section C is carried forwardly between the housings 60 and 61 by the intermittently moving conveyor 92, and is accurately centered between the knives 59 by the stops 79, side positioning members 83 and clamp 87, as has heretofore been described. The ensuing descent of the knife blocks 68 and 69 clamps the section C along the side edges of the pack, which are then trimmed square with the previously cut ends, as shown at D in Fig. 11. The successive sections of the pack thus produced are now ready for the finishing of the sheets.

By referring to Figs. 9 and 11, it will be apparent that a considerable saving of material is effected by first transversely cutting the packs according to my method instead of first trimming the packs longitudinally as indicated in broken lines at E, as has heretofore been done in machines of the combination type.

Advantages of the invention in first cutting the pack transversely into sections are, first, the reduction of the extreme chordal distance in a bowed pack, thereby practically eliminating the longitudinal bow and curvature of the cut edges of the sections; second, the prevention of the separation of the sheets during the cutting; and third, the production of sections of maximum size from cambered packs. Furthermore, the invention is advantageous in that the packs are fed through the machine and maintained in position for taking straight parallel cuts automatically notwithstanding the bow and camber of their longitudinal edges. The machine is capable of handling a large amount of work, in a rapid manner, producing rectangular sections of accurate dimensions with a minimum of waste.

In the claims the words "width" and "length" are used to indicate the two dimensions of the finished sheet irrespective of which may be the greater, as the transverse dimension may be either greater or less than the longitudinal dimension of the cut packs.

I claim:

1. The method of shearing cambered hot mill packs of sheet metal which comprises cutting the pack transversely into sections of desired length and then trimming the side edges of each section square to the previously cut transverse edges.

2. The method of shearing cambered hot mill packs of sheet metal which comprises first trimming one end of the pack transversely to form a squared end, cutting the pack transversely into sections of desired length, and then trimming the side edges of the sections.

3. The method of shearing hot mill packs of sheet metal as they are delivered from a mill and which are cambered in the direction of the length, which comprises first cutting the packs transversely on parallel lines to provide sections of packs of desired size, and then trimming the side edges of the sections to square them with the transversely cut edges.

4. The method of shearing hot mill packs of sheet metal having curvature longitudinally as they are delivered from the mill, which comprises cutting the pack transversely into sections, thereby to decrease the waste effective curvature in each section, and then trimming the side edges of the sections to form sections of desired size and shape.

5. The method of shearing hot mills packs of sheet metal, which comprises moving the pack in a direction parallel to its longitudinal axis, shearing the pack transversely to form sections of desired size, centering the cut-sections independently and then trimming the side edges of the sections to form sections of desired width.

6. The method of shearing hot mill packs of sheet metal, which comprises moving the pack in a direction parallel to its longitudinal axis, cutting the pack transversely to square and trim one end thereof, shearing the pack transversely to form sections of desired length, and then trimming the side edges of the sections to form sections of desired width.

7. The method of shearing hot mill packs of sheet metal, which comprises intermittently moving the pack in a direction parallel to its longitudinal axis, shearing the pack transversely to form sections of desired length, and then trimming the side edges of the sections at right angles thereto to form sections of desired width.

8. The method of shearing hot mill packs of sheet metal, which comprises progressively trimming one end of the pack to square it, cutting the pack transversely on lines parallel to said end cut into sections of desired length, centering the cut sections individually in position for trimming the two side edges of the same and then trimming their side edges to form squared pack sections.

9. A shearing machine for hot mill packs of sheet metal, comprising a transversely arranged shearing means and longitudinally arranged shearing means disposed rearwardly of said first named shearing means, means for advancing the pack a predetermined distance according to the length of the section to be cut, thereby to present the pack to the transverse shearing means to cut the pack into sections, and cooperating means for advancing the cut sections to the longitudinally arranged shearing means for trimming the side edges of the sections.

10. A shearing machine for hot mill packs of sheet metal comprising a plurality of shearing means, means for advancing the pack to one of the shearing means for cutting the pack transversely into sections of desired length, and cooperating means for separately advancing the individual sections to the other shearing means for independently trimming the side edges of the several sections for the purpose described.

11. A shearing machine for hot mill packs of sheet metal comprising a plurality of shearing means, means for advancing the pack a limited distance to present it to one of the shearing means to trim and square one end of the pack, cooperating means for successively advancing the uncut portion of the pack to said shearing means according to the length of the sections to be cut, means for presenting the cut sections to the other shearing means and means for actuating said shearing means to cut the pack transversely into sections and trim their sides.

12. A single shearing machine for hot mill packs of sheet metal comprising means for moving the pack in a path parallel to its longitudinal edges, a shearing mechanism arranged transversely of said path, means for intermittently actuating said pack moving means to move the pack step by step to the shearing means for repeated crosswise severing thereby, and means for limiting the initial movement of the pack, whereby actuation of the shearing mechanism cuts off a small amount of metal for the purpose of trimming and squaring the forward end of the pack.

13. A shearing machine for hot mill packs of sheet metal comprising means for initially guiding the pack in a path parallel to its longitudinal edges, a shearing mechanism arranged transversely of said path, means for intermittently moving the pack toward the shearing means, means for limiting the initial movement of the pack, whereby actuation of the shearing mechanism cuts off a narrow strip for the purpose of trimming and squaring the pack, and means operating repeatedly after the initial cut to move the pack a distance equal to the length of the section to be formed whereby repeated actuation of the shear operates to cut the pack into a plurality of sections of desired length.

14. A shearing machine for bowed hot mill packs of sheet metal comprising intermittently operating means for moving the pack in a path parallel to its longitudinal edges, a shearing mechanism arranged transversely of said path, adjustable means operating in connection with said pack moving means for stopping the movement of the pack with its forward end at different distances from said shearing mechanism, and means for repeatedly actuating said shearing means during periods of rest of said pack moving means, whereby a small amount of metal may first be cut off from one end of the pack to square it, and the pack then cut into a plurality of sections of desired length.

15. A shearing machine for bowed hot mill packs of sheet metal comprising means for moving the pack in a path parallel to its longitudinal edges, a shearing mechanism arranged transversely of said path, means for intermittently actuating said pack moving means to advance the pack a predetermined distance according to the length of the sections to be cut, and sheet engaging means for restraining the initial movement of the pack to present only a short end to the shearing mechanism for the purpose of trimming one end of the pack.

16. In a shearing machine for shearing bowed hot mill packs of sheet metal into sections of predetermined length prior to trimming their longitudinal edges, a reciprocatory cutter head, means for intermittently reciprocating said cutter head, means controlled by the first mentioned means for moving the pack forwardly under the cutter head

a predetermined distance according to the length of the sections to be cut, and means for maintaining parallelism of the successive cuts.

17. A shearing machine for bowed hot mill packs of sheet metal, comprising shearing means, means for feeding the packs forwardly a predetermined distance preparatory to cutting them into sections of desired length, and means operable at the option of the operator for restricting the initial movement of the packs into the machine.

18. In a shearing machine for shearing hot mill packs of sheet metal into sections of predetermined length, comprising a reciprocating cutter, a rotatable shaft, means connecting said shaft and cutter whereby rotation of the shaft will reciprocate the cutter, feed rolls and gearing connected to said feed rolls and actuated by said shaft for rotating said feed rolls to feed the pack forwardly a predetermined distance, a stop member movable into and out of the path of said pack to restrict the initial movement of the pack, means on said shaft for actuating said stop member to move it out of the path of the pack, and means for normally holding said stop member in inoperative position.

19. In a machine for shearing hot mill packs, bowed longitudinally and transversely, transversely into sections of desired width, in combination, means for feeding the pack forwardly into the machine, shearing means, means for flattening the end of the pack forwardly past the shearing means, an actuating shaft, and means whereby said shaft actuates all of said means to progressively feed the pack past the shearing means a predetermined distance according to the length of the section to be cut, flatten the end of the pack forwardly of the shearing means and then shear the pack transversely.

20. In a machine for shearing hot mill packs, bowed longitudinally and transversely, transversely into sections of desired length, in combination, means for feeding the pack forwardly into the machine, shearing means, means for flattening the end of the pack forwardly past the shearing means, said last named means comprising a vertically reciprocable presser plate, and means for moving said plate to release the pack for feeding.

21. In a machine for shearing hot mill packs transversely into sections of desired length, in combination, means for feeding the pack forwardly into the machine, shearing means, means for flattening the end of the pack forwardly past the shearing means, said last named means comprising a vertically reciprocable presser plate, and a stop member carried by the presser plate and movable into the path of movement of said pack for limiting the forward movement thereof.

22. In a machine for shearing hot mill packs into squared sections of desired length comprising means for transversely shearing the pack into sections, means for longitudinally shearing the edges of the sections to square them, pack feeding means for advancing the pack forwardly past the first pack shearing means a predetermined distance, and other feeding means adapted to advance the sections of the pack to the second shearing means for operating the two feeding means synchronously.

23. In a machine for shearing hot mill packs into squared sections of predetermined length comprising means for cutting the packs transversely into sections, means for advancing the sections to a shearing mechanism for trimming the side edges of the sections, and means for locating and holding said sections squarely with reference to said trimming mechanism, whereby to cut squared sections of predetermined size.

24. In a machine for shearing hot mill packs into squared sections of predetermined length comprising means for cutting the packs transversely into sections, a second shearing mechanism spaced from said first mentioned shearing mechanism and disposed at right angles thereto for trimming the side edges of the sections, means for advancing the sections to said second shearing means, stop means for limiting the advancement of the respective sections with reference to the shearing mechanism and for squaring one previously cut edge with said shearing mechanism, and means for holding said sections in squared position during the trimming of the side edges thereof.

25. In a machine for shearing hot mill packs into squared sections of predetermined length comprising means for cutting the packs transversely into sections, a second shearing mechanism spaced from said first mentioned shearing mechanism and disposed at right angles thereto for trimming the side edges of the sections, means for advancing the sections to said second shearing means, stop means for limiting the advancement of the respective sections with reference to the shearing mechanism and for squaring one previously cut edge with said shearing mechanism, and means for engaging and clamping the sections at the ends thereof to hold them in squared position during the edge trimming operation.

26. In a machine for shearing hot mill packs into squared sections of predetermined length comprising means for shearing the pack transversely to form therefrom sections of desired length, spaced parallel means for shearing the sections in a direction at right angles to said first shearing means to trim the side edges of the pack, means for operating both of said shearing means in synchronism, means for moving the sections cut at the first shearing mechanism to the second

shearing mechanism, stop means for limiting the movement of the sections with respect to the second shearing mechanism, and positioning means engaging the sides of said sections for positioning the pack centrally between the spaced shears of the second shearing means.

27. In a mechanism for trimming the side edges of sheet metal packs previously cut to desired width, means for intermittently moving the sections in a direction parallel to the direction of the length of the pack, shearing means comprising spaced shears disposed on opposite sides of the moving means, means engaging the ends of the sections to position them for engagement by said shearing means, and means engaging the side edges of the respective sections to position them centrally between the spaced shears.

28. In a mechanism for trimming the side edges of sheet metal packs previously cut to desired length, means for intermittently moving the sections in a direction parallel to the direction of the length of the pack, shearing means comprising spaced shears disposed on opposite sides of the moving means, means for adjusting the shears toward and from each other, means for positioning the sections endwise between said shearing means, and means engaging the side edges of the respective sections to position them centrally between the spaced shears.

29. In a mechanism for trimming the side edges of sheet metal packs previously cut to desired length, means for intermittently moving the sections in a direction parallel to the direction of the length of the pack, shearing means comprising spaced shears disposed on opposite sides of the moving means, means engaging the side edges of the sections to position them centrally between the spaced shears, means for clamping the sections between said shearing means, and common means for actuating said shears, positioning means and clamping means.

30. In a mechanism for trimming the side edges of sheet metal packs previously cut to desired length, means for intermittently moving the sections in a direction parallel to the direction of the length of the pack, shearing means comprising spaced reciprocable shears disposed on opposite sides of the moving means, a stop member movable into and out of the path of said sections to limit the movement of the sections forwardly, positioning means adapted to engage the side edges of the sections to position them centrally between the shears, and a common shaft for reciprocating said shears, and actuating said stop member and positioning means.

31. The method of shearing a hot, longitudinally, laterally curved mill pack of sheet metal to produce sections therefrom which comprises subdividing said pack transversely of its longitudinal dimension to form sections thereof and then trimming the side edges of each of said sections to leave the sections of a width greater than the width of the widest parallel sided continuous strip which might have been cut from said pack before subdivision.

In testimony whereof, I have signed my name to this specification.

JOHN W. FREE.