May 10, 1932. E. W. M. BAILEY 1,857,832

AUTOMATIC BUFFING MACHINE

Filed Feb. 15, 1930 4 Sheets-Sheet 1

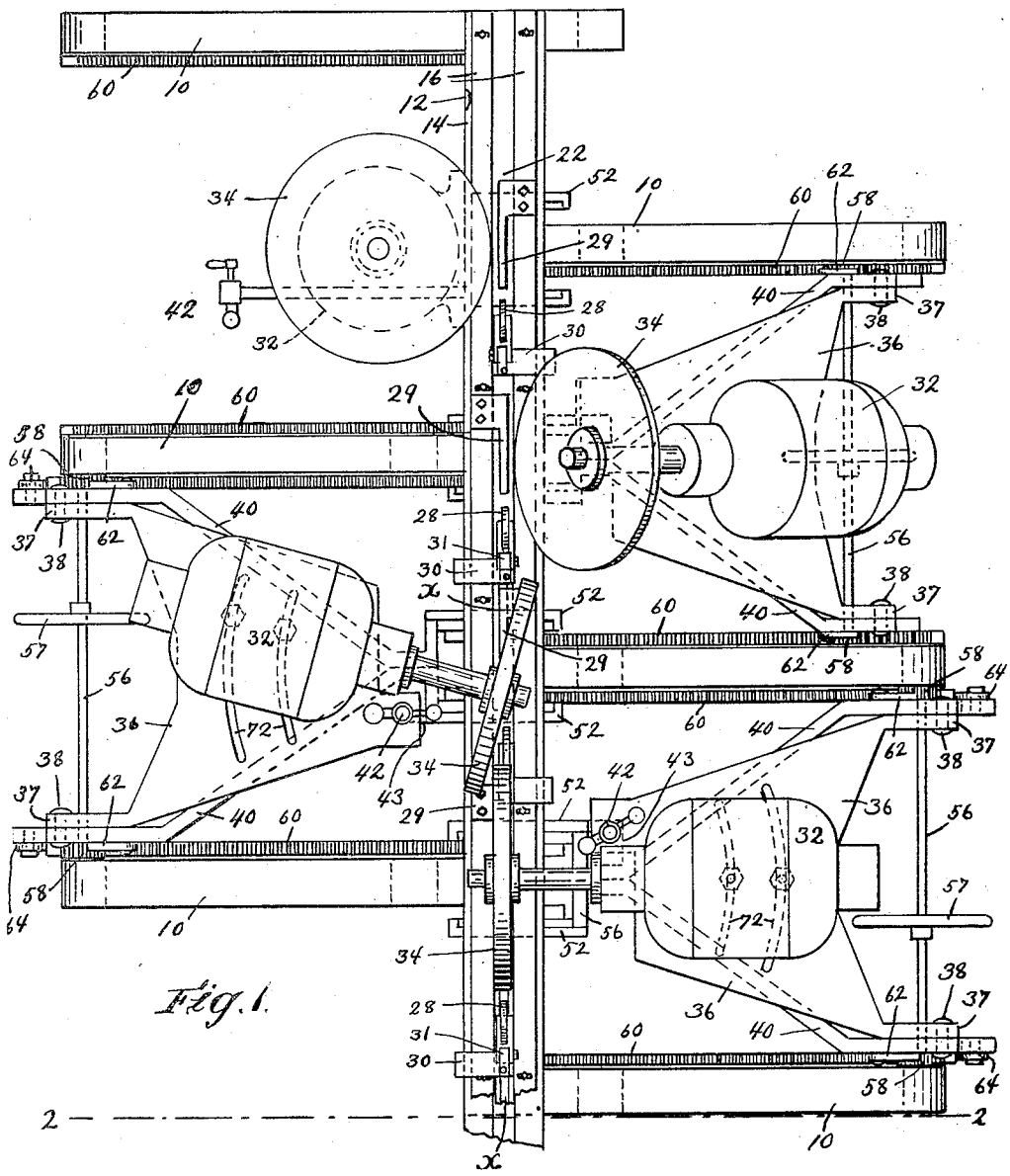


Fig. 1.

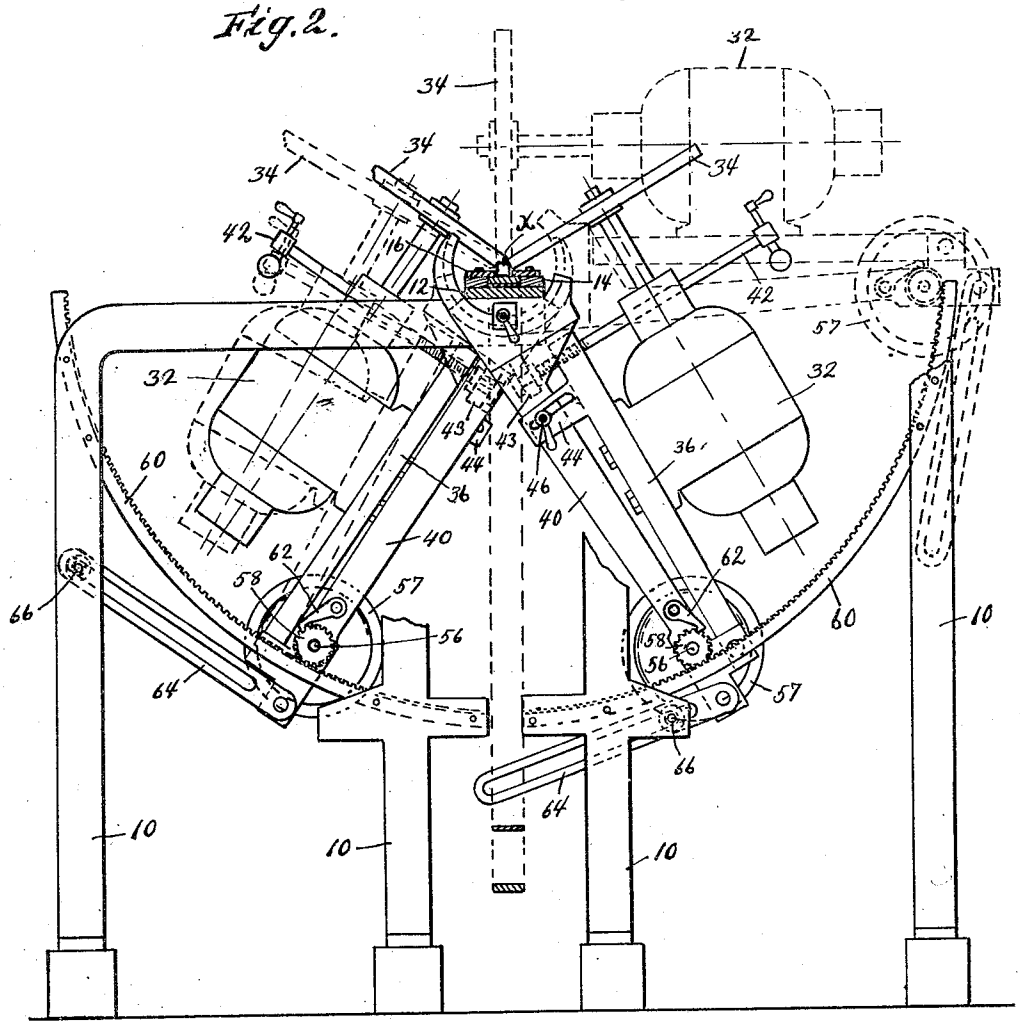
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AUTOMATIC BUFFING MACHINE

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Fig. 2.



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AUTOMATIC BUFFING MACHINE

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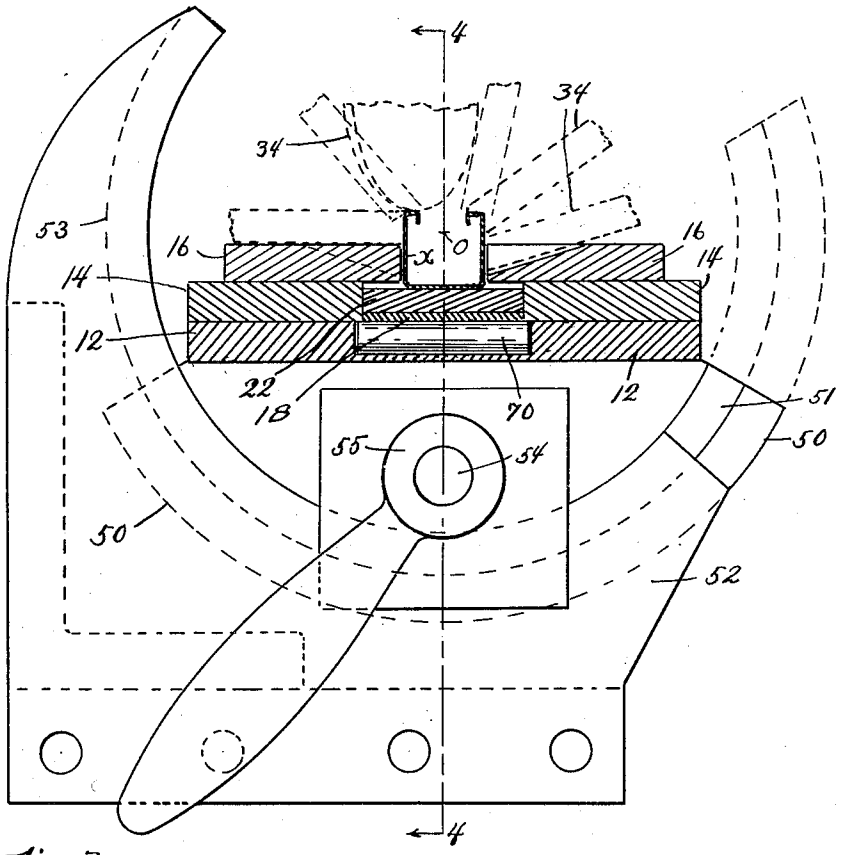


Fig. 3.

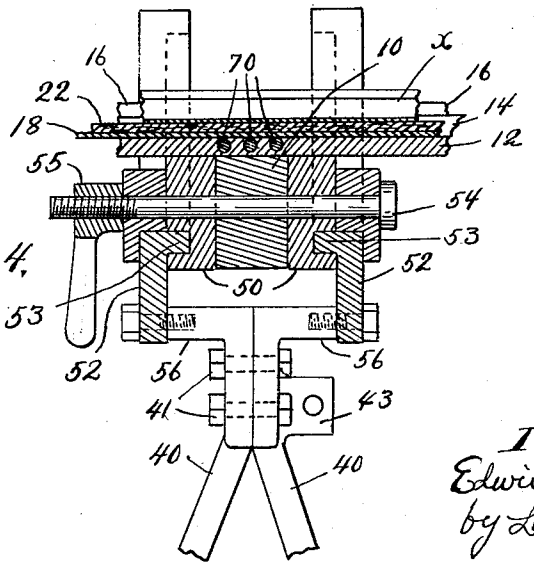


Fig. 4.

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AUTOMATIC BUFFING MACHINE

Filed Feb. 15, 1930 4 Sheets-Sheet 4

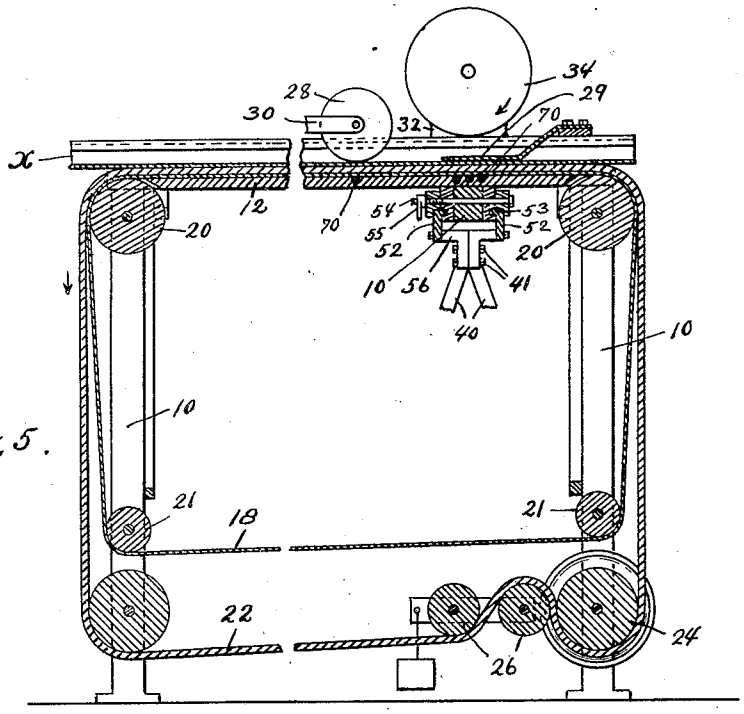


Fig. 5.

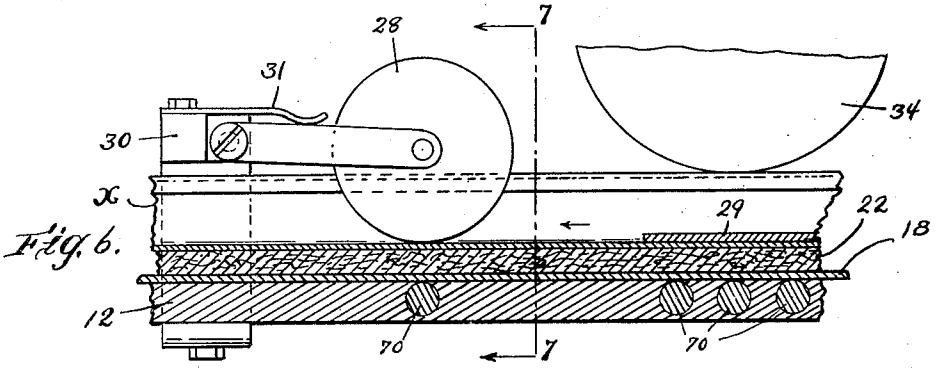


Fig. 6.

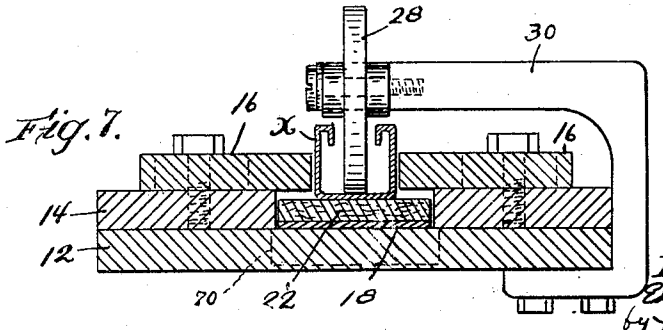


Fig. 7.

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UNITED STATES PATENT OFFICE

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AUTOMATIC BUFFING MACHINE

Application filed February 15, 1930. Serial No. 428,777.

This invention relates to automatic means for buffing, or similarly finishing strips of material, such as metal moldings, and particularly to machines for finishing the surfaces of metal moldings used in automobile bodies, such as metal window glass guides, which are generally employed in closed body automobiles for receiving the edge portions of window glass.

Prior to my invention, work of this character has usually been performed by manually holding the strip, or molding, in contact with a rapidly driven abrading or polishing wheel, such as a "rag" wheel, so that the cost of this work has been objectionably expensive and serious delay in production has resulted. Also the work, in many instances, has not been satisfactorily or thoroughly performed, and unless the strips are cut into short lengths it is impractical to perform this operation in this manner.

The objects of my invention are to provide an automatic machine which is adapted to polish, or otherwise finish the surfaces of molding strips, guides, or the like, of any length, by a continuous operation, and without bending or otherwise distorting the strip of material operated on, so that the work may be performed in a uniformly satisfactory manner and much more rapidly and at materially less expense than would be possible by hand.

I accomplish these objects, primarily, by providing means for continuously feeding strip material longitudinally in position to be operated on by a series of buffing or polishing wheels, or wheels of like character, which are arranged for adjustment in transverse relation to the direction of feed of the strip, so that all portions of the outer surface of strips of various forms may be effectively finished.

For a more complete disclosure of the invention reference is made to the following description, in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a section of a machine embodying the invention, the portions thereof not shown being substantial duplicates of those shown.

Fig. 2 is a cross sectional view approximately at line 2—2 of Fig. 1, and partly broken away.

Fig. 3 is a similar view on an enlarged scale of the middle portion of the machine.

Fig. 4 is a sectional view, at line 4—4 of Fig. 3, on a somewhat smaller scale.

Fig. 5 is a longitudinal sectional view of the machine, at line 4—4, partly broken away.

Fig. 6 is a detail sectional view, at line 4—4 of Fig. 3.

Fig. 7 is a detail sectional view, at line 7—7 of Fig. 6.

As shown in the drawings, the main frame of the machine consists of a series of transversely disposed frame sections 10, each of which comprises a pair of upright leg portions and a horizontal top portion, said sections being oppositely and alternately arranged and connected in perpendicular relation to a longitudinally extending fixed table 12, which is mounted horizontally on said frame sections. A pair of guide ways 14 are mounted on the upper side of said table 12, with their side edges in parallel relation, to form a passage of uniform width therebetween which extends for the entire length of the machine and a pair of guide plates 16 are mounted on said guide ways, which are adapted to be interchanged, or adjusted to and from each other in any convenient manner as by bolt and slot connections, according to the width of the strip to be operated on. A movable anti-friction support 18 is provided between said guide ways 14, which consists of an endless belt of thin flexible steel, of uniform width and thickness, which extends over the table 12, then about idle pulleys 20, at each end of said table 12 and beneath same, and about guide pulleys 21, as shown in Figs. 3 and 5. A conveyer belt 22 of frictional material is arranged to encircle the belt 18 and to be supported thereon between the guide ways 12, said belts being of the same width, and the belt 22 being of leather, canvas, or other suitable material, which will provide a strong frictional engagement with the material to be fed. The belt 22 also passes over the idle pulleys 20

and about a driving pulley 24, to drive which an independent motor, not shown, is provided, and a simple form of belt tightener 26 is arranged adjacent said pulley 24 in position to cause the belt to be frictionally engaged by the pulley with sufficient force to drive it.

While the construction may be variously modified for different types of molding strips, the particular type, which the machine is illustrated as arranged to operate on, is of the U-form glass channel type, as X, formed by bending a strip of thin metal to provide a bottom and two sides, the edge portions of which are turned inwardly. When this form of strip is to be operated on, the guide plates 16 are so arranged that the distance between their edges corresponds to the width of the strip, to permit the bottom of the strip to be held against the top side of the feed belt 22, while the edges of plates 16 engage the sides of the strips with sufficient closeness to hold the strip against lateral displacement while it is being fed therebetween.

For the primary purpose of holding the strip X in sufficiently firm frictional engagement with the belt 22, to cause the strip to be fed thereby, a series of hold down rolls 28 are mounted on the frame by means of suitable brackets 30, and are held to rotate in a vertical plane midway between the edges of plates 16, in position to be pressed down on the bottom of the strip, between its sides, as shown in Figs. 1, 5, 6 and 7, flat springs 31, or other suitable means, being provided for holding the rolls 28 in sufficiently firm engagement with the strip.

In performing the operation of finishing or burnishing the surface of the sides and top edge portions of the metal strip X, it is usually desirable to perform several successive operations on the same surface, the first of which is often an abrading operation, to secure a fresh smooth surface, this being followed by a buffing operation, to color or polish the surface. As the entire surface which is to be finished must be operated upon uniformly and is usually curved, or angularly formed transversely, each surface portion should be operated on by a wheel which rotates in a plane approximately perpendicular to such surface.

For the purpose of accomplishing this result, a series of electric motors 32 are provided, each having a circular operating head 34, for example, an ordinary "rag" wheel, on the shaft thereof, said motors being mounted at opposite sides of the path of movement in which the strip X is fed by the conveyer belt 22, one-half of said motors being arranged at one side, and the other half thereof at the opposite side of said path, preferably in alternate relation, so that, in no instance, is the operating head of a motor at one side directly opposite that of a motor at the opposite side.

To provide means which will effectively support said motors, and will permit ready and effective adjustment thereof, so that the operating heads thereon may rotate in planes approximately perpendicular to the particular surfaces with which they are engaged, the hereinafter described construction is provided, and as the means employed for all of said motors is substantially the same, a description of the means employed in connection with one of the motors will suffice.

Each motor is mounted on a base plate 36, said plate having ears 37 at one end which are respectively connected by pivots 38 to the end portions of a pair of arms 40, which extend convergently from said end portions and are clamped together side by side by bolts 41, as shown in Fig. 4. An adjusting screw 42 is threaded in base plate 36 and engaged by nuts, or other suitable means, with a lug 43 on one of the arms 40, by means of which said plate may be angularly adjusted on pivots 38 with relation to arms 40, and slotted ears 44 are provided on the said plate which are adapted to be locked to said arms by clamping screws 46 after adjustment.

An adjustment permitted by this construction is indicated in Fig. 2, in which a full line and a dotted line position of the left hand motor 32 is shown.

A pair of bearing blocks 50 are secured on opposite sides of a horizontal portion of frame 10 directly beneath the table 12, each block being provided with an arc-shaped groove 51, each groove having its center in a line which extends approximately at the middle of the channel strip X, and longitudinally thereof, as indicated at O in Fig. 3. A pair of pivot blocks 52 are each provided with an arc shaped rib 53 corresponding to, and fitted in the grooves 51, said blocks 52 being held in position by a clamping bolt 54 and adjusting nut 55 thereon, said bolt passing through the several parts and acting with said nut to hold the pivot blocks in clamping engagement with the frame. The pivot blocks 52 are bolted to ribs 56, formed integrally with the arms 40, so that they are rigidly connected to blocks 52, as shown in Fig. 4, the parts thus being constructed to permit them to be readily assembled.

The above described construction thus permits a swinging adjustment of the arms 40, and with them the base plate 36 with the motor 32 thereon, about the center O, between, for example, the full line and the dotted line positions of the right hand motor shown in Fig. 2, altho a somewhat greater range of adjustment is permitted.

A convenient means for adjusting the arms 40, and parts connected thereto, are preferably employed, the means shown comprising a shaft 56 having a hand wheel 57, thereon, said shaft being mounted for rotation in the arms 40 and having a pinion 58 at each end

arranged for engagement with curved rack bars 60, which are fixed on the frame 10, a pawl 62 being arranged on each arm 40 in position to lock the pinions 58 against rotation and adjustment being made by rotating the shaft 56 in directions to swing the arms 40 upward or downward. Links 64 are also pivotally connected to said arms 40 and provided with a pin and slot connection with the frame, and a clamping nut 66 is provided in connection therewith for securely locking the arms in any position to which they are adjusted.

The guide plates 16 are recessed, as at 17, directly beneath the operating heads 34 from their top sides to the inner edges thereof, so that, when the work to be operated on, as the channel strip X, is fed between said guide plates, the heads may be engaged with the sides of the strip close to the bottom thereof, if desired.

The feed belt 22 may be considered as driven, and the heads 34 as rotated in the directions indicated by arrows in Fig. 5, so that the heads tend to assist the feeding action on the strip and, at the same time, some of them have a tendency to press the strip down on the feed belt 22 with some force, so that they tend to increase the frictional engagement of the strip with the belt. The heads 34 are likely, however, to tend to feed the strip faster than the belt 22 travels, but this tendency is counteracted by the hold-down rolls 28. Also, when short strips are fed and their ends are not kept in contact, or overlapped, a buffing head is liable to engage the end of a strip as it passes beneath the same and lift it up, or even throw it out of contact with the belt 22. To prevent such an occurrence a hold down roll 28 is preferably located in the rear of, and close to each head 34. As this arrangement is not wholly effective in preventing such an occurrence under all conditions, a series of resilient hold-down arms 29 are provided, which are mounted on the frame and are extended into positions to press down on the middle of the bottom of the strip directly beneath, or opposite each operating head, so that the strip will be pressed firmly down on the conveyer belt at each side of the portion of the strip which is engaged by the head at one time, as shown in Figs. 1, 5 and 6. Consequently, any tendency which the head may have to pick up the strip, as the latter is moved out of engagement with the head, is fully counteracted.

In practice a substantially greater number of motors than the number shown are provided, which are so adjusted that the operating heads thereon will be engaged with all portions of the outside surface of the strip which it is desired to finish, as indicated for example in Fig. 3, so that, as the strip is fed, its surfaces will be satisfactorily finished by the successive operations thereon. This operation may be continuously performed on strips of any length, and the ends of successive strips may be butted together, or slightly telescoped to make the operation continuous indefinitely.

The flat table, with the anti-friction metal belt 18 slidably supported thereon, is particularly desirable where the strip to be operated on is of thin, easily bent metal, as, with this arrangement the bottom of the strip is firmly supported at all points and the hold down rolls 28 and arms 29 provide a constant frictional engagement with the belt 22, so that the strip will be fed at a uniform speed. Friction rolls, as 70, may be provided in the table 12, directly beneath the hold down rolls and the operating heads, for reducing the force of frictional engagement of the anti-friction belt 18 with the table, or other suitable means may be provided for the purpose which will not permit substantial depression of the conveying means.

In practice some, or all of the motors 32 are secured to the base plates 36 by bolt and slot connections, which permit adjustment thereof to different positions on the base plates, so that, if it is desired to have a head 34 operate in an oblique plane with relation to the strip the position of the motor on the base plate 36 may be varied correspondingly, as indicated in Fig. 1, arc shaped slots 72 being provided in the base plate for the purpose, but under ordinary conditions the rotation will be in planes approximately parallel to the path of movement of the strip.

The location of the motor supports in alternate relation, at opposite sides of the path of movement of the work which is operated on, so that no operating thread is directly opposite another, is important for several reasons, aside from the fact that the particular construction employed to permit adjustment of the motor support about said path makes such an arrangement practically necessary, as this arrangement avoids the possibility of oppositely arranged operating heads from engaging each other, when operating, for example, on the top portion of the molding. Also it avoids undue heating of the thin metal strip adjacent the point of engagement with the strip, which would be likely to occur if directly opposite portions of the strip were operated on at the same time.

It will be understood that the reference to a U-form metal strip, as the work operated on, is merely illustrative, and that the machine illustrated may, with slight, or no modification, be advantageously employed on various other forms of elongated strips of material.

I claim:

1. In a machine of the character described, means for feeding elongated strips of material in a straight predetermined path, a sup-

port disposed at one side of said path and mounted for swinging adjustment about approximately the middle longitudinal line of said path, and a shaft having an operating head thereon and mounted on said support for rotation about an axis disposed in transverse relation to said path, and arranged for adjustment thereon and transversely of its axis, to carry said head toward and from said path.

2. In a machine of the character described, an endless conveyer having means for conducting elongated strips of material continuously in a predetermined path, a series of supports mounted in opposite relation to said path and each having a pivotal bearing partly encircling said path, to permit swinging adjustment of each support about said path as an approximate axis, and a rotary operating device mounted on each of said supports and arranged to be held in operative relation with different portions of the strips as they are conducted in said path.

3. In a machine of the character described, means for feeding an elongated strip of material longitudinally in a predetermined path, a support disposed at one side of said path and arranged for swinging adjustment about said path as an approximate axis, a shaft mounted for rotation on said support about an axis disposed in transverse relation to said path and having an operating head for engagement with the material as it is fed, and means for adjusting said shaft on said support transversely of its axis, to position said head with relation to said path.

4. In a machine of the character described means for feeding an elongated strip of material longitudinally in a predetermined straight path, a support disposed at one side of said path and arranged for swinging adjustment about said path as an approximate axis, and a shaft rotatably mounted on said support and having an operating head thereon, said shaft being arranged for transverse adjustment on said support to engage the head with said material as the latter is fed.

5. In a machine of the character described, means for feeding an elongated strip of material longitudinally in a predetermined path, a main support disposed at one side of said path and arranged for swinging adjustment about said path as an approximate axis, an auxiliary support mounted on said main support and arranged for swinging adjustment thereon about an axis remote from, and approximately parallel to said path, and a shaft mounted on said auxiliary support to rotate about an axis disposed transversely to said pivotal axes and having an operating head arranged for engagement with the material as it is fed.

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

EDWIN W. M. BAILEY.