Nov. 27, 1934. L. E. CURTIS 1,982,466

MACHINE FOR MAKING CORNER MOLDING, BEADING, AND THE LIKE

Filed July 13, 1931 6 Sheets-Sheet 1

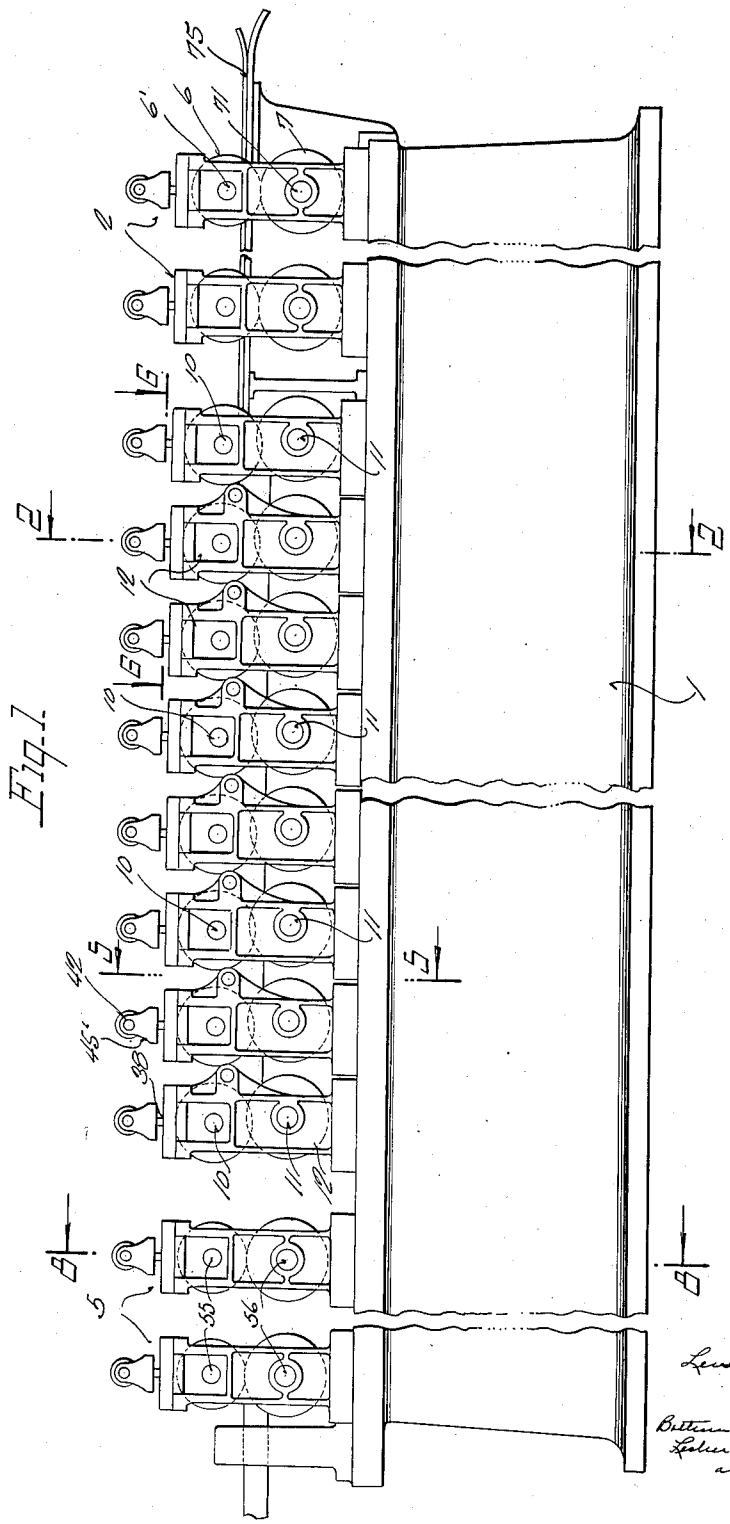


Fig. 1

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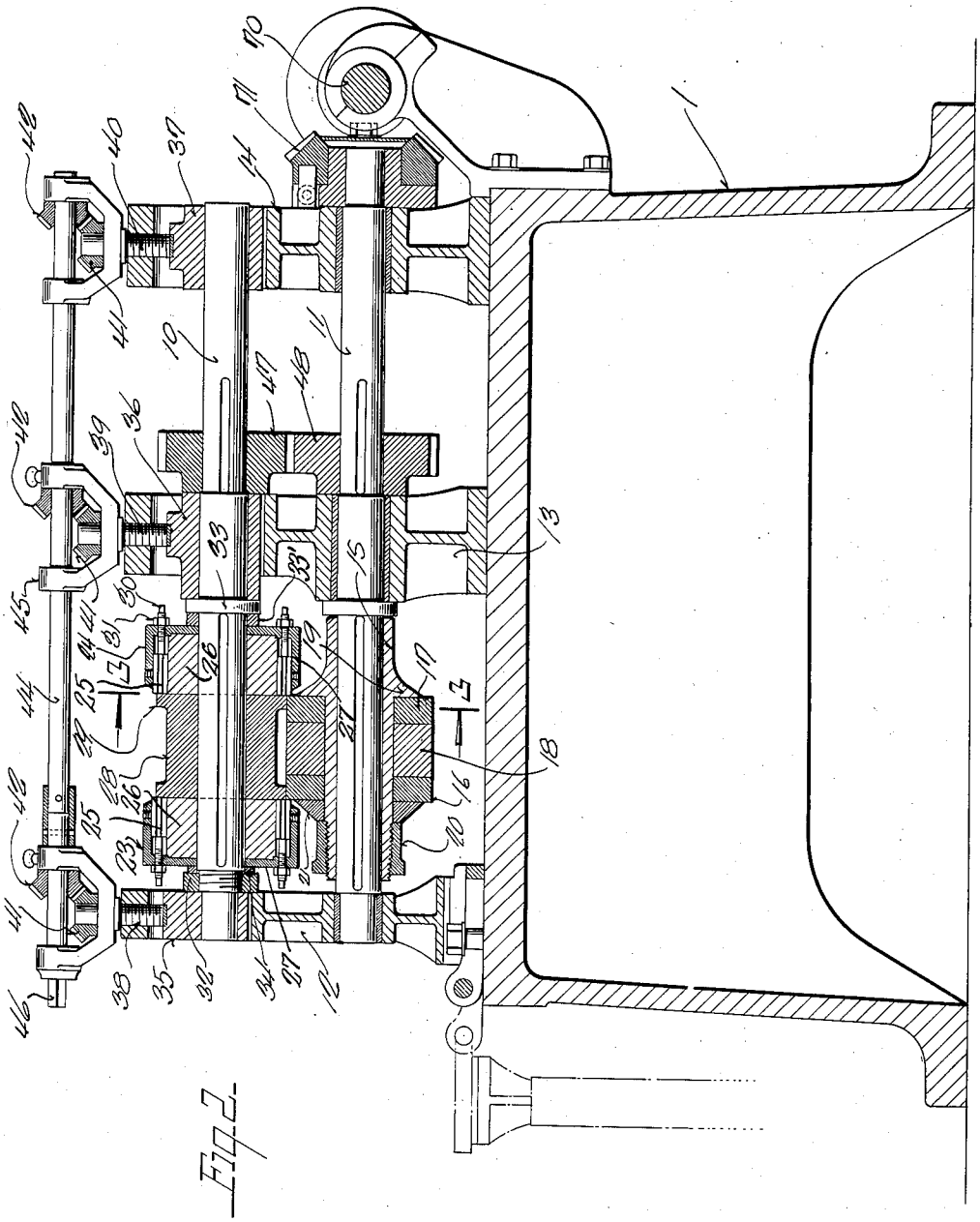


Fig. 2.

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MACHINE FOR MAKING CORNER MOLDING, BEADING, AND THE LIKE

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Fig. 4.

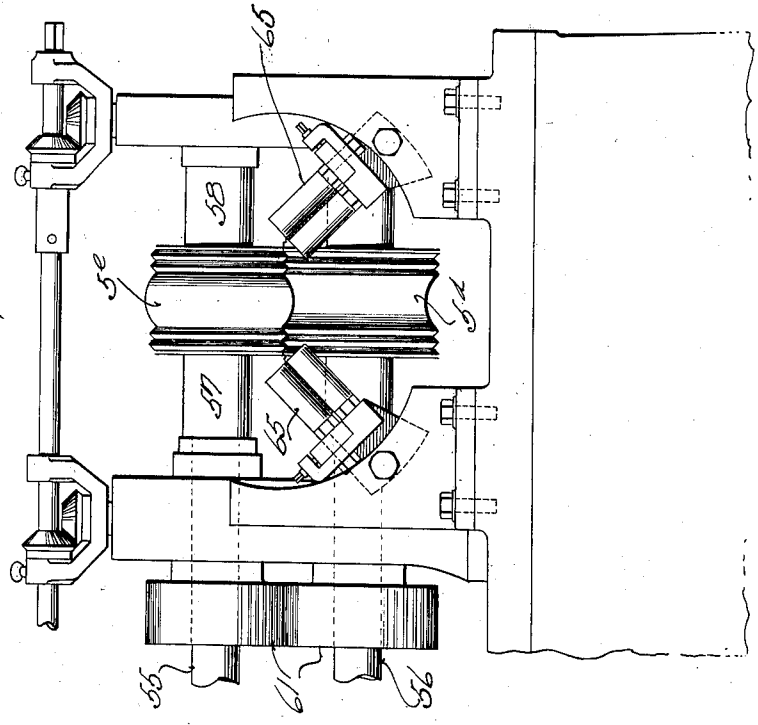
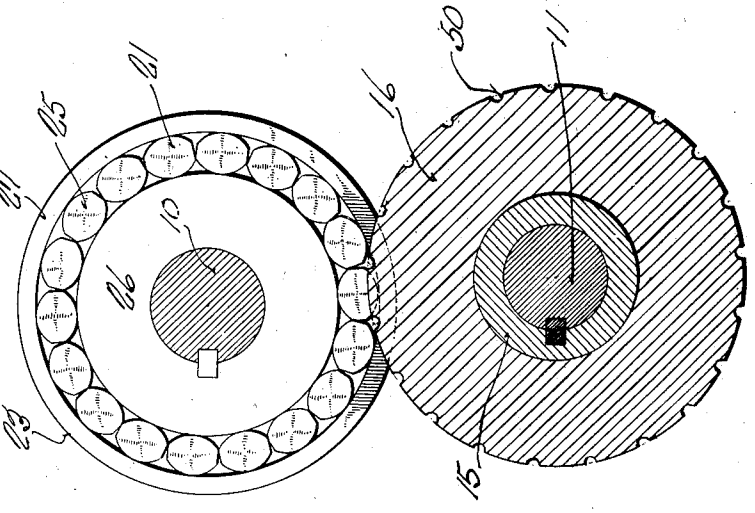


Fig. 3.



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MACHINE FOR MAKING CORNER MOLDING, BEADING, AND THE LIKE

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Fig. 6

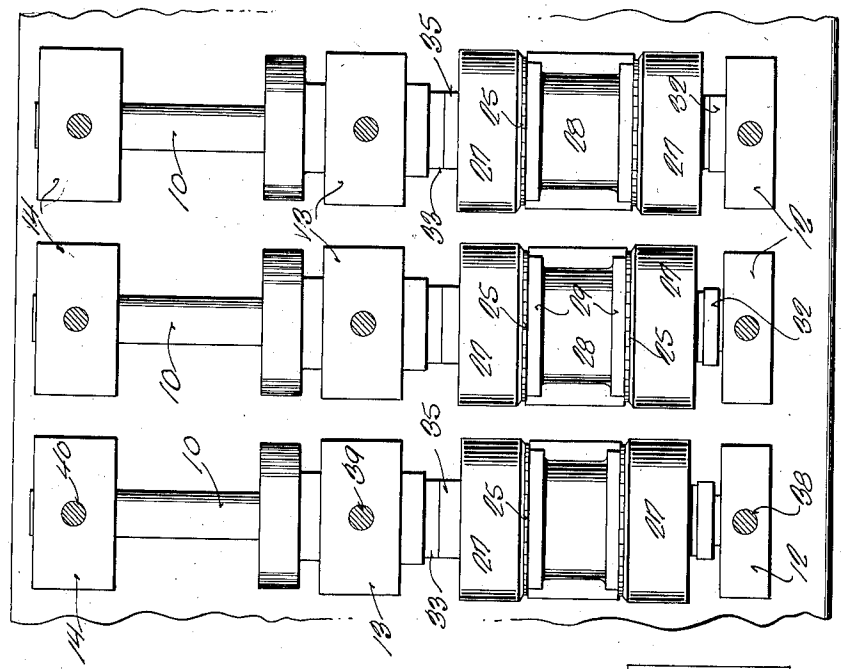


Fig. 5

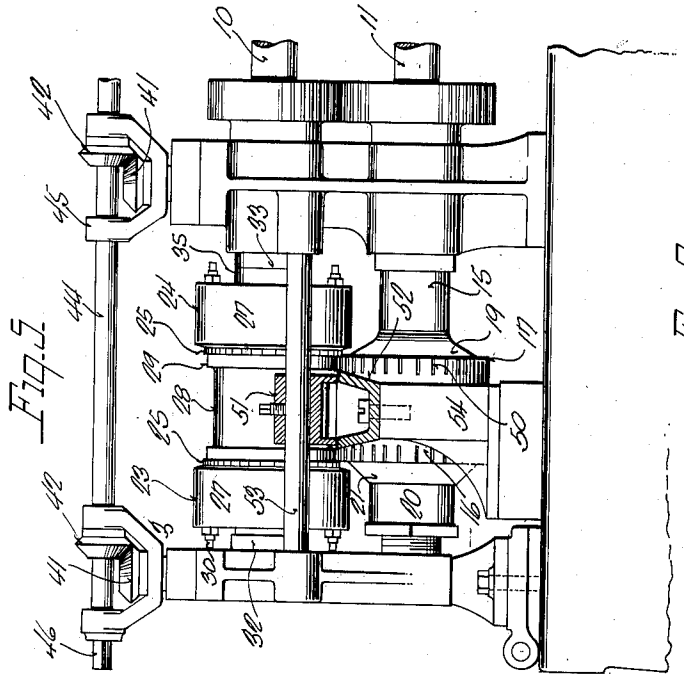
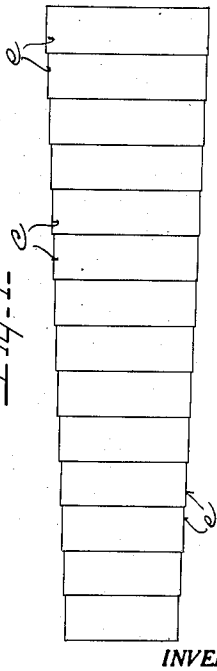


Fig. 7



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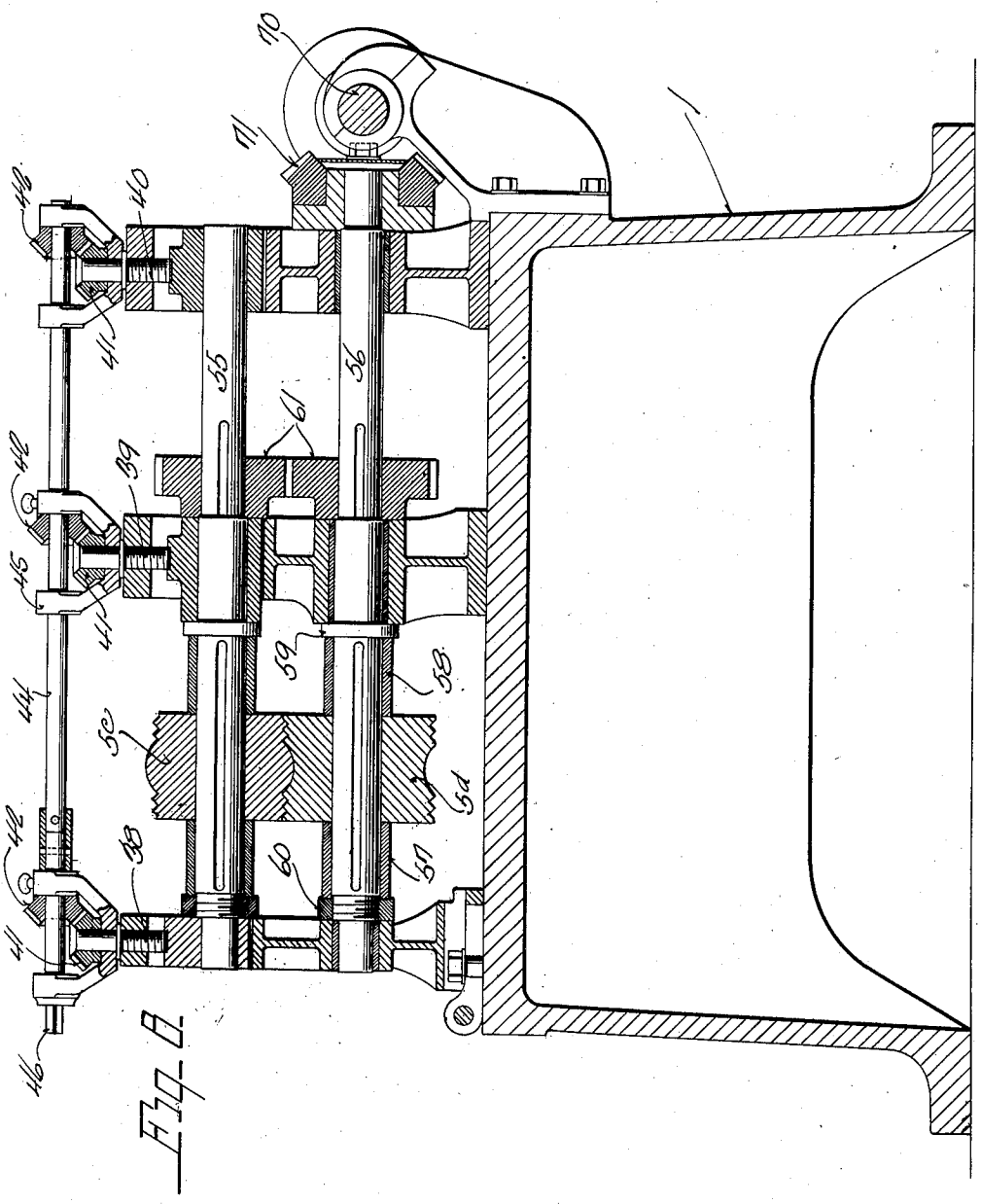


FIG. 8

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MACHINE FOR MAKING CORNER MOLDING, BEADING, AND THE LIKE

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Fig. 10.

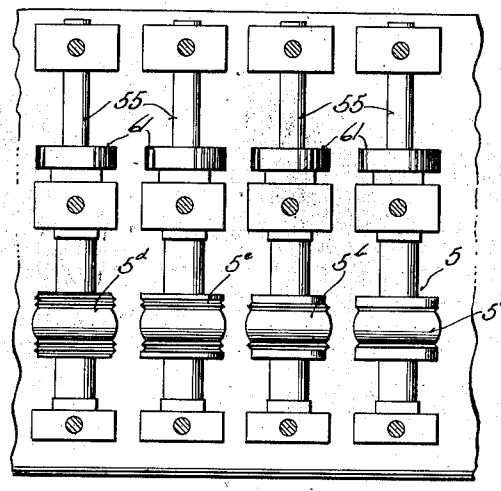


Fig. 9.

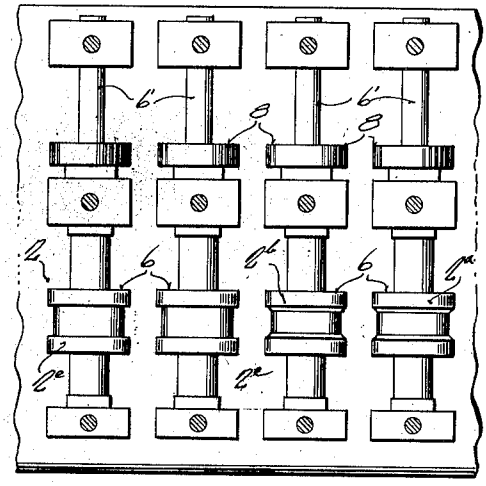


Fig. 12.

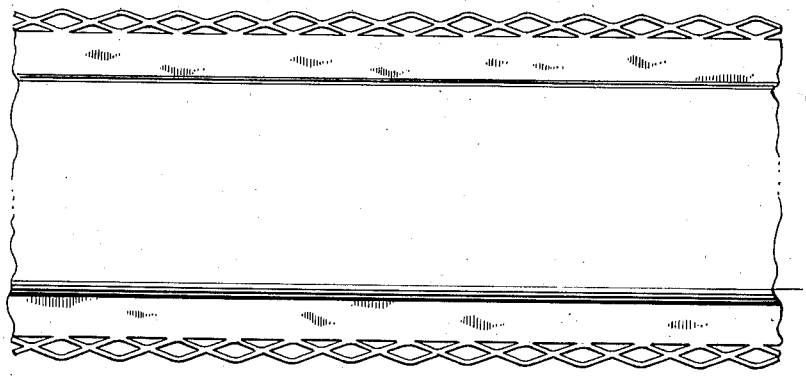
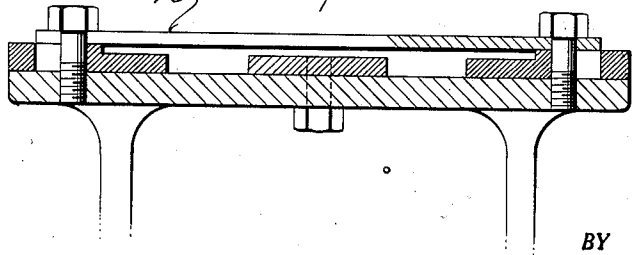


Fig. 11.



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Patented Nov. 27, 1934 1,982,466

UNITED STATES PATENT OFFICE

1,982,466

MACHINE FOR MAKING CORNER MOLDING, BEADING, AND THE LIKE

Lewis E. Curtis, Milwaukee, Wis., assignor to Milcor Steel Company, Milwaukee, Wis., a corporation of Delaware

Application July 13, 1931, Serial No. 550,352

10 Claims. (Cl. 164—6.6)

This invention relates to a machine for producing corner molding, corner bead, or like type of article, which has expanded metal wings adapted to be embedded in the plaster of the intersecting walls with which the molding or the like is associated whereby to support the molding in position.

One of the principal objects of the invention is to provide a machine of this character which utilizes rotary cutters for forming the expanded metal wings with continuous feed of the material through the machine as distinguished from reciprocating cutters with the intermittent feed of the metal thereby realizing the advantages of more rapid and economical production and which achieves this advantage without tearing the metal or impairing the clean quality of the cuts made in the metal to outline the meshes and connecting strands of the expanded metal wings of the corner molding. The body portion of the molding, bead, or the like, is suitably ridged and shaped during its progress through the machine by appropriate forming rollers.

Another object is to provide a machine of this character which is simple and durable in construction, reliable and effective in operation and easy and comparatively inexpensive to manufacture.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is a fragmentary view in side elevation showing a machine embodying the present invention;

Figure 2 is a view in transverse vertical cross section taken on line 2—2 of Figure 1;

Figure 3 is a view in longitudinal vertical section taken on line 3—3 of Figure 2;

Figure 4 is a view in end elevation looking toward the left hand end of the machine as viewed in Figure 1;

Figure 5 is a view in transverse vertical section taken on line 5—5 of Figure 1, with parts shown in elevation for the sake of illustration;

Figure 6 is a fragmentary plan view showing a plurality of cutters and illustrating the manner in which the cutters are progressively spaced greater distances;

Figure 7 is a diagram further illustrating the progressive variation in the spacing of the cutters;

Figure 8 is a view in transverse vertical cross section taken on line 8—8 of Figure 1;

Figure 9 is a fragmentary and diagrammatic view in top plan of the preliminary or initial forming rollers;

Figure 10 is a fragmentary diagrammatic view in top plan showing the final forming rollers;

Figure 11 is a sectional view taken on line 11—11 of Figure 1 and illustrating the structure of the feed table; and

Figure 12 is a diagrammatic plan view showing how the incisions are made in the blank to expand the wings of the molding or corner.

Referring to the drawings, it will be seen that the machine proposes a base or frame 1 which provides a support and a framing for sets or groups of initial or preliminary forming rollers 2, a series of cutters 3 and a set or group of final forming rollers 5. The forming rollers 2 are utilized for the purpose of giving the body portion of the molding or bead a channel form and setting off the wings thereof as distinct portions of the structure.

As will be understood from Figures 1 and 9, each set of forming rollers consists of an upper roller 6 and a lower roller 7, the rollers being mounted on shafts 6' and 7' and being constrained to rotation by intermeshing gears 8. The active peripheral surfaces of the rollers are shaped to develop the channel formation by a series of progressively increasing rolling or bending actions, as will be understood from Figure 9.

The several sets of cutters employed are of identical construction except that the spacing is progressively increased. As shown, each set of cutting mechanism comprises upper and lower shafts 10 and 11 supported for rotation in bearings provided therefor in frames or bearing brackets 12, 13 and 14 (see Figure 2). Each shaft 11 is offset rearwardly in the direction of feed of the work through the machine with respect to the shaft 10 of its cutter set for a purpose which will hereinafter appear.

A sleeve 15 is keyed on each shaft 11 and provides a mounting for circular cutters 16 and 17. The cutters 16 and 17 are spaced by means of a spacer 18 and are secured in proper position on the sleeve by virtue of the cutter 17 abutting a flange 19 of the sleeve and by virtue of the action of a nut 20 threadedly connected with the sleeve 15 and acting through a washer 21 to clamp the cutters between itself and the flange 19.

Coacting with each of the cutters 16 and 17 of each cutter set are cutter assemblies 23 and 24 mounted on and constrained to rotate with the

shaft 10. The cutter assemblies 23 and 24 although oppositely arranged are of identical construction and each consists of a rotary series of cutters 25 confined between a bearing block 26 keyed to the shaft 10 and an angular housing 27 also effectively secured to the shaft 10. The cutters are of non-circular cross section and due to this formation, to their interengagement and to the constraining action of the bearing block 26 and housing 27 are constrained to rotate with the shaft 10. In order to provide for a transverse adjustment the cutters are slidable transversely of their bearing block and within their housing and their transverse adjustment is controlled by means of a spacer 28 located between the bearing blocks and having flanges 29 abutting the cutters and also by set screws 30 threaded through the angular housing 27 engaging the inner ends of the cutters and secured in adjusted position by a lock nut 31. The transverse adjustment of the cutters is varied by adjusting the screws 30 and employing the proper size of intermediate spacer 28. In the construction shown, the spacers 28 between the cutter assemblies 23 and 24 are of progressively decreasing transverse extent in order to provide for the progressively decreasing spacing of the cutters from the inlet to the outlet end of the machine. The transverse dimensions of the spacers 18 between the lower cutters 15 and 16 is correspondingly varied. The entire assembly of cutters 23 and 24 on each shaft 10 is securely held in proper adjustment by means of a nut 32 threaded on the shaft and a stop collar 33 fixed thereon, the nut 32 acting through a washer 34 to bind or clamp the assembly between itself and the collar 33. Preferably, a washer 33' is also provided adjacent the collar 33.

Each shaft 10 has portions journaled in adjustable bearings 35, 36 and 37 slidable in guideways provided therefor in the frames 12, 13 and 14. The bearings 35, 36 and 37 may rest directly on the bottoms of their guideways or may be shimmed up to an appropriate extent and in either event are firmly held in position by means of screws 38, 39 and 40 threaded through the tops of the frames 12, 13 and 14 and bearing at their lower ends against the adjustable bearings 35, 36 and 37, respectively. Each screw 39 has a beveled gear wheel 41 fixed to its upper end and these beveled gear wheels 41 mesh with beveled gear wheels 42 secured to a transverse shaft 44 journaled in supporting yokes 45 carried by the bracket frames 12, 13 and 14. One end of each shaft 44 is squared or otherwise adapted as indicated at 46 for coaction with a wrench or operating handle. A similar support and adjustment is provided for the shafts 6' and 7' of the initial forming rollers 6 and 7.

The shafts 10 and 11 are constrained to appropriate rotation in opposite directions by means of gears 47 and 48 fixed on the shafts 10 and 11, respectively.

Referring now to Figure 3, it will be seen that the cutters 16 and 17, the cutter 16 being shown in Figure 3, are provided with transverse slots or grooves 50, which, as the cutters are rotated, come into alinement with the spaces between the cutters 25. It will be obvious that with this construction each cutter 25 makes an incision or cut of predetermined length and each slot or groove 50 in the cutters 16 and 17 provides for the provision in the metal or stock of an unbroken or uncut portion of predetermined length. Because of the fact that the cutters 16 and 17 are offset from the cutters 25, the cutters 16 and 17 not only have cutting edges of the cutters 25 to carry out the cutting action, but the peripheries of these cutters 16 and 17 providing an anvil or support for the metal from the time the cutter first engages the metal until the completion of the cutting action whereby to preclude tearing or irregular cutting thereof. During the cutting action the cutters 25 coact with the cutters 16 and 17 to make the incisions as described and also displace the strands resulting from the incisions downwardly over the edges of the cutters 16 and 17.

As will be understood from the diagrammatic view shown in Figure 7, the first set of cutters acts on the outer edge portions of the metal and each set acts on the next adjacent portion to the outer edge portion and so on until the metal adjacent the body of the molding is reached. The lines of cut are designated at C in the diagram (Figure 7).

In between each set of cutters the body of the molding is guided and sustained by cooperable guide shoes 51 and 52 secured respectively on a supporting shaft 53 and supporting bracket 54 (see Figure 5).

After the cutting action has been completed the metal blank is fed through the set of final forming rollers 5. Each set of final forming rollers differs only in the particular configuration of the working surface of the rollers, and as will be seen from Figure 10, the first set of forming rollers, designated at 5^a, transform the channel formation into slightly rounded form. The rounded formation is accentuated by the next set of forming rollers designated at 5^b and along each edge the ridge formation is initiated. In the succeeding sets of forming rollers, designated at 5^c and 5^d, the ridge formation is developed into its final form or shape.

As shown in Figure 8, the final forming rollers are keyed on shafts 55 and 56 supported in the same manner as the shafts 10 and 11. The transverse positioning of the rollers is effected by means of spacing sleeves 57 and 58 interposed between the rollers and a stop collar 59 and nut 60. Twin gears 61 keyed to the shafts 55 and 56 and intermeshing constrain these shafts to corresponding movement in opposite directions. After leaving the final forming rollers the completed corner molding has its wings straightened by virtue of their passing through straightening rollers 65 (see Figure 4).

The drive for the initial forming rollers 2, the cutters 3 and the final forming rollers 5 is taken from a shaft 70 extending along one side of the machine and driving the lower shafts of the forming rollers and of the cutter assemblies by means of beveled gearing 71.

In operation, a flat sheet of imperforate metal is fed into the right hand end of the machine as viewed in Figure 1 and is introduced through a stationary guide or feed table 75 (see Figure 12). The metal is first given the form of a flanged channel by the first or initial forming rollers 2^a, 2^b, and 2^c. The flanged and channeled formation then passes into the cutting mechanism and each set of cutters forms a longitudinal row of incisions beginning at their outer edges and progressing inwardly toward the body of the channel as the blank is fed through the machine. After the cutting action has been completed and the strands have been spread or displaced by the cutters, the body of the mold-

ing is given the curved and ridged formation in a manner hereinabove described.

Figure 12 illustrates the action of the first two sets of cutters. The remaining sets operate in exactly the same manner to expand the metal of the wings.

The invention claimed is:

1. A machine for cutting and expanding metal comprising a series of sets of rotary cutters of progressively decreasing transverse spacing and operable to successively form longitudinal rows of incisions in the metal and to displace the metal adjacent each incision downwardly and thereby expand the same, each set having a pair of lower circular cutters and cooperable circular series of upper cutters, the lower cutters being offset with respect to the upper cutters rearwardly with respect to the direction of feed whereby to support the metal when the same is being operated upon by the cutters to preclude tearing or irregular cutting and means for rotating said cutters.

2. A machine for cutting and expanding metal comprising a series of sets of rotary cutters of progressively decreasing transverse spacing and operable to successively form longitudinal rows of incisions in the metal and to displace the metal adjacent each incision downwardly and thereby expand the same, each set having a pair of lower circular cutters and cooperable circular series of upper cutters, the lower cutters being offset with respect to the upper cutters rearwardly with respect to the direction of feed whereby to support the metal when the same is being operated upon by the cutters to preclude tearing or irregular cutting.

3. A machine for cutting and expanding metal comprising cooperable upper and lower rotary cutters of progressively decreasing transverse spacing and operable to successively form longitudinal rows of incisions in the metal and to displace the metal adjacent each incision downwardly and thereby expand the same, the lower cutters being offset relative to the upper cutters and rearwardly with respect to the direction of feed whereby to support the metal when the same is being operated upon by the cutters to preclude tearing or irregular cutting.

4. A machine of the character described comprising a series of sets of rotary cutters of progressively decreasing transverse spacing, each set having a pair of lower combined cutters and anvils, and cooperable circular series of upper cutters designed to coact with the edges of the lower circular cutters to form incisions in the metal and to displace portions of the metal downwardly, said combined cutters and anvils being offset horizontally with respect to the upper cutters and rearwardly in the direction of the feed to provide a positive support for the metal blank when the upper series of cutters initially have contact therewith.

5. A machine of the character described comprising a frame, a series of pairs of preliminary forming rollers adapted to produce a flanged channel formation in a sheet of metal, a series of cooperable rotary cutters of progressively decreasing transverse spacing and operable to successively form longitudinal rows of incisions in the flanges of the channeled blank and to displace the metal adjacent each incision downwardly whereby to expand the flanges, cooperable guide shoes between each set of cutters and engageable with the body portion of the channeled blank, and a series of final forming rollers for ridging and curving the channeled body portion of the blank.

6. In a machine of the character described, a set of rotary cutters consisting of upper and lower shafts, circular cutters constrained to rotate with the lower shaft, a spacer between said cutters, a series of cutters on the upper shaft for each circular cutter of the lower shaft, a mounting for each series of circular cutters including a bearing block fixed to the shaft and on which the cutters of the series are slidably supported, an angular housing coacting with the cutters and with the bearing block to constrain the cutters to rotate with the upper shaft while leaving them free for transverse adjustment, a spacer disposed between the series of cutters and limiting their approach toward each other, and adjusting screws for forcing the circular series of cutters toward each other.

7. In a machine of the character described, a series of sets of rotary cutters, each set having a pair of lower circular cutters and cooperable series of upper cutters, the lower cutters being provided with peripheral slots, there being one slot for each space between the cutters of the upper series whereby the cutters will operate to make a plurality of incisions with uncut portions between adjacent incisions.

8. In a machine of the character described, a plurality of sets of rotary cutters, each consisting of upper and lower shafts, circular cutters constrained to rotate with the lower shaft, a spacer between said cutters, a series of cutters on the upper shaft for each circular cutter of the lower shaft, and a spacer between the series of cutters on the upper shaft, said spacers of the upper and lower shafts having correspondingly and progressively decreasing transverse dimensions from the inlet to the outlet end of the machine.

9. In a machine of the character described, a set of rotary cutters consisting of upper and lower shafts, circular cutters constrained to rotate with the lower shaft, a spacer between said cutters, a series of cutters on the upper shaft for each circular cutter of the lower shaft, a mounting for each series of circular cutters including a supporting member fixed to the shaft and on which the cutters of the series are adjustably supported, a housing coacting with the mounting member to constrain the cutters to rotate with the upper shaft, a spacer disposed between the cutters of the series and limiting their approach toward each other, and means for forcing the circular series of cutters toward each other and against the spacer.

10. A machine of the character described comprising a series of cooperable rollers engageable with a sheet of metal for appropriately shaping the body portion thereof and feeding the sheet through the machine and a series of sets of rotary cutters, said sets of rotary cutters being spaced longitudinally along the machine and the cutters of the several sets having a progressively decreasing transverse spacing, said cutters successively acting on edge portions of the sheet to slit and expand the same whereby to form the expanded metal wings.

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