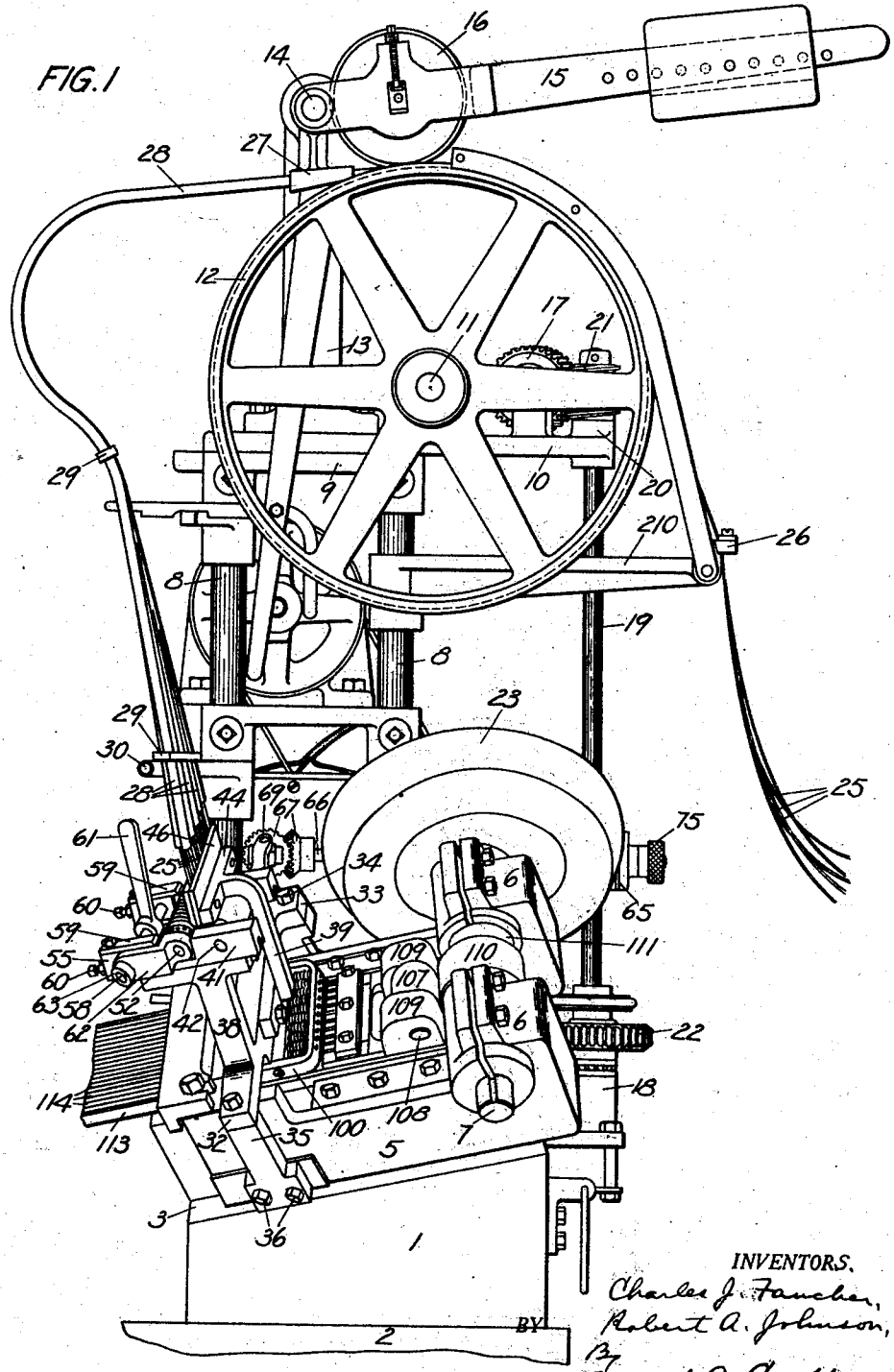
June 17, 1930. C. J. FANCHER ET AL 1,764,831

STRIP FEEDING MECHANISM

Original Filed Jan. 12, 1927 4 Sheets-Sheet 1

FIG. 1



INVENTORS.
Charles J. Fancher,
Robert A. Johnson,
By
Frank A. Cutler,
ATTORNEY.

June 17, 1930. C. J. FANCHER ET AL 1,764,831

STRIP FEEDING MECHANISM

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FIG. 2

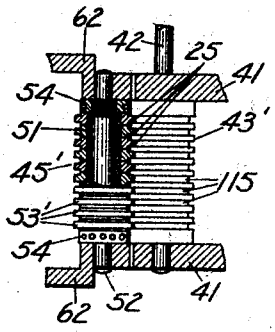


FIG. 3

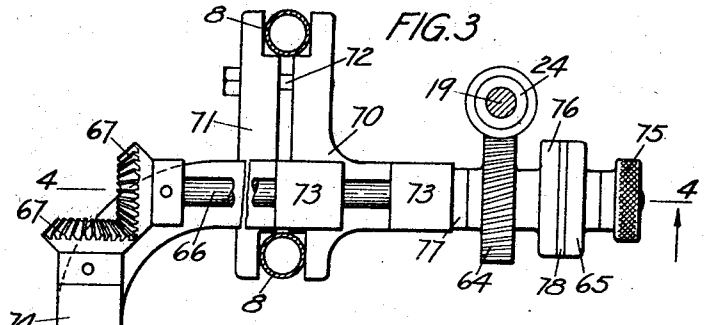


FIG. 4

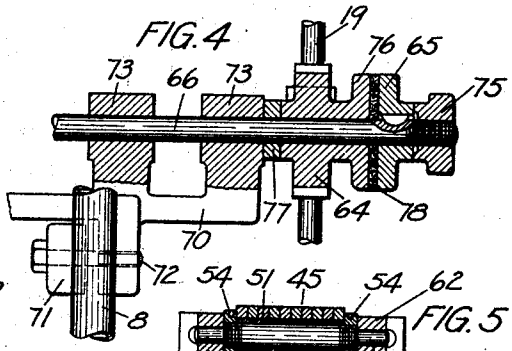


FIG. 5

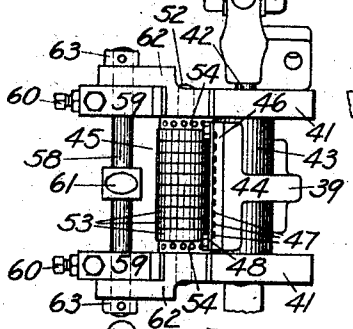


FIG. 6

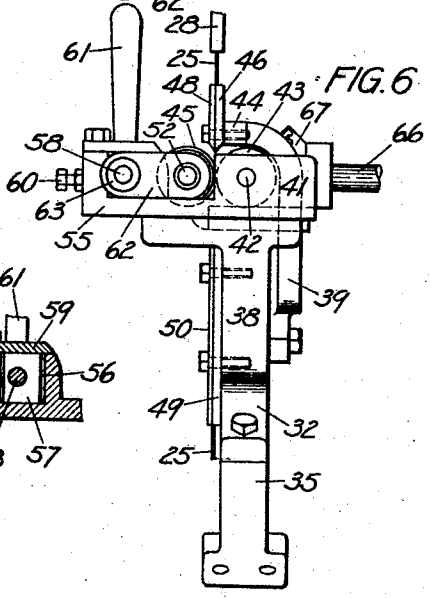


FIG. 7

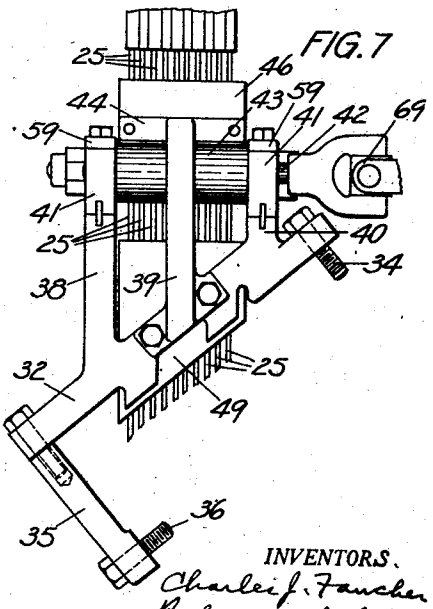
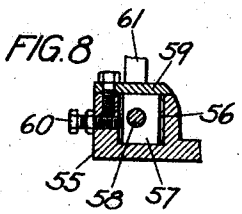


FIG. 8



INVENTORS.
Charles J. Fancher
Robert A. Johnson
BY
Frank A. Cutter,
ATTORNEY.

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FIG. 9

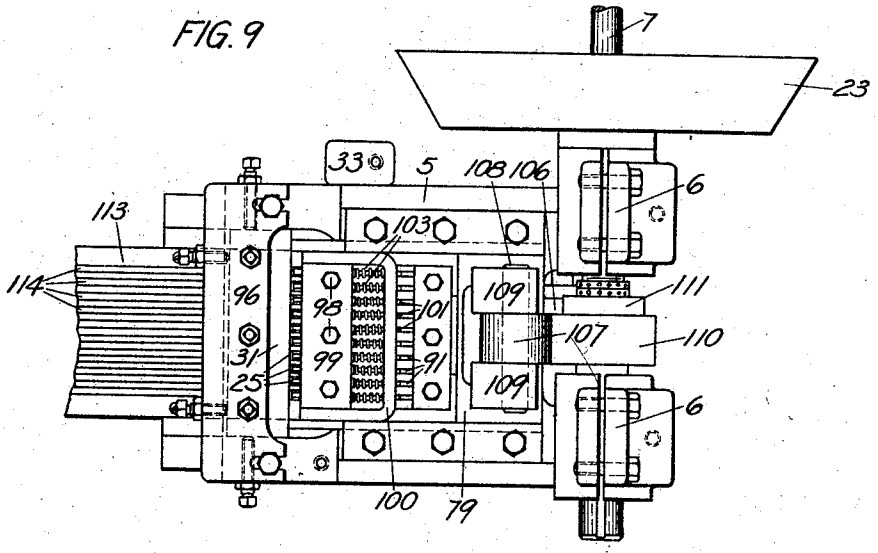
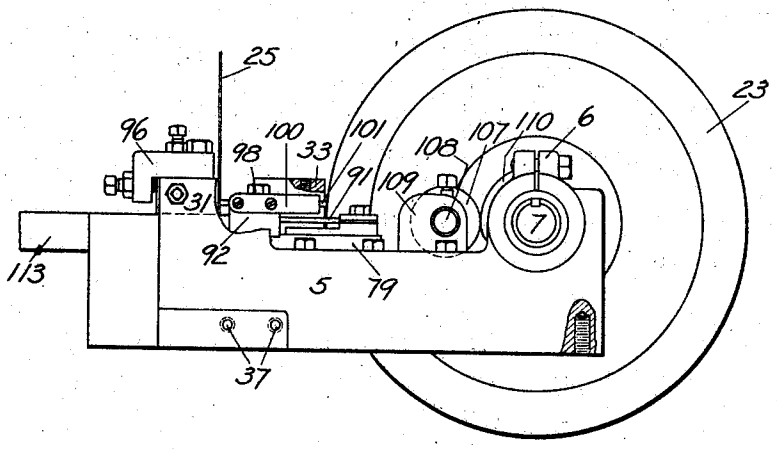


FIG. 10



INVENTORS.
Charles J. Fancher,
Robert A. Johnson,
BY Frank A. Cutter,
ATTORNEY.

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STRIP FEEDING MECHANISM

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FIG. 11

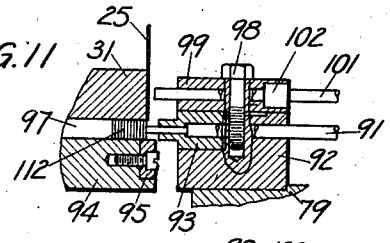


FIG. 12

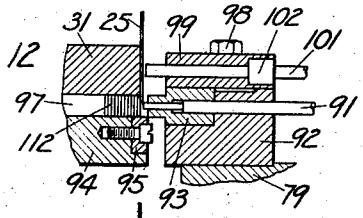


FIG. 13

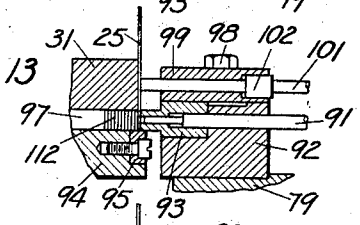


FIG. 14

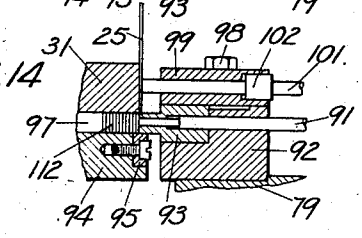


FIG. 15

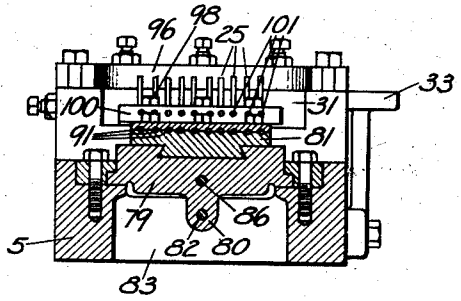
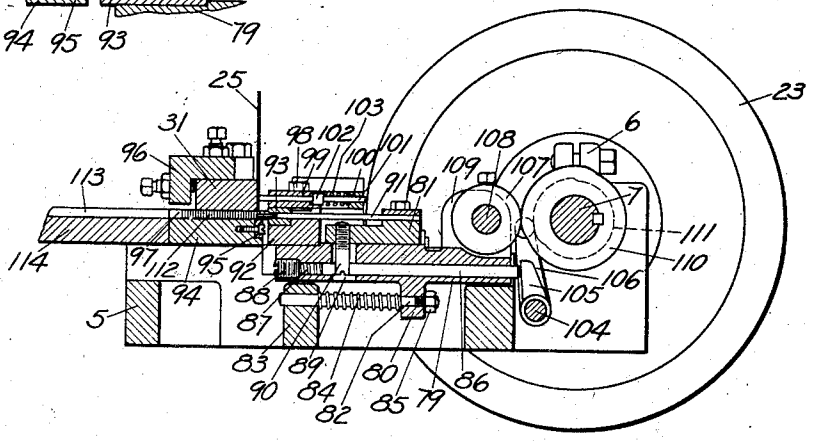


FIG. 16



INVENTORS,
Charles J. Fancher,
BY Robert A. Johnson,
Frank A. Cutter,
ATTORNEY.

Patented June 17, 1930 1,764,831

UNITED STATES PATENT OFFICE

CHARLES J. FANCHER, OF WINDSOR, VERMONT, AND ROBERT A. JOHNSON, OF LONGMEADOW, MASSACHUSETTS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO WOODWARD, HUBBARD COMPANY, OF HILL, NEW HAMPSHIRE, A CORPORATION OF NEW HAMPSHIRE

STRIP-FEEDING MECHANISM

Original application filed January 12, 1927, Serial No. 160,639. Divided and this application filed December 21, 1927. Serial No. 241,574.

Our invention relates to improvements in mechanism for feeding strips, and particularly for feeding strips of tempered steel while being cut into glaziers' points, the same being a divisional part of our application for letters patent of the United States, filed January 12, 1927, Serial No. 160,639.

The primary object of our invention is to produce mechanism with which can be fed to cutting mechanism one or more strips of tempered steel, or more or less similar material, in a manner to insure precision, adequacy, and reliability, said feeding mechanism being comparatively simple both structurally and functionally.

Another object is to provide mechanism of this character with means for feeding the strips at their leading ends intermittently, even though said strips back of such ends be fed continuously. To this end clamping elements are employed and applied to the strips, and intermittently rotating members are provided to assist in feeding the strips said rotary members engage the strips at points adjacent to their leading ends, and remain stationary while said strips at said ends are held stationary by the clamping elements.

In order to feed to the best advantage steel strips to cutting mechanism, feeding mechanism is required which is especially adapted for handling such strips. The feeding of steel strips, as distinguished from the feeding of zinc strips for example, involves the use of means especially adapted for the purpose, and necessarily different from means capable of feeding strips of material of a character unlike steel, or having characteristics which differ from those of steel, as will be readily understood.

Our feeding mechanism is designed to handle and feed simultaneously ten steel strips, but this number as applied to said mechanism may be increased or decreased without changing any essential feature of the mechanism or departing from the invention, since even a single strip might be fed thereby without making any mechanical change, or mechanism might be constructed to handle a single strip only, or to handle more than ten strips. In this connection it may be noted that, when the feeding mechanism is employed in connection with the manufacture of glaziers' points, the strips are obtained from a roll of steel sufficiently wide to cut therefrom the required number, as ten, of said strips each equal in width to the width of a diamond-shaped point between parallel sides. The stock after being cut in a slitting machine into the ten, more or less, individual strips, is rolled on large spools which are supplied as required to the feeding mechanism.

Other objects and advantages will appear in the course of the following description.

A preferred embodiment of the invention, whereby we attain the objects and secure the advantages of the same, is illustrated in the accompanying drawings, and we will proceed to describe the invention with reference to said drawings, although it is to be understood that the form, construction, arrangement, etc., of the parts in various aspects are not material and may be modified without departing from the spirit of the invention.

In the drawings, in which like reference characters designate like parts throughout the several views, Figure 1 is a front elevation of feeding mechanism which embodies a practical form of our invention as aforesaid; Fig. 2, a detail in partial section of a modified form of the feed rolls of said mechanism; Fig. 3, a top plan of certain parts and members of the feeding mechanism which may be and here are in the form of an attachment mounted on a cutter-head, and removable therefrom; Fig. 4, a longitudinal, vertical section through parts of said attachment, taken on lines 4—4, looking in the direction of the associated arrow in Fig. 3; Fig. 5, a longitudinal section through one of the feed rolls of said attachment; Fig. 6, a front end elevation of the attachment; Fig. 7, a front side elevation of the attachment; Fig. 8, a sectional detail of the adjustable and tilting means for said feed roll; Fig. 9, a top plan of said cutter-head, which cutter-head is a part of the

feeding mechanism; Fig. 10, a front side elevation of said cutter-head; each of Figs. 11, 12, 13, and 14, a sectional detail illustrating a stage of the feeding operation; Fig. 15, a transverse, vertical section through the cutter-head, and, Fig. 16, a longitudinal, vertical section through the cutter-head.

We have illustrated our strip-feeding mechanism with or as a part of a glaziers'-point machine, and will describe so much of said machine as is shown or may be necessary fully to understand said mechanism in both structure and function. It is to be understood, however, that the strip-feeding mechanism can be applied to or used in connection with a machine or machines other than a glaziers'-point machine.

A bed block 1 is supported on a table 2, a portion of said block inclining downwardly from rear to front to provide a bed 3 for a cutter-head bed 5. The bed 5 has at the right-hand end bearings 6—6 for a transversely arranged, oblique shaft 7. Posts 8, each having its base firmly set in the bed block 1, are rigidly connected at the top by means of a platform 9. Secured on the platform 9 is a plate 10 above which is journaled in suitable bearings a horizontal shaft 11. A feed wheel 12 is mounted on and secured to the forward end of the shaft 11. A stand 13 rises from the plate 10 and has at its upper end a bearing for a short horizontal shaft 14, on which is mounted a weighted arm 15. The arm 15 carries a roll 16 and locates the same directly above the top of the wheel 12. Secured to the rear terminal of the shaft 11 is a worm-wheel 17. Supported from the bed block 1 at the right-hand end is a bearing 18 for the lower end of a vertical shaft 19. The plate 10 is provided directly above the bearing 18 with a bearing 20 for the upper end of the shaft 19. A worm 21 is secured to the upper terminal of the shaft 19, above the bearing 20, and intermeshes with the worm-wheel 17. Secured to the shaft 19 above the bearing 18 is a worm-wheel 22 which is continuously driven by any suitable means and from any suitable source of power, as is also the shaft 7. Here the shaft 7 is provided with a cone 23 as the direct driving member. A worm 24, Fig. 3, is secured to the shaft 19 above the worm-wheel 22.

Ten steel strips 25, from a spool (not shown), are passed upwardly through a slotted guide bar 26, over the wheel 12 and between said wheel and the roll 16, into and through a holder 27, and into ten tubes 28. The bar 26 is supported by an arm 210 that is rigidly attached to one of the posts 8. The tubes 28 are arranged side by side, being held together by means of links 29—29, and are supported at their upper ends by the holder 27, and at their lower ends by an arm 30 that is also rigidly attached to one of the posts 8. The tubes 28 extend to the left from the holder 27, then curve downwardly and to the right, and finally descend to a plane at some distance above the cutter-head.

Inasmuch as the strips 25 are fed vertically to the cutter-head, and it is essential, after the first cut is made, to produce a plurality of glaziers' points at each active stroke of the movable cutter, it is necessary that said cutter-head be set obliquely to the vertical plane of the strips when they are fed to the cutter. Furthermore, as it is preferred that each point be equal in width, between either pair of its oppositely disposed edges, to the width of the strips from which the point is cut, the cutter-head is set at an angle of 40° to the vertical plane of said strips, that being the degree angle of two parallel edges of said points when the latter is placed vertically on one of said edges. Due to this angular setting or position of the cutter-head, the same is shown in Fig. 1 as it is actually located in and as a part of the machine, wherein said cutter-head inclines downwardly and forwardly from the back to the front side of said machine.

The sides of the cutter-head bed 5 are at right-angles to the top and bottom thereof. This bed carries cutting mechanism that includes a fixed knife 31. Guiding and feeding means for the strips 25 are located directly above the knife 31 in position to carry said strips downwardly against the right-hand side of said knife. The aforesaid means are embodied in an attachment that is adapted to be mounted on and secured to and removed from the cutter-head bed, as herein illustrated and described.

The aforesaid attachment has or consists in part of a fixture 32 which has its rear end secured to a lug 33 on the bed 5 by a bolt 34. Bolted to the front end of the fixture 32, at right-angles thereto, is a support 35 which is secured at the base by means of two bolts 36 against the front side of the bed 5, two openings 37, Fig. 10, being tapped into said side to receive said bolts. The fixture 32 has uprights 38, 39, and 40, the first of said uprights being the longest and in front and the third of said uprights being the shortest and in the rear. The uprights 38 and 40 are T-shaped, and mounted thereon are two horizontal bearings 41 for a shaft 42 on which is mounted a feed roll 43.

The upright 39 at its base is bolted to the right-hand side of the fixture 32, and at the top has a cross-head 44 that extends to the left over the roll 43 and supports a vertical guide for the strips 25, said guide

being located by said upright and cross-head directly above the bite between said roll and a feed roll 45. This guide consists of a plate 46 having in the left-hand side thereof ten vertical grooves 47 with their upper ends located directly below the lower ends of the tubes 28, and a plate 48 secured to the left-hand side of said first-named plate over said grooves. The strips 25 are guided by means of the plates 46 and 48 to the bite between the feed rolls 43 and 45, from above. Secured to the fixture 32 and to the upright 39, directly below the plates 46 and 48, are vertical plates 49 and 50 which form a guide to receive the strips as they pass down between the aforesaid rolls. The plate 49 is grooved like the plate 46, and the guide made up of said first-named plate and the plate 50 is located to open at the bottom directly above the knife 31, with the right-hand side of the plate 50, also of the plate 48, in the same vertical plane with the right-hand side of edge of said knife.

The feed roll 45 consists of a hollow core 51 of rubber or other yielding material, which is mounted directly on a shaft 52, and of ten rings 53 of unyielding material, one for each strip 25 and wide enough to accommodate itself to the same, mounted on said core. The shaft 52 has screw-threaded parts, beyond the core 51 and the rings 53, to receive nuts 54—54 by means of which said rings are held in place on said core, and may be removed therefrom and replaced thereon, or have new rings substituted for the old ones.

In the feed roll 45 provision is made for a varying tension on the several strips passing in contact with said roll, whereby is obtained a uniform feed for the strips, which it might not be possible to obtain if a roll having a one-piece periphery, even though that were made of yielding material, were employed. The yielding core 51, between the shaft 52 and the plurality of rings 53, affords the proper amount of resiliency to obtain the desired result.

Each bearing 41 has a part or arm 55 which extends to the left and has therein a recess 56, Fig. 8, to receive a bearing block 57 for a horizontal rock-shaft 58, said recess being closed at the top by means of a plate 59 bolted to the arm below. A bolt 60, having a check-nut thereon, is tapped into and through the left-hand end of each arm 55 to bear against the corresponding side of the block 57 in said arm. The rock shaft 58 extends beyond the arms 55 and has mounted on and secured thereto in the center a handle 61, and at the ends two arms 62. The arms 62 extend to the right, and in their right-hand terminals the shaft 52, which carries the feed roll 45, is journaled. Collars 63—63 are pinned to the outer terminals of the rock-shaft 58, outside of the arms 62, to hold said rock-shaft against endwise movement.

Upon grasping the handle 61 and swinging the same to the left, the rock-shaft 58 is caused partially to rotate in the blocks 57 and carry with it upwardly the arms 62 and the shaft 52 with the feed roll 45 thereon, thus carrying said roll away from the feed roll 43. This opens the way for the operator to pass the strips 25 from the guide supported by the upright 39 down through into the guide comprising the plates 49 and 50. After the strips have been properly inserted in the lower guide, the roll 45 is moved down into position to grasp the strips between it and the roll 43 at the right, being thus moved into operative position by rocking to the right the handle 61 and thereby swinging the arms 62 downwardly. The amount of tension exerted by the roll 45 on the strips 25 between said roll and the roll 43 is regulated by the bolts 60.

The shaft 42 on which the roll 43 is mounted is positively driven, from the worm 24 on the shaft 19, through the medium of a worm-wheel 64, which intermeshes with said worm, a friction member 65, a shaft 66, a pair of bevel-gears 67, a shaft 68, and a universal-joint 69. A horizontal bracket 70 is secured to two of the posts 8 which are arranged one behind the other, by means of a clamp 71 and bolts 72. The bracket 70 has on the top thereof a pair of bearings 73 for the shaft 66, also a bearing 74 for the shaft 68, the first shaft being at right-angles to the second shaft. The friction member 65 is keyed to the shaft 66 adjacent to the outer terminal thereof as shown in Fig. 4, being prevented from sliding off of said terminal by a nut 75 to receive which said terminal is screw-threaded. The worm-wheel 64 is loosely mounted on the shaft 66 between the friction member 65 and the adjacent bearings 73, and the hub of said worm-wheel at the end adjacent to said friction member is provided with a friction member 76. A collar 77 is arranged on the shaft 66 between the hub of the worm-wheel 64 and the adjacent bearings 73, and there is a friction-disc 78 between the friction members 76 and 65. The nut 75 not only holds the friction member 65 in place on the shaft 66, but, by being tightened or loosened, increases or decreases the amount of friction between both friction members and the friction-disc 78. The bevel-gear 67 on the shaft 66 is at the left of the left-hand bearing 73, while the other bevel-gear is at the rear end of the shaft 68 back of the bearing 74. The universal-joint 69 connects the shaft 68 with the shaft 42, and is provided to take care of or compensate for any angular relationship that may exist between the axes of the driven bevel-gear 67 and the feed roll 43.

Rotary motion from the vertical shaft 19 is transmitted through the worm 24, the worm-wheel 64 and its friction member 76, the friction-disc 78, the friction member 65, the shaft 66, the bevel-gears 67, the shaft 68, and the universal-joint 69, to the shaft 42. The roll 43 on the shaft 42 and the roll 45 on the shaft 52, when in motion, carry the strips 25 downwardly to the cutting members and at the proper rate of speed. A friction drive instead of a direct or positive drive is provided for the shaft 66, in order to enable the parts to slip and said shaft to remain stationary when the strips 25 are clamped and can not be fed down further by the feed rolls, which latter then cease from rotating. This cessation of movement overcomes the driving action of the worm-wheel 64. As soon as the strips are released the worm-wheel sets in motion the parts driven thereby. Thus it is seen that this friction drive enables the strips to be fed only as fast as they are cut, and thus prevents crowding or any other interference with the successful operation of the feeding and cutting mechanisms.

The attachment can be removed after taking out the bolts 34 and 36, and taking off the clamp 71.

Arranged to slide longitudinally on the bed 5 is a carriage 79, which carriage has a depending lug 80. Another carriage 81 is mounted on the carriage 79 for longitudinal movement. A horizontal rod 82 is arranged in the lug 80 and a cross-piece 83 of the bed 5, a spring 84 being interposed between said cross-piece and said lug. Threaded on to the right-hand end of the rod 82, at the right of the lug 80, is a nut 85. The spring 84 forces the lug 80 against the nut 85, and exerts a constant pressure to the right on said lug and the carriage 79. Slidingly arranged in the longitudinal center of the carriage 79 is a rod 86. This rod projects beyond the right-hand end of the carriage 79, and is forced to the right by means of a spring 87 interposed in said carriage between the left-hand end of said rod and a plug 88 tapped into the corresponding end of the passage provided in said carriage for said rod, spring, and plug. There is a vertical opening 89 in the carriage 79, and a pin 90 extends downwardly from the carriage 81 into said opening, said pin being rigidly attached to the rod 86. The opening 89 is larger than the pin 90 to allow said pin to move therein, and the spring 87 tends constantly to force the rod 86, said pin, and the carriage 81 to the right. The top of the carriage at the right-hand end is elevated, and secured to the elevated portion are ten holding rods 91. These rods are arranged side by side and extend to the left over the top of the carriage and through a block 92 secured to said carriage at the left-hand end thereof, and through a movable knife 93 let into and rigidly secured to said block at said end. Bolted to the right-hand end of a bed block 94, at the left of the block 92, is a gage-bar 95 which receives the descending strips 25 and assists in positioning them for cutting.

The fixed knife 31 is mounted on the bed block 94 and secured thereto by means of an angular bar 96 bolted to the top of the bed 5, together with bolts with which said bar is equipped. In the block 95, beneath the knife 31, are ten channels 97 to receive the points as they are cut from the strips, and wherein said points are held intermittently by the rods 91.

Mounted on and bolted at 98 to the block 92 and extending to the left over a portion of the movable knife 93 is a guide bar 99, and having its ends secured to said bar is a U-shaped guide bar 100. Slidingly arranged in the bars 99 and 100 are ten clamping plungers 101, each provided intermediate of its ends with a collar 102. The passages in the bar 99 for the plungers 101 are enlarged at their right-hand terminals to accommodate the collars 102. Interposed between the transverse part of the bar 100 and the collars 102 are springs 103. These springs have a constant tendency to force the collars 102 and the plungers 101 to the left or toward the fixed knife.

The knife 93 is adapted, when actuated to the left or advanced, to make with the bottom right-hand edge of the knife 31 shearing cuts on the vertical strips 25, which cuts are at an angle of 40° to the strips. The rods 91 are in line with the channels 97, and the plungers 101 are at the right of the right-hand side of the knife 31.

A transverse rock-shaft 104 is journaled in the bed 5 below and a little to the left of the shaft 7, and mounted on and secured to said rock-shaft are upwardly extending arms 105 and 106, the former being shorter than and in front of the latter. The arm 105 bears at its upper terminal against the outer end of the rod 86. A roll 107 is mounted on a transverse shaft 108 journaled in two bearings 109 that rise from the carriage 79 at the right-hand end thereof. Mounted on and secured to the shaft 7 between the bearings 6 are two cams 110 and 111, the former being larger than and in front of the latter. The cam 110 is in contact with the roll 107, which roll is at the left of said cam, and the cam 111 is in contact with the arm 106, which is also at the left of its cam.

At each revolution of the shaft 7, the cam 110, acting on the roll 107 and through the medium of the shaft 108 and the bearings 109, forces the carriage 79 to the left, or advances it, against the resiliency of the spring 84, and permits said carriage to be

returned by said spring to retracted or initial position, and at the same time the cam 111 acting on the arm 106 rocks said arm to the left on the rock-shaft 104 and with it the arm 105, and said last-named arm forces the rod 86 to the left, against the resiliency of the spring 87, with the result that the carriage 81 is moved to the left or advanced, through the medium of the pin 90, and then said last-named spring acts to move said last-named carriage to the right into retracted or initial position.

Referring to Figs. 11, 12, 13, and 14, in the order named, it will be seen that, while the movable knife 93 and the clamping plungers 101 are in retracted position, the points (represented at 112) in the channels 97 are prevented from falling out of the entrances to said channels by the holding rods 91; that, after said strips are carried down further by the rolls 43 and 45, the strips descend over said entrances into position to hold said points in place, said rods are withdrawn from the path of said strips, and said knife and said plungers begin to advance; that, by the time the strips are moved down by said rolls until the lower ends contact with the gage-bar 95, the strips are clamped by said plungers against the face of the fixed knife 31, said movable knife advances into cutting position, and said rods are retracted so that they no longer project to the left beyond said movable knife; and that, while the strips are clamped by the plungers, the movable knife continues to advance and cuts a set of ten points from the lower portions of the strips which cover the entrances to said channels. Next, the movable knife and clamping plungers recede, and the holding rods advance, the parts and members again being disposed as in Fig. 11. While the strips 25 at their bottom edges rest on the gage-bar 95, and are held immovable by the plungers 101 the feed roll 43 ceases to revolve, and with it the feed roll 45 which is actuated thereby or by the intervening strips. The rolls 43 and 45 are held against rotation by the frictional resistance offered by the strips, such resistance being sufficient to hold stationary the parts which intervene between said first-named roll and the friction member 65, so that the worm-wheel 64 rotates on the shaft 66 without imparting motion thereto.

From the channels 97 the points 112 as they accumulate are forced into ten channels 113 in a carrier 114 which extends to the left from the bed block 94.

Assuming that ten steel strips 25 have had their leading ends passed between the feed wheel 12 and the tension roll 16, introduced into the holder 27, and moved on into and through the tubes 28, and down between the plates 46 and 48, the rolls 43 and 45, and the plates 49 and 50, onto the gage-bar 95, and that said feed wheel and the shaft 7 are in motion, the operation is described as follows:

At each revolution of the cams 110 and 111, on the shaft 7, the knife 93, clamping plungers 101, and holding rods 91 are operated to cut ten points from the bottoms of the strips 25 and to advance the points previously cut and in the channels 97 a distance in said channels equal to the thickness of a point. The strips 25 are fed continuously, although having their lower ends momentarily retarded by the gage-bar 95 and the clamping plungers 101 while the cut is being made each time. Whatever slack in the strips may occur during the time they are clamped is distributed and taken care of in the tubes.

The feed rolls 43 and 45 operate to carry down the strips 25 a distance equal to the width of a point 112 between any two of its parallel sides, during the time the plungers 101 are out of contact with said strips, and said rolls are idle while the strips are held stationary, as hereinbefore fully explained.

The ten points are cut from the ten strips 25 at an angle of 40° by the knives 93 and 31. These points are pushed into the channels 97 by the cutting parts of the knife 93, and held there by the rods 91 while said knife is retracted and until said strips are moved down in front of said points.

If desired or found necessary, in order the better to guide the strips 25 in their passage between the directly driven feed roll and the indirectly driven feed roll, which latter is driven from the former by the force transmitted from one to the other through the intervening strips, and prevent said strips from moving laterally, feed rolls such as those represented at 43′ and 45′, respectively, in Fig. 2, may be substituted for the rolls 43 and 45. The roll 45′, which is positively driven roll, has in its periphery ten annular grooves 115 each of the proper width to receive one of the strips 25; and each of the rings 53′ of the roll 45′, which is the indirectly driven roll, has an annular raised, peripheral part to enter one of said grooves and engage the strip therein, and annular, depressed, peripheral parts on each side of said raised part to form, with such part or parts in the adjacent ring or rings an annular groove or grooves, the raised parts which form said grooves 115 being received in the grooves in the roll 45′. Obviously, the strips 25 in passing down between the rolls 43′ and 45′ through the grooves 115 wherein they are confined between the raised parts of the rings 53′ are prevented from moving laterally or becoming displaced, and are perforce fed by said rolls in straight and undeviating courses.

We claim:

1. In strip-feeding mechanism, clamping

means for a strip, continuously operating feeding means for said strip, rotary feeding means for said strip at the leading end, continuously operating driving means for said last-named feeding means, and means to enable said last-named feeding means to be held against rotation by the strip when in the grasp of said clamping means, while said driving means continues to revolve.

2. In strip-feeding mechanism, clamping means for a strip, continuously operating feeding mechanism for said strip, and intermittently operating feeding mechanism, for the leading-end portion of said strip, adapted to feed the strip, and to remain stationary while the strip is held by said clamping means.

3. In strip-feeding mechanism, a bed, a fixture attachable to said bed, and provided with bearing members and a support, a strip guide attached to said support, a strip guide attached to said fixture, a shaft journaled in said bearing members, a feed roll mounted on said shaft, a feed roll to cooperate with said first-named feed roll, a shaft carried by said bearing members for said second-named feed roll, said guides being above and below the bite between said rolls, and driving mechanism for said first-named shaft.

4. The combination, in strip-feeding mechanism, with an inclined bed, of a fixture attachable to said bed, and provided with bearing members and a support, an upper strip guide attached to said support, an under strip guide attached to said fixture, a shaft journaled in said bearing members, a feed roll mounted on said shaft, a feed roll to cooperate with said first-named feed roll, a shaft carried by said bearing members for said second-named feed roll, the bite between said rolls being between said upper and under guides, and driving mechanism for said first-named shaft.

5. In strip-feeding mechanism, bearing members, a shaft journaled in said members, a feed roll mounted on said shaft, a feed roll to cooperate with said first-named roll, means carried by said bearing members to locate said second-named roll in and out of operative position relative to said first-named roll, driving mechanism for said shaft, and guide means associated with said feed rolls.

6. In strip-feeding mechanism, an attachment comprising a fixture having bearing members and a support, an upper strip guide attached to said support, an under strip guide attached to said fixture, a shaft journaled in said bearing members, a feed roll mounted on said shaft, a feed roll to cooperate with said first-named feed roll, means carried by said bearing members to locate said second-named feed roll in and out of operative position relative to said first-named feed roll, the bite between said rolls being between said upper and under guides, and driving mechanism for said first-named shaft.

7. In strip-feeding mechanism, bearing members, a shaft journaled in said members, a feed roll mounted on said shaft, a rock shaft journaled in said bearing members, arms mounted on said rock-shaft, a shaft journaled in said arms, a feed roll mounted on said last-named shaft to cooperate with said first-named roll, driving mechanism for said first-named shaft, and guide means associated with said rolls.

8. In strip-feeding mechanism, an attachment comprising a fixture having bearing members and a support, an upper strip guide attached to said support, an under strip guide attached to said fixture, a shaft journaled in said bearing members, a feed roll mounted on said shaft, a rock-shaft journaled in said bearing members, arms mounted on said rock-shaft, a shaft journaled in said arms, a feed roll mounted on said last-named shaft to cooperate with said first-named feed roll, the bite between said rolls being between said upper and under guides, and driving mechanism for said first-named shaft.

9. In strip-feeding mechanism, a feed roll for strips to be cut, said roll comprising a yielding supporting member, and a plurality of unyielding annular members mounted on said supporting member, each of said annular members being adapted peripherally to engage a strip.

10. In strip-feeding mechanism, a feed roll for strips to be cut, said roll comprising a shaft, a yielding core on said shaft, a plurality of unyielding rings mounted on said core, and means to secure said core and rings to said shaft, each of said rings being adapted peripherally to engage a strip.

11. The combination, in strip-feeding mechanism, with a feed roll having peripheral grooves to accommodate strips, of a second feed roll comprising a yielding supporting member, and a plurality of unyielding annular members mounted on said supporting member, said unyielding members having peripheral parts to enter said grooves and engage individual strips therein.

12. The combination, in strip-feeding mechanism, with a feed roll having in the periphery thereof grooves adapted to receive strips to be cut, of a second feed roll comprising a shaft, a yielding core on said shaft, a plurality of unyielding rings mounted on said core, and means to secure said core and rings to said shaft, said rings having peripheral parts receivable in said grooves, and having inset peripheral parts to accommodate the groove-forming parts of said first-named roll.

13. In strip-feeding mechanism, a suit-

ably journaled shaft, driving means for said shaft, said means consisting in part of members which are adapted to yield when a predetermined amount of resistance is set up, a fixture provided with bearing members, a shaft journaled in said bearing members, a feed roll mounted on said last-named shaft, and driving means between said shafts.

14. The combination, in strip-feeding mechanism, with an upright, and a bed, of a bracket having bearing members and means to clamp the same to said upright, a shaft journaled in said members, a driven member loosely mounted on said shaft, intermeshing with said worm, and having a friction member, a friction member secured to said shaft, a friction disc between said friction members, a fixture attachable to said bed, and provided with bearing members, a shaft journaled in said last-named bearing members, a feed roll mounted on said last-named shaft, and driving means between said shafts.

15. In strip-feeding mechanism, an attachment comprising a fixture provided with bearing members and a supporting member, grooved plates secured to said supporting member above and to said fixture below, cover plates secured to said grooved plates, a shaft journaled in said bearing members, a feed roll on said shaft, means to drive said shaft, a second shaft carried by said bearing members, and a feed roll on said second shaft to cooperate with said first-named feed roll, the bite between said rolls being in the same plane with the grooves in said grooved plates.

16. In strip-feeding mechanism, an attachment comprising a fixture provided with bearing members and a support, grooved plates secured to said support above and to said fixture below, cover plates secured to said grooved plates, a shaft journaled in said bearing members, a feed roll mounted on said shaft, means to drive said shaft, rocker arms carried by said bearing members, a shaft journaled in said arms, and a feed roll mounted on said last-named shaft to cooperate with said first-named feed roll, the bite between said rolls being in the same plane with the grooves in said grooved plates.

17. In strip-feeding mechanism, an attachment comprising a fixture provided with bearing members and a support, strip guides secured to said fixture and support, a shaft journaled in said bearing members, a feed roll mounted on said shaft, means to drive said roll, bearing blocks adjustably held in said bearing members, a rock-shaft journaled in said blocks, arms mounted on said rock-shaft, a shaft journaled in said arms, and a feed roll mounted on said last-named shaft to cooperate with said first-named feed roll, the bite between said rolls being in the same plane with said guides.

18. In mechanism for feeding a metallic strip comprising in combination, continuously operating means for continuously feeding a strip, intermittently operating means for feeding a leading end of a strip intermittently and to provide a slack in a strip so that its length between said feeding means will be greater than the distance between said means when not slack and a guideway between said means for confining a strip and co-operating therewith when in slack condition to tension the same for urging it towards said intermittently operating means.

19. In mechanism for feeding a metallic strip comprising in combination, means for continuously feeding a strip, means at the leading end of said strip to intermittently feed successive portions thereof and provide slack in said strip between said feeding means and a guideway between said feeding means for enclosing said slack strip and adapted to co-operate therewith and urge the same towards the feeding means at the leading end of the strip.

CHARLES J. FANCHER.
ROBERT A. JOHNSON.