



Nov. 7, 1939.

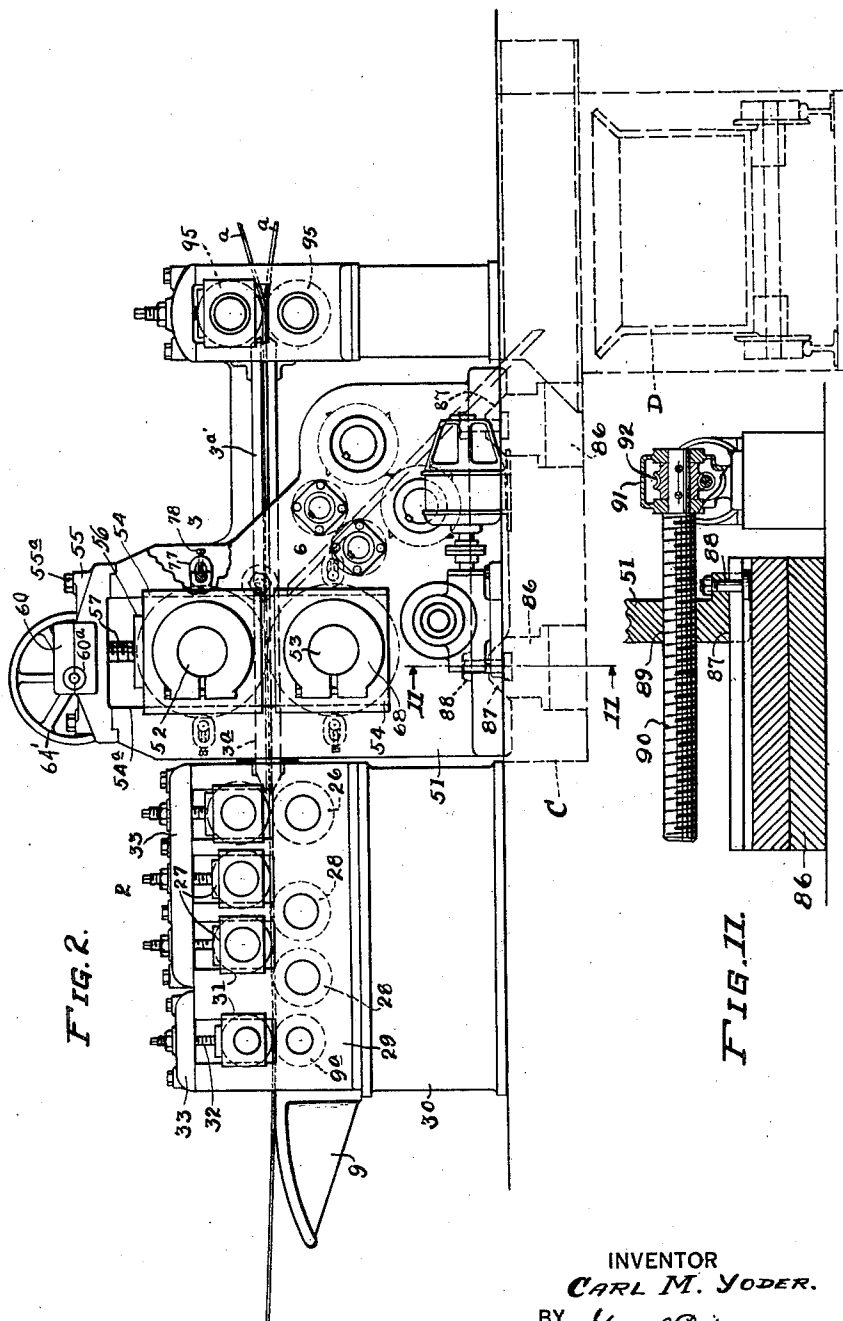
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 2



INVENTOR  
CARL M. YODER.  
BY *Geo. R. Pitts*  
ATTORNEY



Nov. 7, 1939.

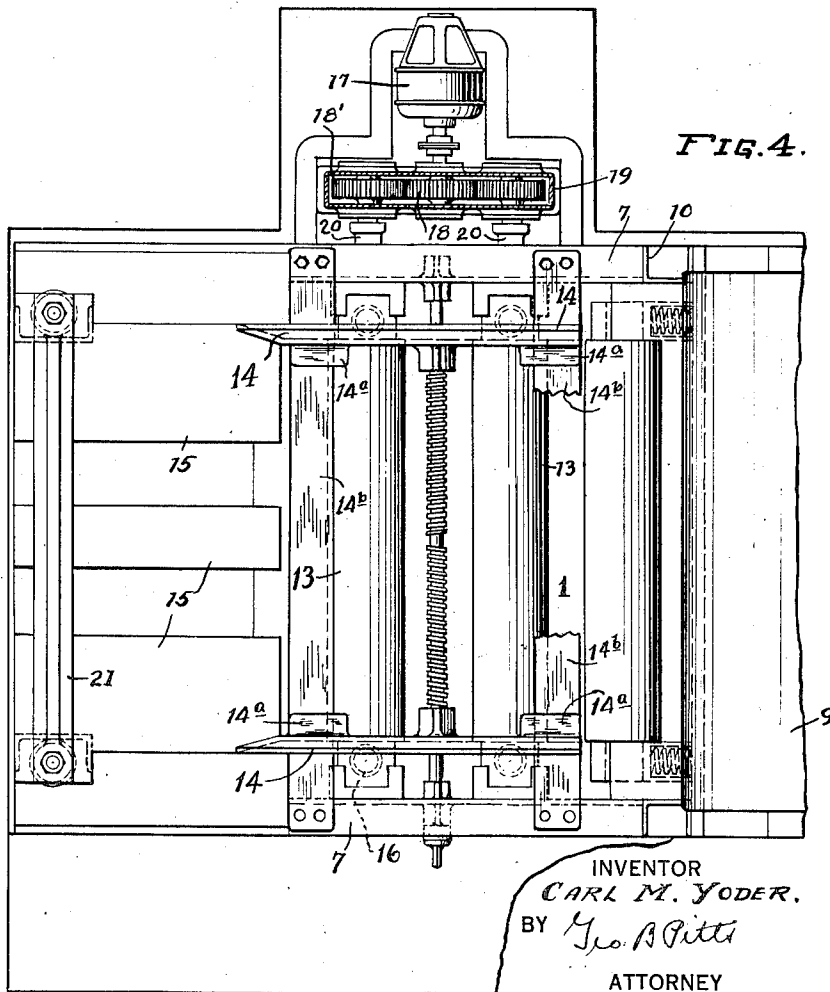
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 4



Nov. 7, 1939.

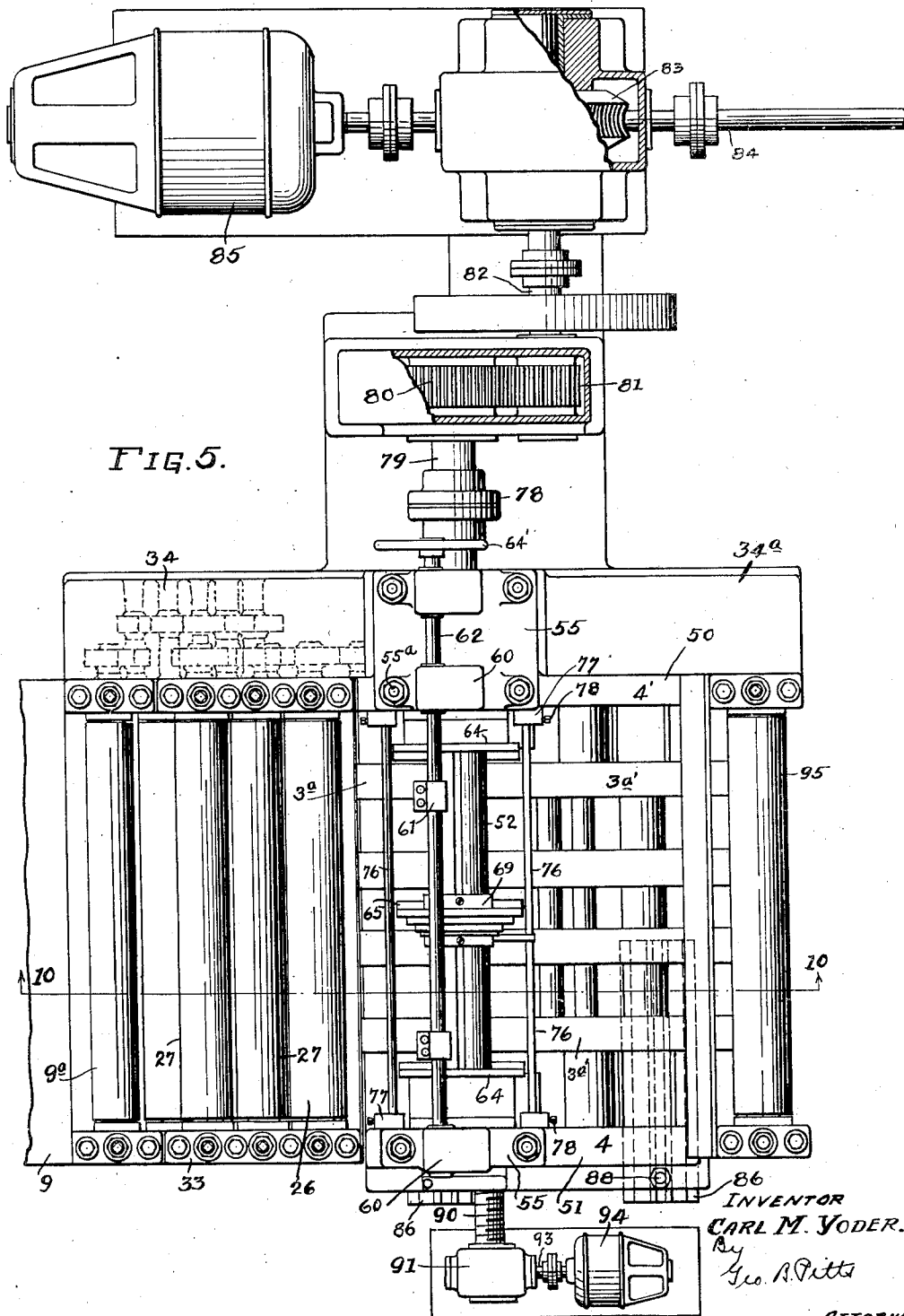
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 5



Nov. 7, 1939.

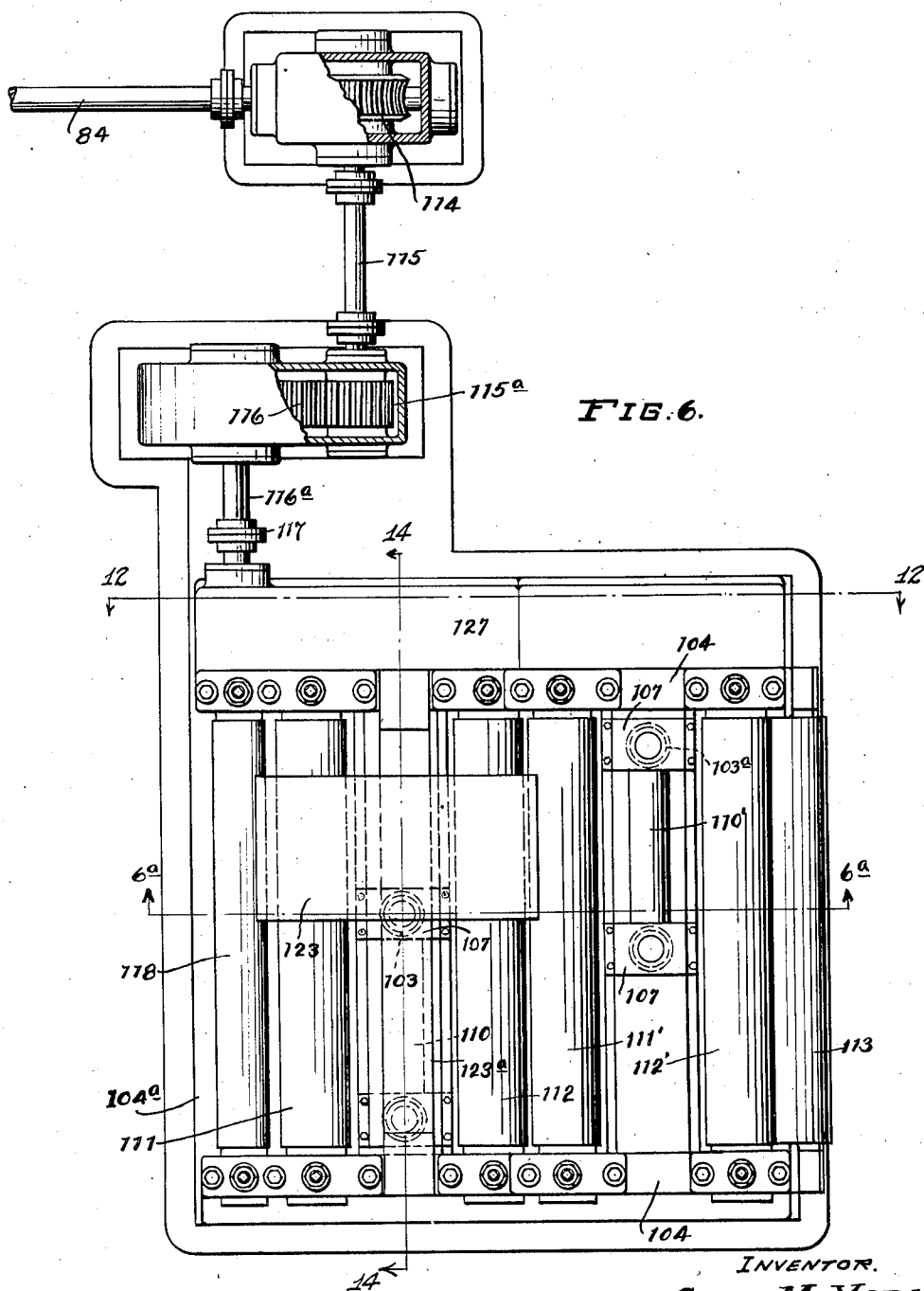
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 6



INVENTOR.  
CARL M. YODER.  
Geo. B. Pitts  
BY ATTORNEY

Nov. 7, 1939.

C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 7

FIG. 8.

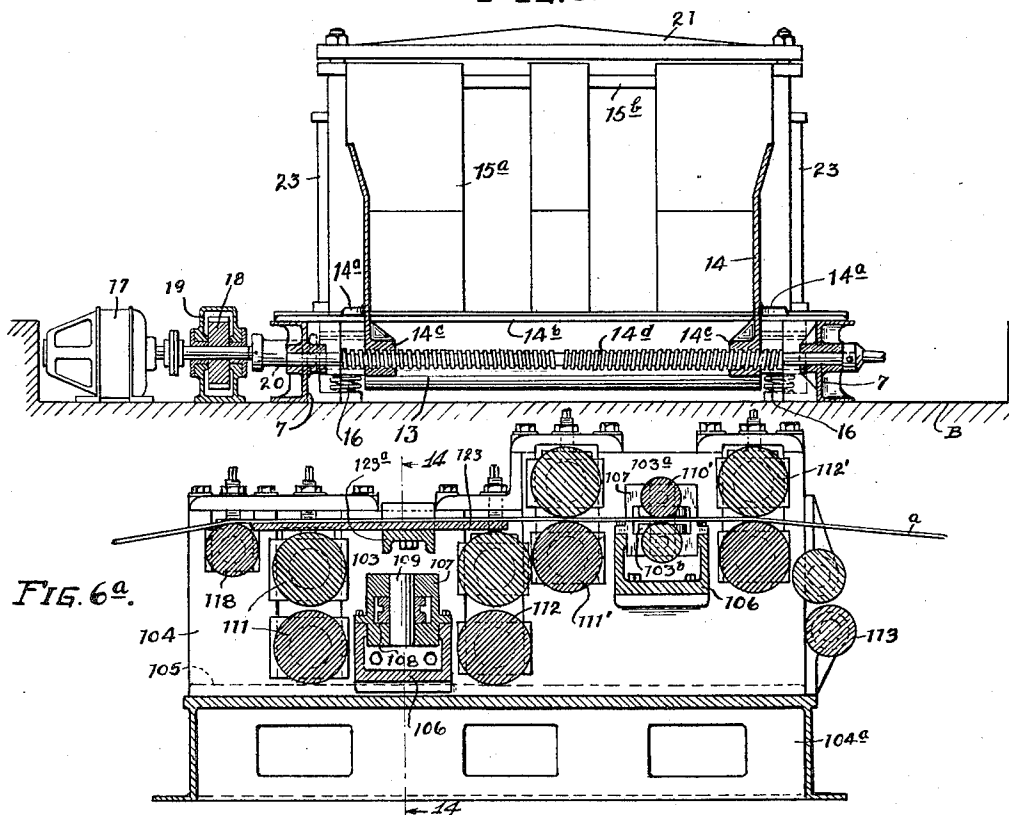


FIG. 6a.

INVENTOR  
CARL M. YODER.  
BY *Geo. B. Pitt*  
ATTORNEY

Nov. 7, 1939.

C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 8

FIG. 7

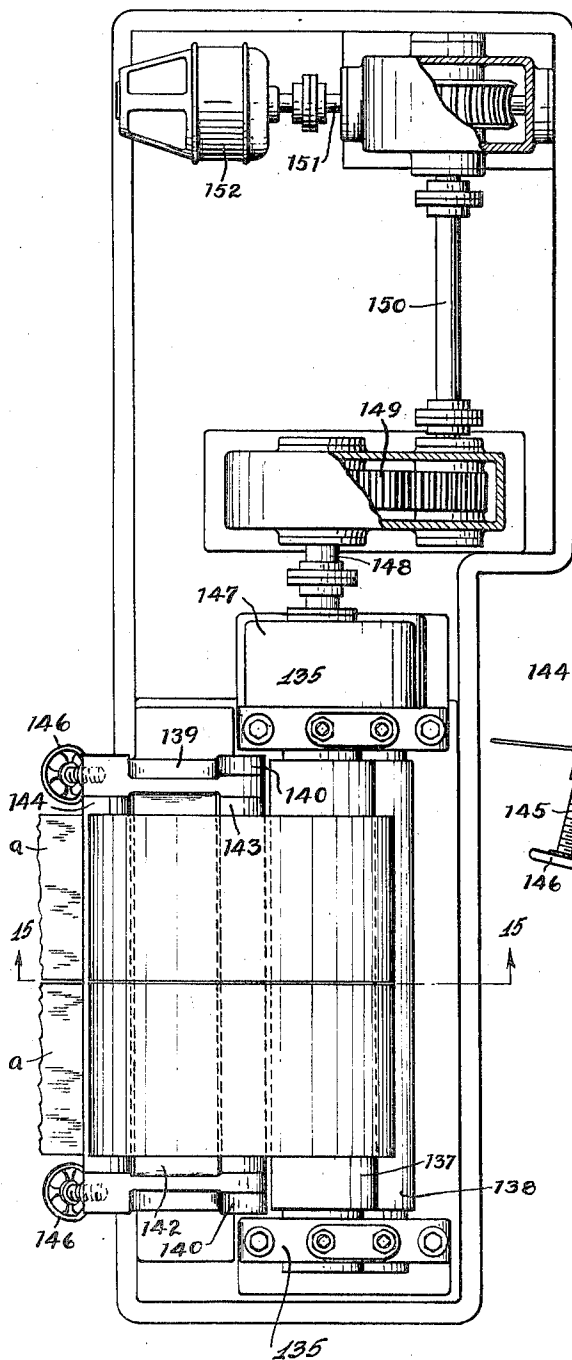
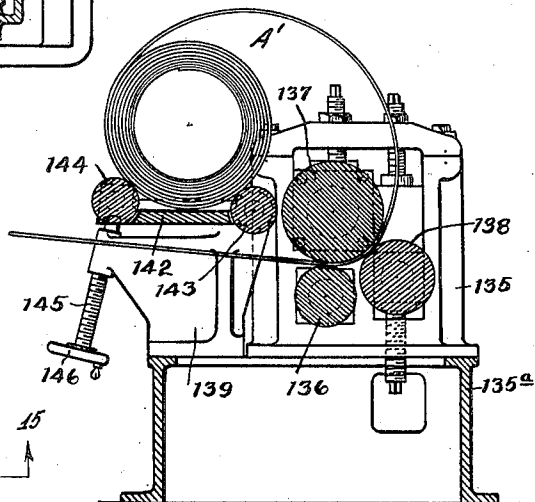


FIG. 15



INVENTOR  
CARL M. YODER.  
Geo. B. Pitts  
ATTORNEY

Nov. 7, 1939.

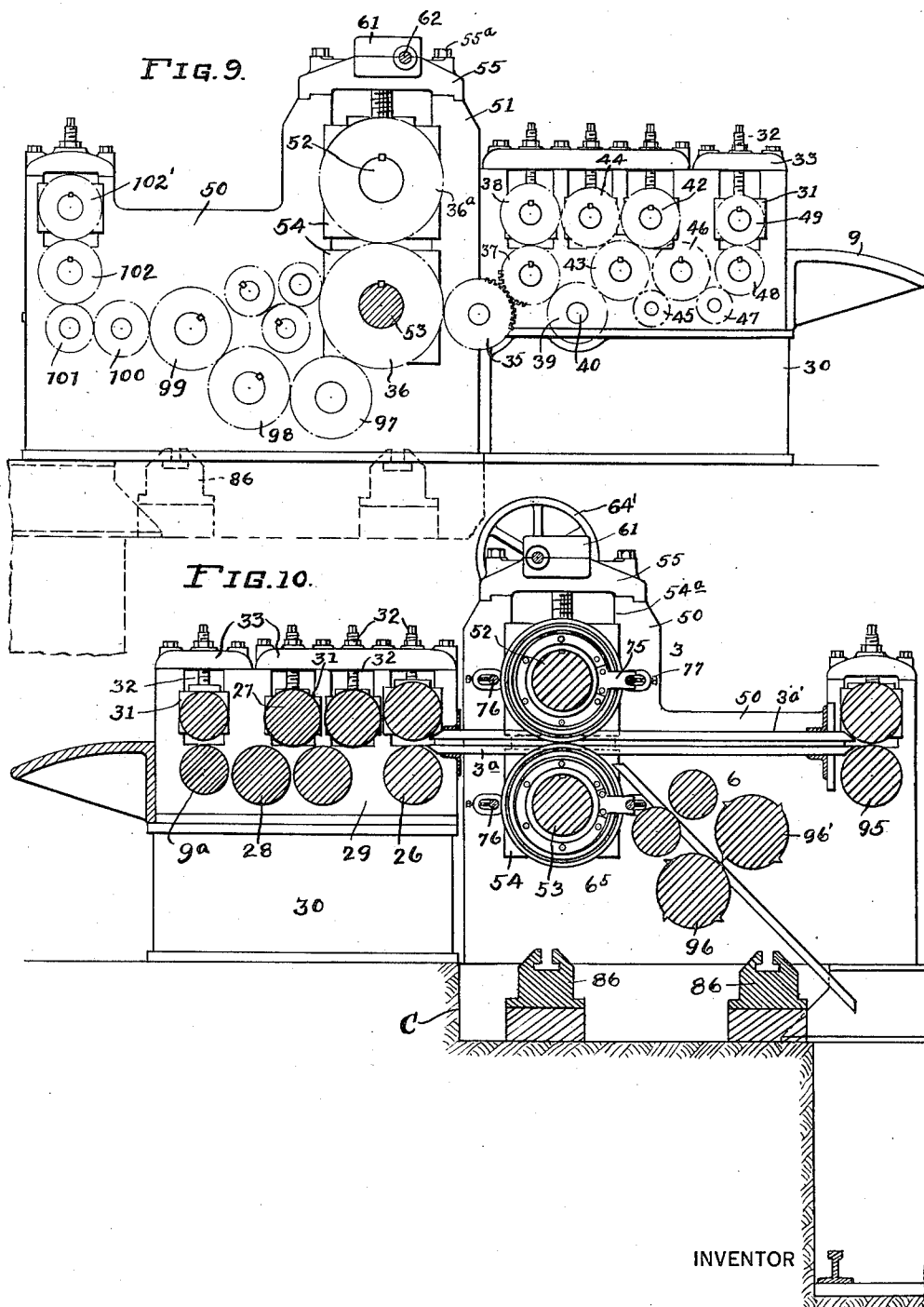
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 9



INVENTOR

CARL M. YODER.  
By Geo B Pitts  
ATTORNEY

Nov. 7, 1939.

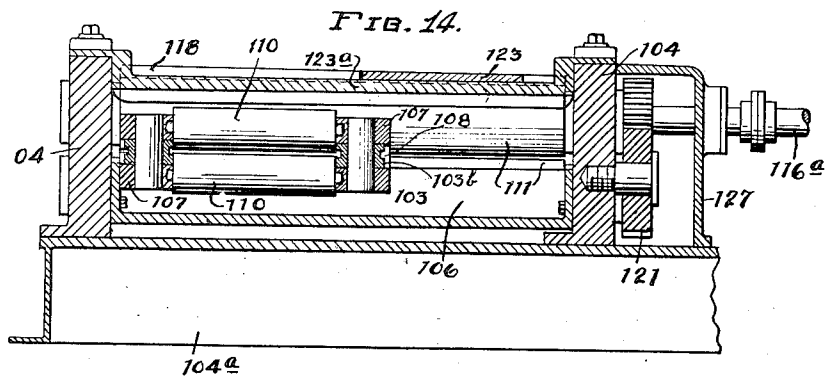
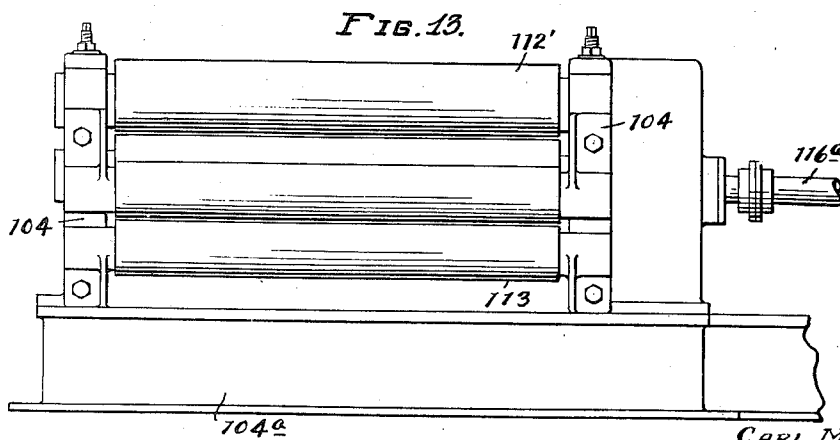
C. M. YODER

2,179,461

METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 10



INVENTOR.  
CARL M. YODER.  
BY Geo. B. Pitts ATTORNEY.

Nov. 7, 1939.

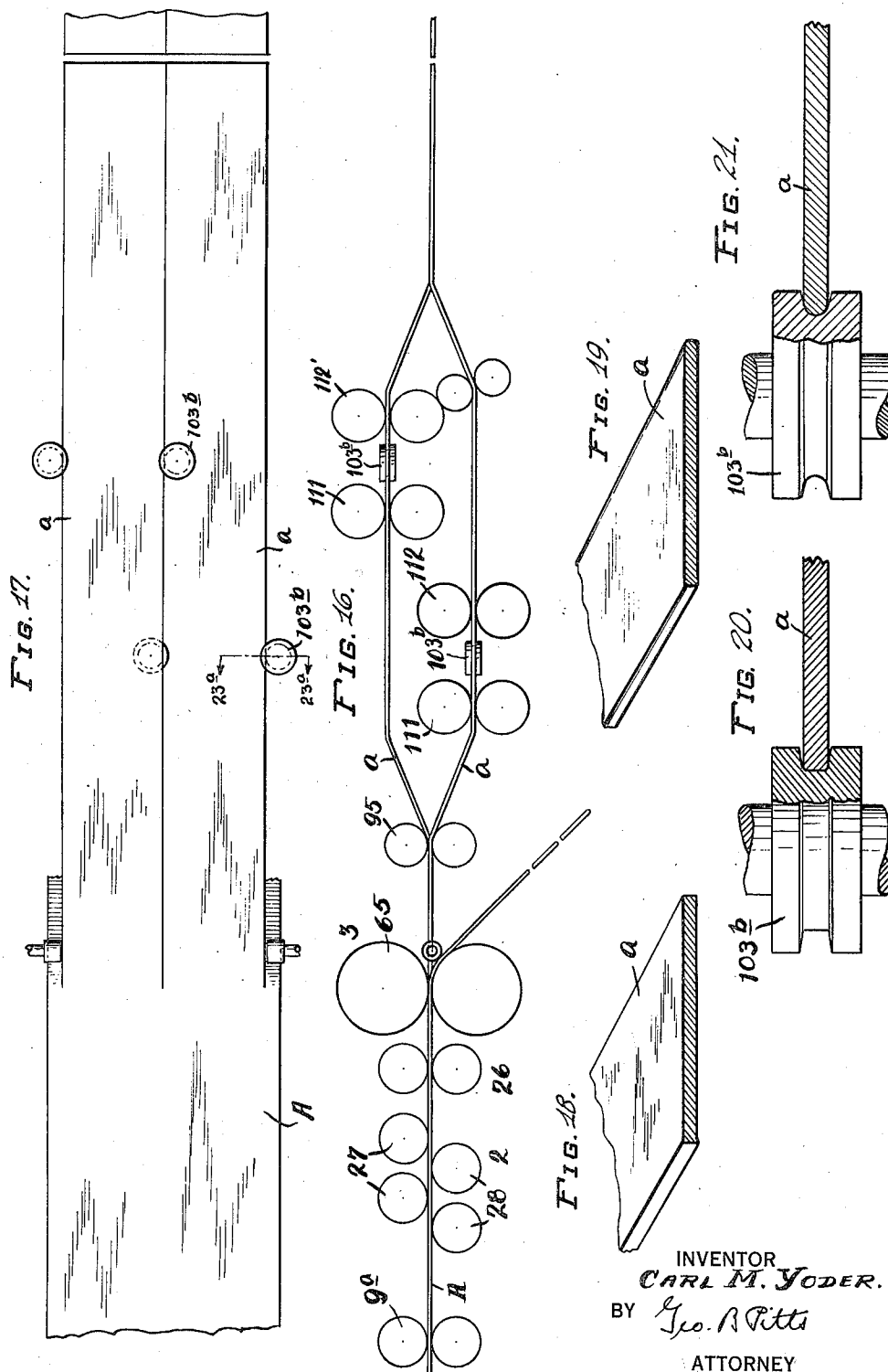
C. M. YODER

2,179,461

## METHOD OF OPERATING ON SHEET MATERIAL

Filed April 15, 1935

11 Sheets-Sheet 11



## UNITED STATES PATENT OFFICE

2,179,461

## METHOD OF OPERATING ON SHEET MATERIAL

Carl M. Yoder, Lakewood, Ohio

Application April 15, 1935, Serial No. 16,373

9 Claims. (Cl. 29—18)

This invention relates to a method or process for operating on sheet metal stock, that is hot or cold rolled, of varying width, thickness and length and fed continuously through the apparatus.

One object of the invention is to provide an improved process for trimming and finishing the side edge of sheet material ready for subsequent treatment.

Another object of the invention is to provide an improved process for simultaneously conditioning or finishing the opposite side edges of a plurality of sheet metal sections or strips.

Another object of the invention is to provide an improved process for cutting sheet metal stock into sections and simultaneously conditioning or finishing the side edges of the sections.

A further object of the invention is to provide an improved process capable of handling sheet stock, which is cold or hot rolled and of maximum width, cutting it into strips of a predetermined width and finishing the strips ready for subsequent manipulation or treatment and simultaneously coiling the strips to permit the handling or transportation of the material for any desired purpose.

A still further object of the invention is to provide an improved process of handling sheet stock, which is cold or hot rolled and of maximum width, processing the material, cutting it into strips of a predetermined width and finishing the edges of the strips ready for subsequent manipulation or treatment and simultaneously coiling the strips to permit the handling or transportation thereof.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein—

Figs. 1, 2 and 3 together show a side elevation of an apparatus embodying my invention, parts being broken away.

Figs. 4, 5, 6 and 7 together show a plan view of the apparatus.

Fig. 6a is a section on the line 6a—6a of Fig. 6.

Fig. 8 is a section on the line 8—8 of Fig. 1.

Fig. 9 is an elevation of that portion of the apparatus supporting the processing, cutting or slitting and scrap cutting mechanisms from the side of the apparatus remote from the side shown in Fig. 2.

Fig. 10 is a section on the line 10—10 of Fig. 5.

Fig. 11 is a fragmentary section on the line 11—11 of Fig. 2.

Fig. 12 is an elevation of that portion of the apparatus supporting the edge conditioning or finishing mechanism from the side of the apparatus remote from the side shown in Fig. 3; on the line 12—12 of Fig. 6.

Fig. 13 is an end elevation of the mechanism shown in Figs. 3 and 6 looking toward the left.

Fig. 14 is a section on the line 14—14 of Figs. 3, 6 and 6a.

Fig. 15 is a section on the line 15—15 of Fig. 7.

Fig. 16 is a diagrammatic view; this view also illustrating a modified arrangement in which the sections are cut transversely into lengths instead of being coiled.

Fig. 17 is a plan view of parts shown in Fig. 16.

Fig. 18 is a perspective fragmentary view of a cut section, showing the burrs thereon resulting from the cutting and trimming devices.

Fig. 19 is a view similar to Fig. 18 showing the edges of the section after passing the conditioning or finishing devices.

Fig. 20 is a fragmentary view, enlarged, showing the engagement of one finishing or edging device with one side edge of a cut section.

Fig. 21 is a fragmentary view similar to Fig. 20, but showing a slightly different form of construction.

The disclosed apparatus comprises a plurality of mechanisms correlated to uncoil the sheet metal material as it comes from the mill, to level or straighten the material, trim either or both edges of the material, finish the side edges of the material, cut the material longitudinally into sections each of a predetermined width, finish the opposite edges of each section and finally cut the section or sections into lengths or re-coil them ready for handling or transportation. Referring to the drawings, 1 indicates as an entirety the mechanism for supporting a coil A of sheet material and permitting the uncoiling thereof, 2 indicates as an entirety the mechanism for leveling or straightening the material, 3 indicates as an entirety the mechanism for trimming either or both side edges of the material and/or cutting it longitudinally into sections, 4 indicates as an entirety the mechanism for conditioning, finishing or rounding the opposite edges of the material or sections thereof, 5 indicates as an entirety the mechanism for re-coiling the material or the sections thereof, in the event the material or the sections thereof are not cut into lengths, as shown in Figs. 16 and 17, and 6 indicates a mechanism for cutting the trimmed-off portions or scrap into lengths or pieces. As the apparatus shown is intended to operate on sheet metal that is rela-

tively thick and of varying lengths, these mechanisms are mounted on separate bases or frames for convenience in manufacturing and setting. The apparatus may be constructed to accommodate sheet material of maximum width.

Of the mechanism 1 for supporting the coil of material A (see Figs. 1, 4 and 8), 7 indicates a pair of spaced channel members disposed in front of the processing mechanism 2 and connected by a plurality of cross members 8, these members being set into a pit B, so that the outer portion of the coil, when the latter is positioned, will feed substantially horizontally or be on a level with a guide device 9 and a pair of guiding and feeding rolls 9a of the leveling mechanism 2. 10 indicates a pair of uprights near the rear ends of the channel members 7. The channel members 7 and uprights 10 are provided with pairs of aligned guide devices 11 slidably supporting pairs of journal boxes 12, which in turn rotatably support the shafts 12' to which rollers 13, 13', are fixed, the rollers 13, 13', being supported in spaced relation by the channel members 7 and the roller 13' being supported by the uprights 10. As shown in Fig. 1, the coil of material A is supported on the rollers 13, which are driven, as later set forth, to rotate the coil to feed the material therefrom to the leveling mechanism 2. The roller 13' serves as an abutment to resist bodily movement of the coil due to the feed of the material, so that the coil may be maintained on the rollers 13 while uncoiling. The roller 13' is free to rotate to reduce friction when engaged by the coil. 14 indicates a pair of upright side plates arranged to be disposed at opposite sides of the coil to maintain it in position relative to the other mechanisms and prevent it from tipping laterally. The plates 14 are provided at their opposite ends with lugs 14a which slide on cross bars 14b fixed at their ends to the channel members 7. The central portions of the plates have depending portions terminating in hollow bosses 14c provided with right and left hand threads to engage correspondingly threaded portions on a shaft 14d. The shaft 14d is mounted in suitable bearings and one end thereof is extended and shaped to receive a tool, whereby it may be rotated, the effect of which is to move the plates toward or from each other. The upper portions of the plates 14 are inclined outwardly so that when the coil is lowered into position, it will be guided downwardly between the plates. The journal boxes 12 for the shafts 12' are yieldingly supported on coiled springs 16 and the boxes for the shaft 12' of the roller 13' engage coiled springs 16' so that these rollers may yield to compensate for any unevenness in the coil. The springs 16 serve to elevate the coil A as the weight thereof decreases due to feed of the material. As a result, that portion of the material which is being fed forwardly is maintained substantially on a level with the feed rolls 9a. The springs 16' permit the roller 13' to operate as a yielding abutment for the coil of material A. Any suitable means may be employed for driving the rollers 13, that shown comprising an electric motor 17 drivingly connected to a gear 18 within a casing 19 (see Fig. 8). The gear 18 meshes at its diametrical opposite sides with gears 18', also mounted in the casing 19. The latter gears are connected, preferably by suitable universal joints, to the outer ends of shaft sections 20, the inner ends of which are connected by suitable universal joints to the adjacent ends of the shafts 12'. This construction of driving connections permits the

rollers 13, 13', to move upwardly and downwardly and relative to each other while being driven. To position a coil of material A on the rollers 13, 13', and start the feed of the material, it is engaged by a suitable hoist mechanism so as to position the free end of the coil on the lower side of the latter. The coil is then lowered into engagement with the upper portion of the ramp 15 and its outer free end is clamped to the ramp, following which the hoist mechanism is lowered to permit the coil to unroll and roll down the ramp onto the rollers 13, these operations being shown in dotted lines in Fig. 1. Then the free end of the coil is unclamped or detached from the ramp and moved over to the guide 9. The motor 17 may then be driven to rotate the coil on the rollers 13 or the coil may be manually rotated to engage the free end of the material with and between the feed rolls 9a. The ramp 15 preferably comprises a plurality of upright members 15a supported in the pit B and suitably connected by cross members, one being shown at 15b; the coil engaging walls of the ramp are preferably of convex curvature. The upper portions of the members 15a form a base against which the free end of the material is detachably secured by a clamping device 21, as shown in Fig. 1. The device 21 is preferably constructed and arranged to extend from side edge to side edge of the material, for which purpose the device is preferably movably supported at its opposite ends, for example, by piston rods 22 connected to pistons within cylinders 23. A suitable fluid, such as compressed air, may be supplied by a pipe 24 and by means of a suitable control valve 25, the air may be injected into the cylinders through pipes 24a, to either side of the pistons to operate the device to clamp the material A or release it. When the air is injected into the cylinders at one side of the pistons, any air therein at the other side escapes by suitable bleed valves (not shown).

The leveling mechanism comprises the front feed rolls 9a, rear feed or delivery rolls 26, which feed the material to guides 3a of the trimming and cutting mechanism 3, and related intermediate upper and lower rolls 27, 28, any number of which may be provided. The peripheries of the rolls 27, 28, are spaced less than the thickness of the material and when desired they may intersect a plane lying midway between their axes, the purpose being to flex or bend the material in opposite directions on transverse lines, during feeding of the material, to level it, so as to remove therefrom wrinkles, distorted portions and unequal stresses in the metal, whereby the material may be accurately manipulated and shaped or re-shaped by dies or other apparatus for various purposes and uses. In the construction shown for purposes of illustration the lower rolls 9a, 26 and 28 are mounted in fixed bearings provided in standards 29, which are mounted on a suitable support 30, whereas the upper rolls 9a, 26 and 27 are independently adjustable vertically dependent upon the thickness of the material. Each upper roll is mounted in a pair of journal boxes 31 slidably fitting the walls of openings formed in the standards 29, these boxes being preferably connected to the lower ends of screws 32, which are arranged to rotate relative to the boxes. The upper ends of the screws are threaded through openings formed in bridge members 33, so that by rotating the screws the boxes may be raised or lowered. The bridge members 33 are suitably secured to the standards 29.

By preference, all of the rolls 9a, 26, 27 and 28

are positively driven. For this purpose these rolls have at one side, extended ends carrying gears enclosed in a casing 34 (see Figs. 5 and 9), the casing being secured to the adjacent standard in any desired manner. 35 indicates a gear preferably driven by a driven gear 36 of the driving means for the mechanism 3. The gear 35 meshes with a gear 37 fixed to the shaft of the lower roll 26; the gear 37 in turn meshes with a gear 38 fixed to the shaft of the upper roll 26. The gear 37 also meshes with and drives an idler 39, which is fixed to a shaft 40 mounted in the outer wall of the casing 34. The shaft 40 carries a gear which is fixed to the shaft of the adjacent roll 28 to drive the latter and which meshes with a gear 42 fixed to the shaft of one of the rolls 27 (right hand roll 27 as viewed in Fig. 9) to drive it. The shaft for the roll 28 carries a second gear 43 (see dotted lines in Fig. 5) in a plane outwardly of the gears 39, 41 and 42, the second gear 43 meshing with a gear 44 fixed to the shaft of the other roll 27. The gear 43 also meshes with an idler 45 which in turn meshes with a gear 46 fixed to the shaft of the other roll 28. The gear 46 operates through an idler 47 to drive a gear 48 fixed to the shaft of the lower roll 9a, the gear 48 meshing with a gear 49 fixed to the shaft of the upper roll 9a. As shown and above described, all of the rolls 9a, 26, 27 and 28 are driven and have the same peripheral speed.

Referring to the mechanism 3 for trimming either or both edges of the material and/or cutting the material into longitudinal sections of any predetermined width: 50, 51, indicate a pair of standards, the former being mounted on the flooring or a suitable bed and the latter being mounted for adjustment transversely to the direction of feed of the material A, as later set forth. The standards 50, 51, support the opposite ends of upper and lower shafts 52, 53, by means of pairs of suitable journal boxes 54. As shown in Figs. 2, 9 and 10, the boxes have grooved side walls which slidably fit the sides of openings 54a formed in the standards, the boxes 54 for the shaft 53 preferably resting on the bottoms of the openings 54a and the boxes 54 for the shaft 52 being adjustably supported by bridge members 55 bridging the openings 54a and removably fixed to the upper ends of the standards 50, 51, by bolts 55a. The adjusting devices for each upper journal box comprise the following: 56 indicates an inverted cup-shaped member suitably secured to the top of the adjacent box 54 for the upper shaft 52 and formed in its top wall with an opening. 57 indicates a screw having a head rotatably fitting the member 56, the shank of the screw extending loosely through the opening and its upper end portion being threaded into an opening 58 formed in the adjacent bridge member 55, whereby the screw is supported by the bridge member 55 and adjustable endwise when rotated to raise or lower the adjacent journal box. The free end of the screw shank is keyed to but slidably fits into a worm gear (not shown). The bridge member 55 is shaped to co-operate with a casting 60 to form a gear box for the worm gear and a worm for driving it, the worm being fixed to a shaft 62 which carries the worm for the worm gear for adjusting the other box 54. Each bridge member 55, interiorly of the gear box, is formed with an annular gear engages when being driven. The walls of each bridge member 55 and the adjacent casting 60 are provided with thickened related walls 60a, which form bearings for the shaft 62. The shaft 62 carries an operating device, preferably a hand

wheel 64', at one end, whereby the shaft may be rotated. If the shaft 62 is rotated, the worms fixed thereto will be driven and they in turn will rotate the worm gears; the latter in turn will rotate the screws 57, which, having threaded engagement with the walls of the openings, will raise the adjacent boxes 54 or permit them to gravitate downwardly (the slidable but non-rotatable connections between the gears and upper ends of the screws 57 permitting of either operation), whereby the shaft 52 will be adjusted relative to the shaft 53 to properly correlate the active edges of the cutting devices, as hereinafter set forth. The shaft 62 may be formed in sections, the adjoining ends of which are connected by clamping devices 61. I provide at the ends of the shafts 52, 53, sets of devices 64 for trimming the longitudinal side edges of the material to a predetermined width and intermediate the ends of the shafts 52, 53, I provide a set of slitting or cutting devices 65 to cut the material into sections a, a, of equal or predetermined unequal widths. As the standard 51 is adjustable the adjacent set of trimming devices 64 are preferably mounted for adjustment therewith. The trimming devices at the opposite ends of the standards may be similarly mounted; for example, as shown in my co-pending application, Serial No. 12,818, filed March 25, 1935.

No claim is made herein to the mounting of the trimming devices, the assembly of such mounting with the journal boxes and adjustment of these parts with the adjacent standard as that forms in part the subject-matter of the aforesaid application.

The slitting devices 65 are also mounted for movement into and out of operative relation, each being provided with an operating arm which is locked in either position by a rod 76. The rod 76 is slidably supported at its opposite ends in horizontal guides 77 provided on the inner walls of the standards 50, 51. Each rod 76 may be held in the notch of the adjacent arm 75 by a set screw 78. The mountings for the devices 65 are indicated at 69. A gear 36 is fixed to the shaft 53, which is driven, and meshes with a gear 36a fixed to the shaft 52 to drive the latter. The shaft 53 is connected through a coupling 78 to a shaft 79 having a gear 80. The gear 80 meshes with a pinion 81 on a countershaft 82 which is provided with a worm gear 83. The gear 83 meshes with a worm fixed to a shaft 84, which is driven by a motor 85.

To permit of adjustment of the standard 51, I provide a pair of spaced sills 86 provided in a pit C and having oppositely inclined walls forming ways for grooves 87 formed in the lower end of the standard 51. The sills 86 are formed with longitudinal T slots for bolts 88 by means of which the standard may be adjustably secured to the sills. 89 indicates a threaded opening formed in the standard 51 and arranged to receive a feed screw 90, which, when rotated and upon loosening of the bolts 88, serves to move or adjust the standard along the sills 86. The outer end of the screw is preferably power driven, such end being mounted in the side walls of a casing 91 and fixed to a worm gear 92 disposed between said side walls, the gear in turn meshing with a worm fixed to a shaft 93, which is driven by a motor 94.

As the material A moves to and through the trimming and slitting mechanism 3, its marginal edges are trimmed off by the devices 64 and cut or slit longitudinally by the devices 65. As only

one set of slitting devices are shown, the material A may be cut into two sections of equal or unequal width, depending upon the transverse adjustment of the devices 65; but more than one set of devices 65 may be provided when desired. By positioning the devices 65 in an inoperative position, the slitting operation may be omitted as the material feeds forwardly. As the trimming and slitting devices are mounted on the same shafts, these operations are effected simultaneously but this arrangement is not an essential feature of my invention. The trimmed-off marginal edges are directed downwardly to the scrap cutting mechanism 6, which is shown diagrammatically and preferably is similar to that shown in my aforesaid co-pending application. No claim is made to this mechanism or to it in combination with a trimming mechanism as that forms in part the subject-matter of said co-pending application. The scrap or trimmed-off material is cut into suitable lengths and gravitates into a receiver D (see Fig. 2).

From the trimming devices 64 and slitting devices 65, the material A is guided by and between pairs of guide members 3a' to a set of feed rolls 95, which are preferably driven in the following manner through a gear train, within a casing 34a, certain of the gears serving to rotate the scrap cutters 96, 96', of the mechanism 6 (see Fig. 9): 97 indicates a gear in mesh with the gear 36. The gear 97 meshes with a gear 98 fixed to the shaft for the scrap cutter 96'. The gear 98 meshes with a gear 99 fixed to the shaft of the scrap cutter 96'. The gear 99 through idlers 100 and 101 drives a gear 102 fixed to the shaft of the lower feed roll 95 and the gear 102 meshes with a gear 102' fixed to the shaft of the upper feed roll 95.

From the feed rolls 95 the sections a pass to the edge conditioning or finishing mechanism 4 having a plurality of sets of devices, one set for each section a, two sets being herein shown and indicated at 103, 103a. As the sections a are in edge to edge relation when slit, the sets of devices 103, 103a, are so arranged that they may condition, finish or round the side edges of both sections simultaneously, while providing for the continuous feed of the sections to a mechanism for cutting them into uniform lengths, as shown diagrammatically in Figs. 16 and 17, or to a mechanism for simultaneously coiling the sections, as shown in Figs. 3, 7 and 15. In this arrangement, one section is guided out of the plane in which the other section feeds or moves, but by preference both sections are guided to and fed in spaced planes above and below the plane in which the material moves through the leveling mechanism 2 and trimming and slitting mechanism 3, and the sets of edging devices are in these spaced planes, respectively. The sets of devices 103, 103a, may be positioned in different vertical planes as shown in Figs. 3, 6, 16 and 17. Referring to Figs. 3, 6, 6a, 13 and 14, 104 indicates standards suitably mounted on a base 104a. 106 indicates a U-beam having end walls suitably secured to the standards 104. 107, 107, indicate a pair of supports provided on their opposite sides with lugs removably and adjustably secured to the sides of the beam 106, for supporting one set of finishing or edging devices (set 103). Each support is formed with an opening 108 and its upper and lower walls are formed with aligned openings to support a vertical shaft on which an edging device 103b freely rotates. The device 103b comprises a roller formed with a groove

shaped to receive the adjacent marginal edge of the section, the bottom of the groove engaging the lateral surface of the edge and the sides of the groove engaging the opposite faces of the section. The edging devices 103b are in opposed contacting relation so as to engage the opposite side edges of the section in the same transverse plane. As shown in Fig. 18, each section a as it leaves the trimming and slitting devices is rough and provided with burs, so that by passing the section to and between a pair of edging devices the metal of the edges is finished, smoothed, conditioned or rounded as may be desired, to eliminate the roughness and burs and condition them for welding or other purposes. As shown in Figs. 19 and 20, the edges of the section may be finished to be disposed at right angles to the surfaces thereof or, as shown in Fig. 21, these edges may be rounded. By preference, I associate with the edging devices a pair of holders 110 which engage the upper and lower surfaces of the section to prevent distortion or buckling of the section while being engaged by the edging devices. In the form of construction shown in these views, the holders comprise a pair of freely rotatable rolls 110. The axes of the rolls 110 are disposed in the plane cutting the axes of the edging devices 103b. The rolls 110 are provided at their opposite ends with stud shafts which loosely rotate in bearings provided in the upper and lower walls of the supports 107. 111, 112, indicate pairs of driven feed rolls disposed forward and rearward of the set of edging devices 103 and serving to guide and feed the section in the plane of the grooves in the devices 103b. From the feed rolls 112 the section a passes to and between a pair of guide rolls 113 suitably mounted at the rear ends of the standards 104 and from the latter rolls the section a may lead to the coiling mechanism 5.

The feed rolls 111, 112, of each pair are preferably mounted similarly to the feed rolls 9a and 26, but are driven in the following manner (see Fig. 6): 114 indicates a worm gear in mesh with a worm fixed to the shaft 84. The worm gear 114 is fixed to a shaft 115 carrying a pinion 115a which is in mesh with a gear 116, the gear in turn being fixed to a shaft 116a. The shaft 116a is connected through a coupling 117 to one end of the shaft of a guide and feed roll 118 to which reference will later be made. The opposite end of the shaft for the roll 118 carries a gear 119 (Fig. 12) which meshes with a gear 120 fixed to the upper feed roll 111. The gear 120 meshes with a gear 120a fixed to the shaft for the lower feed roll 111 and the latter gear, through an idler 121 drives a gear 122 fixed to the shaft for the lower feed roll 112. The gear 122 meshes with a gear 122a fixed to the shaft for the upper feed roll 112.

The other section a of the material is guided and fed by the roll 118 (already referred to) and a plate 123 to the set of edging devices 103a. The plate 123 is mounted on a cross bar 123a secured at its ends to the standards 104. The set 103a is arranged in a plane above the set 103 and spaced longitudinally of the direction of feed of the material, but in alignment with the adjacent section a. The set of devices 103a comprise opposite related edging devices constructed and mounted similarly to the set of devices 103 already referred to, to engage the opposite edges of the section and have associated with them holders 110' which engage the adjacent section a in line with the edging devices, these rolls being constructed and mounted in the same manner as

the rolls 110, 111', 112', indicate pairs of feed rolls disposed forward and rearward of the set of devices 103a. The feed rolls 111', 112', are mounted similarly to the rolls 111, 112, and are driven as follows (see Fig. 12): 124 indicates a gear fixed to the shaft for the lower feed roll 111' and in mesh with and driven by the gear 122a. The gear 124 also meshes with a gear 124a fixed to the shaft for the upper feed roll 111' and with an idler 125. The idler 125 meshes with a gear 126 fixed to the shaft for the lower feed roll 112' and the gear 126 in turn meshes with a gear 126a fixed to the shaft for the upper feed roll 112'. The gears above referred to are enclosed in a suitable casing 127.

The re-coiling mechanism 5 comprises the following: 135 indicates a pair of spaced standards mounted on a support or base 135a. 136, 137, 138, indicate a set of driven rolls between which the sections a, a, feed in side by side relation (see Fig. 7), these rolls being so arranged that they co-operate to bend or curve the sections as this feeding takes place. The shafts for these rolls are suitably mounted in journal boxes mounted in the standards, the boxes for the shafts of the rolls 137, 138, respectively, being adjustable to insure the desired curvature, so that the sections, will readily wind into coils A', as shown. 139 indicates a bed mounted on the base 135a forward of the standards 135. At its opposite ends the bed is formed with up-standing lugs 140 having openings to receive and support a rod or shaft 141, on which is pivoted a shelf 142. The shaft 141 supports a roller 143 which co-operates with a roller 144 suitably mounted on the outer end of the shelf 142, to support the coils A'. As the rollers 143, 144, are free to rotate, they permit each coil to rotate about its axis due to the feed of the section a from the rolls 136, 137, 138. The shelf 142 is supported at its outer end by a pair of screws 145 threaded through openings formed in the walls of the bed 139. The screws 145 are provided with hand wheels 146 for rotating them to swing the shelf upwardly to a desired position to accommodate the coil when the first convolution thereof is produced. As the coil A' increases in diameter, due to the progressive coiling action, the shelf 142 may be adjusted downwardly to compensate for such increase. The shafts for the rolls 136, 137, 138, are driven through suitable gearing in a casing 147 by a shaft 148, the shaft being driven through reducing gears 149 by a shaft 150, which in turn is driven through a worm and worm gear by the shaft 151 of a motor 152.

It will be understood that the driven elements of each mechanism have the same peripheral speed and that these elements of all the mechanisms are driven at speeds which insure a uniform feed of the material to prevent slack or buckling thereof while passing from one mechanism to the other.

To those skilled in the art to which my invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. My disclosures and the description herein are purely illustrative and not intended to be in any sense limiting.

What I claim is:

1. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof processing the material to straighten the strip into a plane, then slitting the material into

longitudinal sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously cutting the sections into lengths suitable for subsequent handling.

2. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof processing the material to straighten the strip into a plane, then slitting the material into longitudinal sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously coiling the sections separately.

3. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof processing the material to straighten the strip into a plane, then simultaneously trimming one marginal side edge of the material and slitting the material longitudinally into sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously cutting the sections into lengths suitable for subsequent handling.

4. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof processing the material to straighten the strip into a plane, then simultaneously trimming one marginal side edge of the material and slitting the material longitudinally into sections of the desired width, then finishing the opposite side edges of each section while advancing in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously coiling the sections separately.

5. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof slitting the material into longitudinal sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously cutting the sections into lengths suitable for subsequent handling.

6. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof slitting the material into longitudinal sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously coiling the sections separately.

7. The herein disclosed continuous process which consists in feeding a strip of sheet material of finished thickness and during the feeding thereof simultaneously trimming one marginal side edge of the material and slitting the material longitudinally into sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously cutting the sections into lengths suitable for subsequent handling.

8. The herein disclosed continuous process which consists in feeding a strip of sheet mate-

- rial of finished thickness and during the feeding thereof simultaneously trimming one marginal side edge of the material and slitting the material longitudinally into sections of the desired width, then finishing the opposite side edges of each section while advancing the sections in spaced parallel planes, one parallel to the unsevered strip, and finally simultaneously coiling the sections separately.
- 5 9. The continuous process of shaping a sheet material stock of finished thickness which consists in progressively straightening the sheet into a plane, slitting it longitudinally into continuous strips of the desired width, edging the strips as fed from the slitting operation while in a plane 5 parallel with that of the straightened sheet and without twisting the said strips, and finally separating and shaping the strips for subsequent handling.
- 10

CARL M. YODER. 10