J. B. McKIBBIN.
APPARATUS FOR MANUFACTURE OF METALLIC BANDS.
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2 SHEETS—SHEET 2.

Witnesses:

Wittke
Fred. Steil.

Inventor:

John B. McKibbin
his attorney.
To all whom it may concern:

Be it known that I, JOHN B. MCKIBBIN, a citizen of the United States, residing at Crafton, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Manufacture of Metallic Bands, of which the following is a specification.

My invention relates to the art of manufacturing bands or strips of sheet metal and particularly relates to the manufacture of hoop iron, cotton ties, and the like.

The invention has in view to accomplish the making of a plurality of comparatively narrow longitudinal strips or bands and consists in the hereinafter described mechanism for slitting a sheet metal blank longitudinally into a plurality of such strips, guiding means for the severed strips, and means for finishing or rounding the edges of each strip, in a continuous operation.

This application is a continuation of my former application filed April 5, 1910, Serial No. 555,691.

In carrying out my invention, I employ specially designed and constructed slitting mechanism, means for treating the opposite edges of each individual strip to finish the same, with means between the slitting and finishing mechanism adapted to automatically guide the severed slits and impart a continuous spiral deflection to them as they pass through the slitting mechanism and to introduce them individually in changed position to the edge finishing mechanism. The apparatus by which they are carried out as hereinafter claimed, are illustrated in the accompanying drawings in which:

Figure 1 is a plan view, partly in section, showing the assembled apparatus. Fig. 1' is a detail view illustrating the end of the blank as it may be prepared for introduction to the slitting mechanism. Fig. 2 is a longitudinal sectional view, indicated by the line II, II. of Fig. 1. Fig. 3 is an enlarged sectional detail view through the slitting mechanism, indicated by the line III, III. of Fig. 1. Figs. 4, 5 and 6 are enlarged sectional detail views, indicated by the section lines IV, IV', V, V and VI, VI', respectively of Fig. 1, illustrating the turning passes of the several blanks at successive points in their progress from the slitting mechanism to the edge finishing mechanism. Fig. 7 is a partial plan view similar to Fig. 1, showing a modified construction of mechanism for introducing the severed strips to the edge finishing mechanism. Fig. 8 is a vertical sectional view therethrough, indicated by the line VIII, VIII. of Fig. 7. Fig. 9 is an end view of the slitting mechanism. Fig. 10 is a similar view of the edge finishing mechanism. Fig. 11 is an enlarged sectional detail view, illustrating one preferred manner of making and assembling the slitting mechanism. Fig. 12 is a similar view illustrating the edge finishing mechanism. Fig. 13 is a longitudinal sectional view showing a modified construction, employing feed rolls in combination with the slitting mechanism.

The objects of my invention are accomplished by means of a series of pairs of circular co-acting shears or disks slightly overlapping and suitably spaced to sever the blank of any desired width, into a number of longitudinal strips; a corresponding series of guiding channels arranged to receive the severed strips therein from such mechanism and to gradually turn them in continuous spiral path from horizontal to vertical positions; and a pair of rolls provided with edge finishing grooves in corresponding relation, adapted to receive the severed and turned strips and to engage the edges thereof to accomplish the finishing or rounding and to complete the operation.

As illustrated in Figs. 1 and 2, a pair of slitting rolls, generally designated by the letters A, A, are mounted in suitable bearings and housings 2 supported upon any convenient foundation. Each of said rolls is provided with a plurality of extensions or male portions a and a corresponding series of intervening recessed or female portions b of a width corresponding to the desired width of the several strips which are to be severed from the blank B. Said rolls are preferably constructed of a series of disks 3 and intervening spacers 4 and 5, as more clearly indicated in Fig. 11. The object of such construction is that the disks 3 may be comparatively thin and of hardened steel, while the separators 4 and 5 may be of any ordinary metal and may also be of varying widths whereby to suitably space the co-acting edges of the series of disks 3 to any desired width of cut, as will be readily
understood. Said parts 3, 4, and 5 are mounted upon shafts 6 and 7 by longitudinal keys and keyways, and are actuated through suitable gearing 8 from driving pinion 9 and shaft 10, as indicated in Fig. 1, or in any other suitable manner.

Beyond the slitting mechanism is the edge finishing mechanism, also consisting of a pair of co-acting rolls, generally designated by the letters C, C, mounted in suitable bearings and housing 2° and forming, with the housings 2 and the foundation thereof, preferably a continuous integral supporting structure. It will be understood that the distance between the housings 2 and 2° will be regulated by the space necessary to accomplish the turning operation of the severed strips, according to the dimensions, gage, etc., thereof, and is entirely within the province of the designer. Said edge finishing rolls C, C, are actuated from driving pinion 9 by suitable gearing 11, like gearing 8, as will be readily understood without further description, it being understood, of course, that the rolls A, A, and C, C, are actuated in proper directions through suitable intermeshing gearing 12 and 13 respectively, at the opposite ends of the several rolls, or in any preferred manner.

The blank B is introduced between the co-acting overlapping edges of the cutting disks 3, being forced thereinto by any suitable means as desired, and as the blank travels therethrough it is severed into a series of individual strips of the desired reduced width.

For the purpose of facilitating the introduction of the blank B between the several slitting devices or rotary shears, it may, if desired, be notched at its entering end, as indicated at b', Fig. 1', at distances corresponding to the several desired slits, whereby to facilitate the commencement of the operation or centralization of the blank.

Side guides 14 are also preferably employed for the same purpose.

Between the slitting rolls A and the edge finishing rolls C, I insert a composite turning die consisting of a lower or base portion 15 and an upper or top portion 16, mounted upon a suitable supporting base or frame 17 of the main foundation structure and rigidly connected together by any suitable means, as bolts 28. The contacting faces of the portions 15, 16, comprising the spirally turning element, are longitudinally grooved whereby to provide a plurality of pairs of spirally disposed confronting faces 18 and 19 respectively, each of said faces having a right angled limiting end 20 and 21 respectively, and main contacting meeting faces 22, 23, respectively, as clearly shown in the several sectional views, Figs. 4, 5, and 6. By this construction the faces 18 and 19 are spaced apart and rigidly maintained and provide a series of open passes or cavities 24. Said passes are of suitable dimensions as to width and length, to accommodate the several severed strips and to permit them to pass freely therethrough with sufficient clearance to avoid binding or unnecessary friction, but so approximating the cross sectional dimensions of the strips as to prevent any material variation thereof within the several passes. In other words, the passes constitute guides for the strips through which they pass from the slitting mechanism to the edging mechanism. The function of such passes is to gradually turn the severed strips in a spiral direction very gradually and without exerting any special torsion and frictional resistance so that the strips will pass with comparative ease and freedom from resistance or obstruction, from the slitting mechanism to the edge finishing mechanism. The obvious object of this arrangement is to gradually transpose the severed strips from horizontal to vertical positions, thereby changing them from their positions as they emerge from the slitting mechanism, which is, of course, horizontal, to best carry out the slitting function, to vertical positions whereby they may be best and most economically treated by the edge finishing mechanism accomplished through the two main roll members C, C. As thus constructed, the turning passes 22 comprise initial horizontal receiving ends which are absolutely in front of the slitting mechanism, as indicated at 24 at one end, of the guiding mechanism; a plurality of delivering portions 24 immediately in front of the edge finishing mechanism, which are absolutely vertical, each of said portions extending invades toward the middle for a short distance in horizontal and vertical planes respectively; and intervening turning portions 24 of continuously varying angles, as indicated, whereby the plane of each pass is gradually but continuously changed from the horizontal to the vertical. By this arrangement each severed strip in its passage from the slitting mechanism to the edge finishing mechanism is turned through an arc of 90°, as indicated by the dotted lines in Figs. 4, 5 and 6.

The inner faces of the guides 15, 16, at their receiving ends, immediately confronting the slitting mechanism, are flared, as indicated at 25, Figs. 2 and 3, whereby to assure positive introduction of the ends of the several slitless strips into the pass 24, as they travel forwardly from the slitting rolls A.

While the several passes may be so designed and arranged as to absolutely register with the edge finishing grooves of the rolls C, C, as indicated in Fig. 1, I may utilize a supplemental guiding die 26 of comparatively short length, between the edge finishing rolls C and the ends of the guides 130...
20, 25, 30, 35, 40, 45, 50, 55, 60

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15, 16, as illustrated in Figs. 7 and 8. In such construction the vertical terminals 24 of the several passes deliver the strips directly into the guiding openings 27 of such die, which, as shown, are flared so as to provide somewhat wider receiving openings, which are narrowed down to the same width as that of the edge finishing grooves of the rolls C, as will be readily understood. In such construction the die 26 is preferably in a abutting contact with the end of the main guide 15—16 and forms a continuation thereof, being positively secured in position by any suitable means, as bolts 28, securing it to the foundation frame. For the purpose of providing facility for treating strips of varying widths (and corresponding varying lateral distances apart when turned) the slitting mechanism is preferably composed of a series of comparatively short rolls 29 mounted upon driving shafts 29 and 30 and secured thereon for rotation by keys and lock washers. Each of said individual rolls 29 is suitably recessed at its outer ends so that when the several sections c are assembled they will provide a series of grooves c'. The inner end of said grooves may be rounded, as shown, and suitably designed to compress or treat the edges of the severed strips as they pass therethrough whereby to round them and eliminate all sharp edges, burrs, etc.

It will be understood that the speeds of the edge and slitting rolls are suitably gaged for proper cooperation whereby the edge rolls will engage and assist in drawing the strips through at the same speed as that of the slitting mechanism.

In Fig. 13, I have shown at the entering side of the slitting rolls A', a pair of feeding rolls D, D, with any suitable guides d, d, and beyond the slitting rolls a pair of additional feed rolls E, E, and additional guides c, c. While such parts are not essential to the carrying out of the invention in its broader aspects, they may be adopted, if desired, dependent upon the conditions of the material being treated as to gage, width, etc.

The operation and the functioning of the mechanism employed will be readily understood from the foregoing description. Its advantages consist in the ease and facility of manufacturing finished strips, bands, cotton ties, and the like from rolled blanks of sheet metal in one continuous operation whereby to deliver the finished product ready for use.

The operation is comparatively simple and very economical, it results in absolute uniformity of gage and finish, and in a commercial product of unvarying standard quality.

Having described my invention, what I claim is:

1. Apparatus for slitting and finishing
ting rolls, of guide mechanism embodying a series of intervening individual closely adjacent guiding passes for the severed blanks having an initial common horizontal plane adjacent the slitting rolls and gradually changing in spiral formation throughout their length and terminating in vertical planes adjacent the edging rolls, substantially as set forth.

6. The combination with a pair of slitting rolls adapted to slit a blank longitudinally on a horizontal plane and a pair of edge treating rolls having series of vertical passes spaced in correspondence with the spacing of the slitting rolls, of guide mechanism consisting of an upper and a lower member spaced apart from each other having intervening meeting joints, said passes gradually changing from horizontal to vertical planes in spiral formation and maintaining parallelism as to their longitudinal centers and uniformity of spacing corresponding to the spacing of the slitting rolls and edging rolls, substantially as set forth.

7. In combination, means for longitudinally slitting a moving sheet metal blank into a series of individual strips, means for treating the edges of each strip, and guiding mechanism for the strips consisting of two guide-forming members extending between the slitting and the edge-treating mechanism each having spirally arranged shoulders and pass-defining surfaces in interengaging relation and forming between them gradually changing strip-directing cavities, substantially as set forth.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOHN B. MckIBBIN.

Witnesses:
C. M. Clarke,
Charles Large.