Dec. 19, 1939. M. M. NEWMAN 2,183,722

MECHANISM AND METHOD FOR CUTTING BLANKS FOR NECKTIES

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FIG. 1

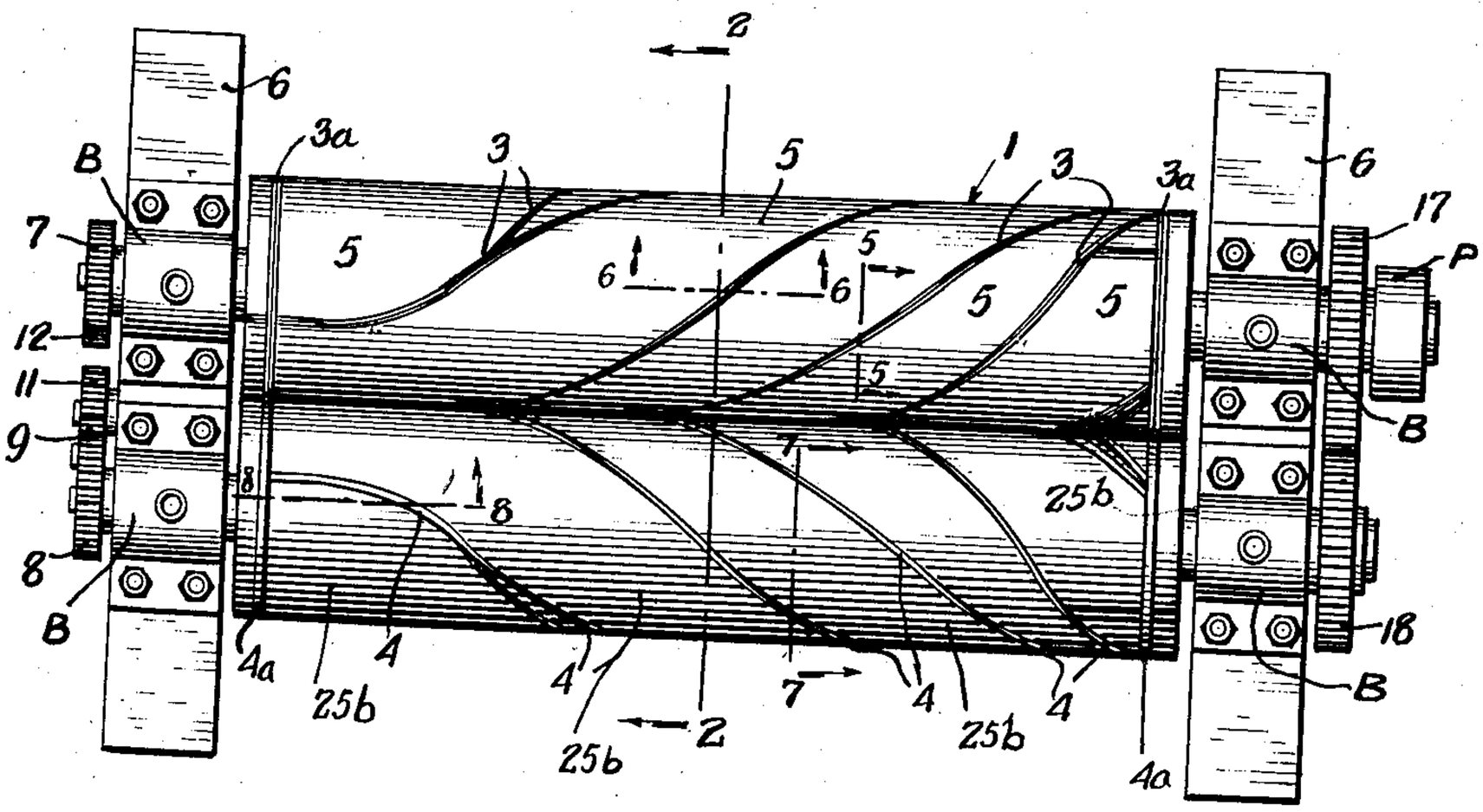


FIG. 3

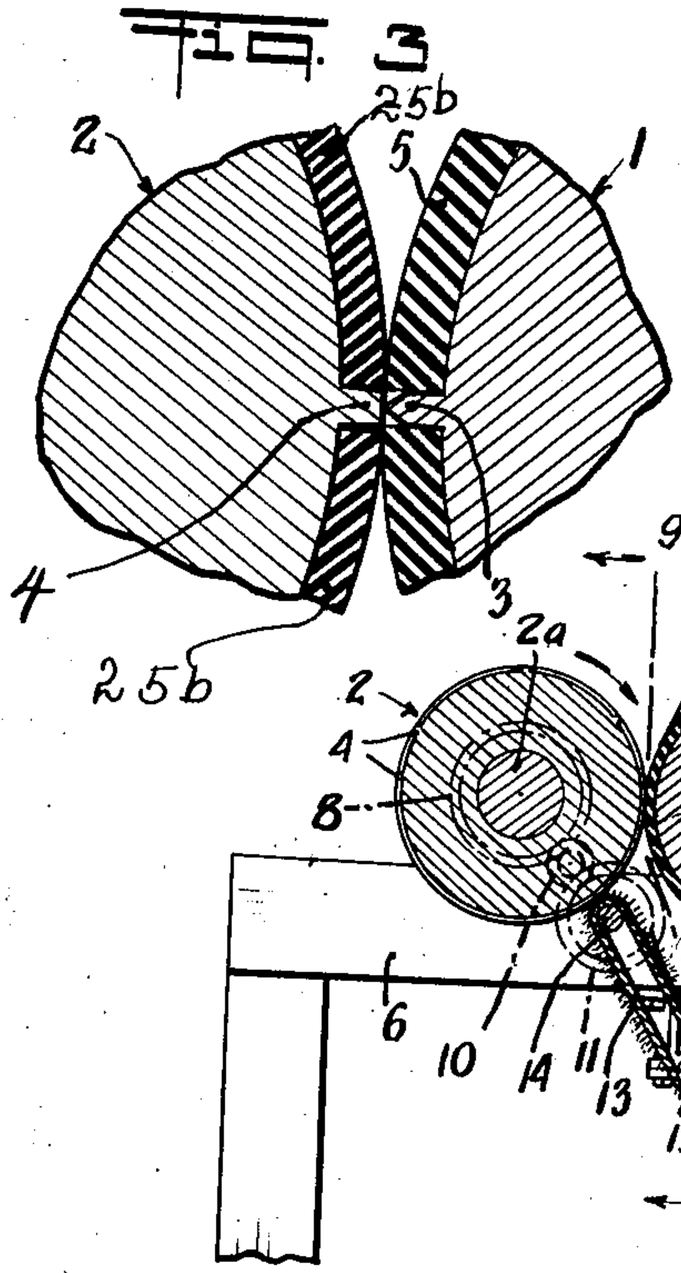
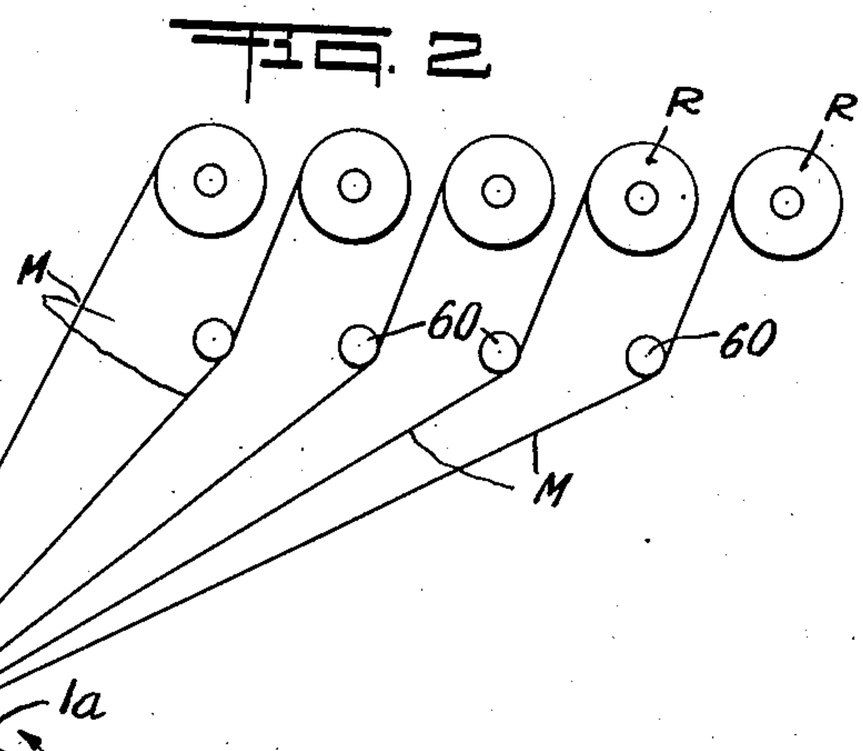


FIG. 2



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MECHANISM AND METHOD FOR CUTTING BLANKS FOR NECKTIES

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FIG. 4

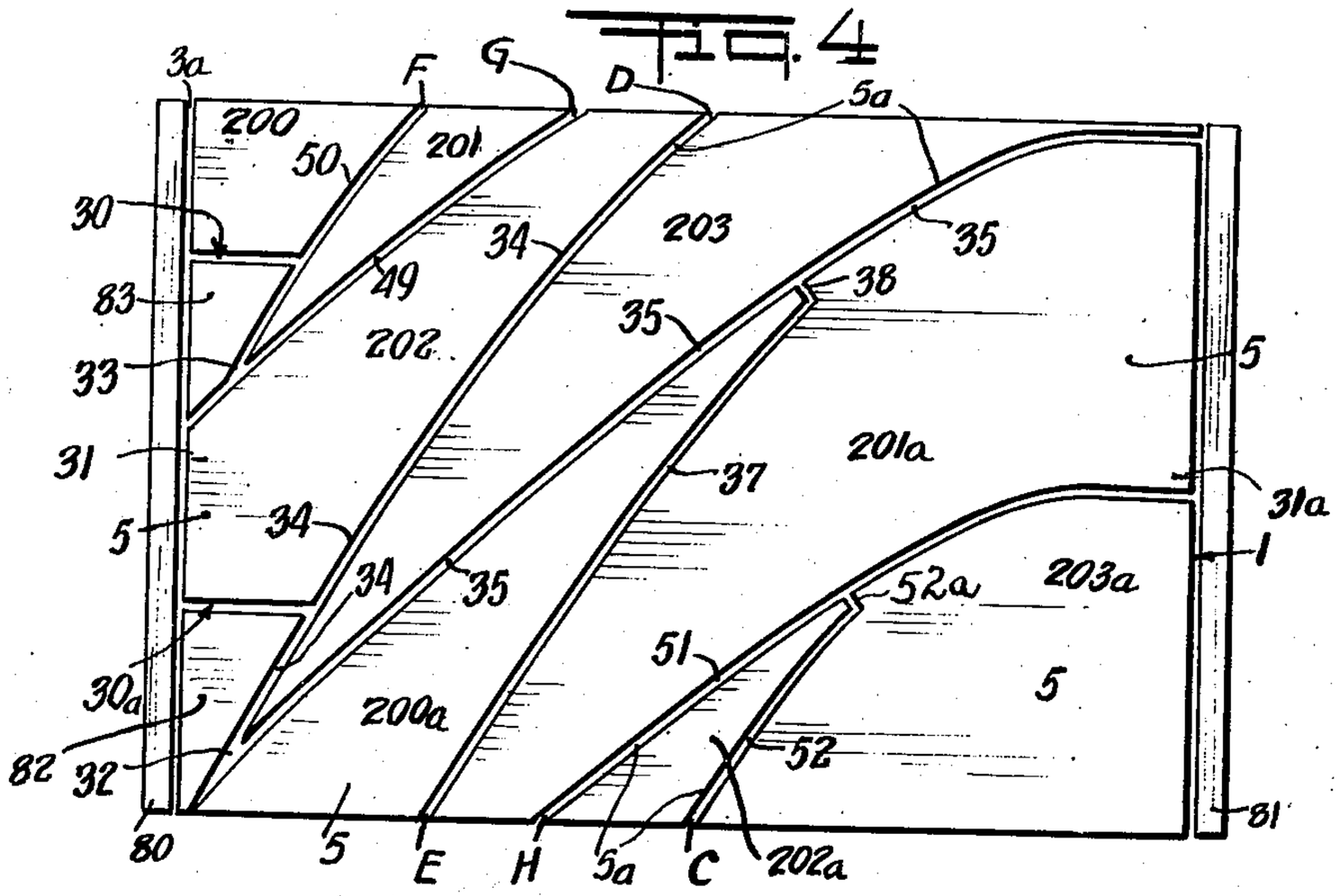


FIG. 5

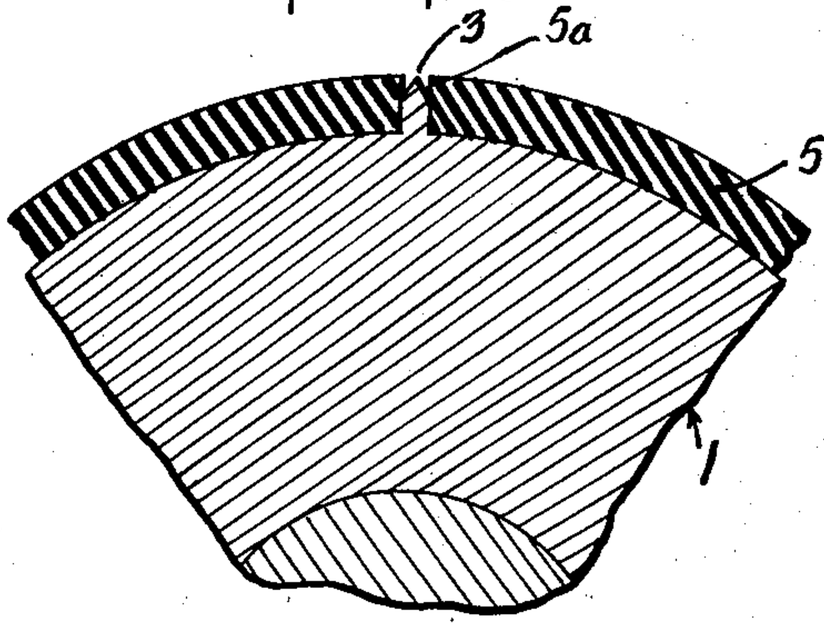


FIG. 6

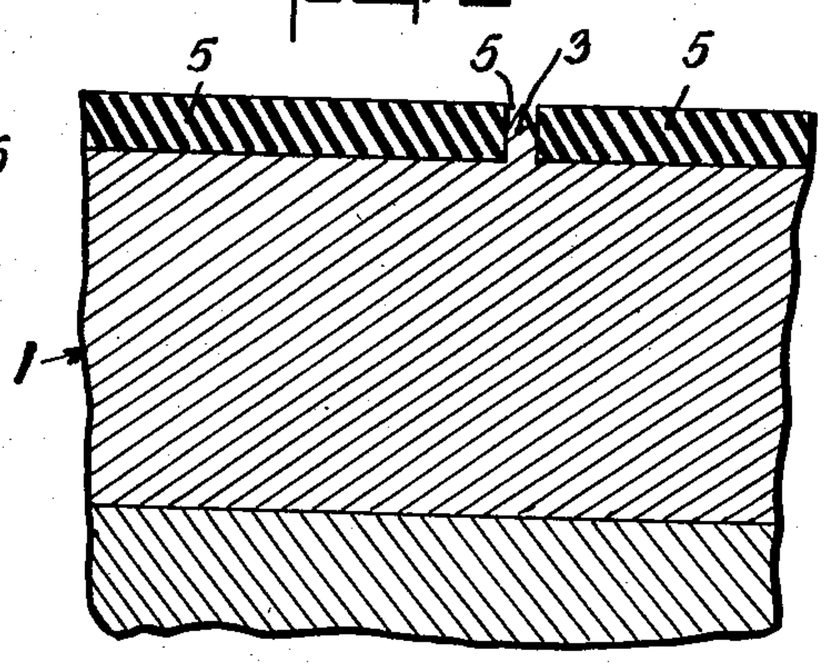


FIG. 7

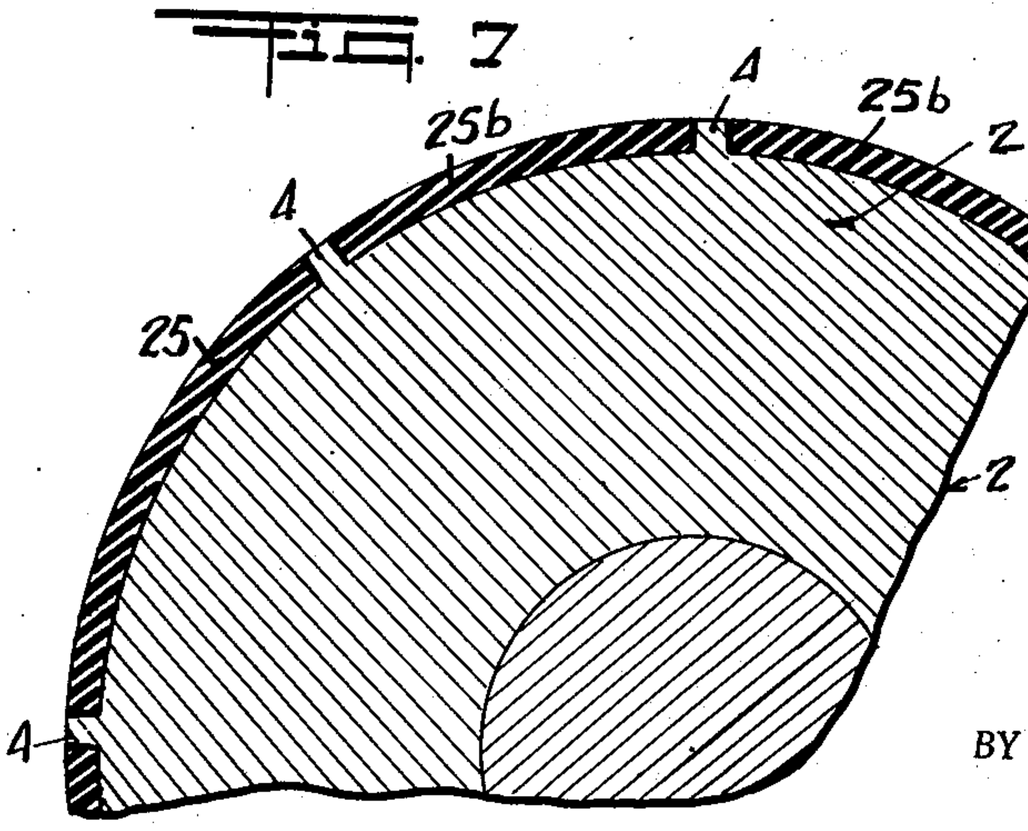
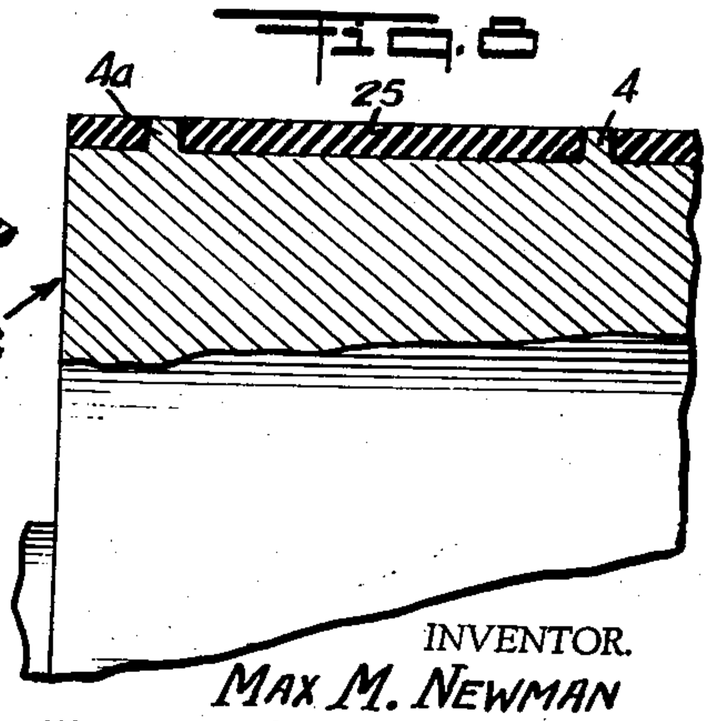


FIG. 8



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MECHANISM AND METHOD FOR CUTTING BLANKS FOR NECKTIES

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Fig. 9

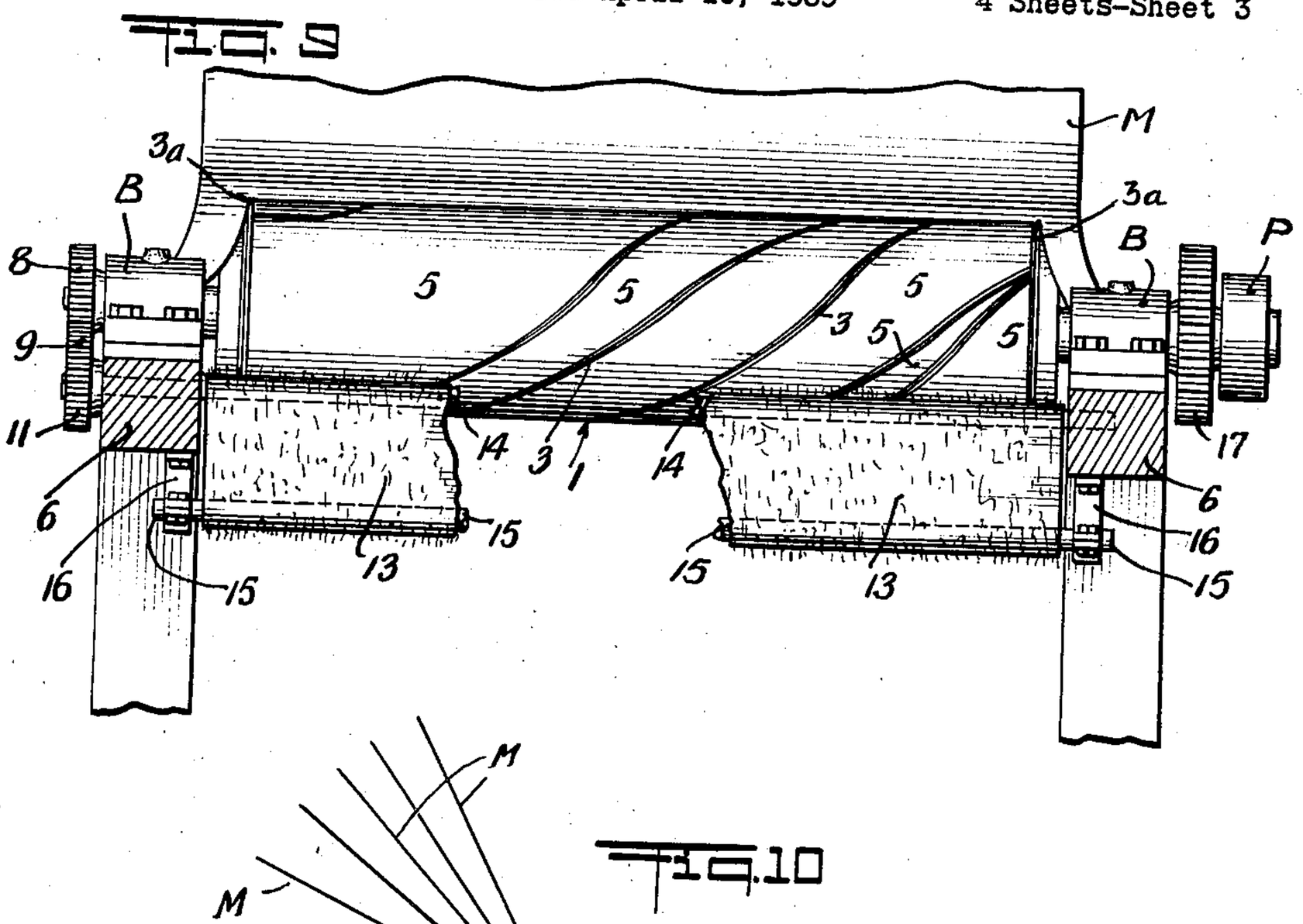


Fig. 10

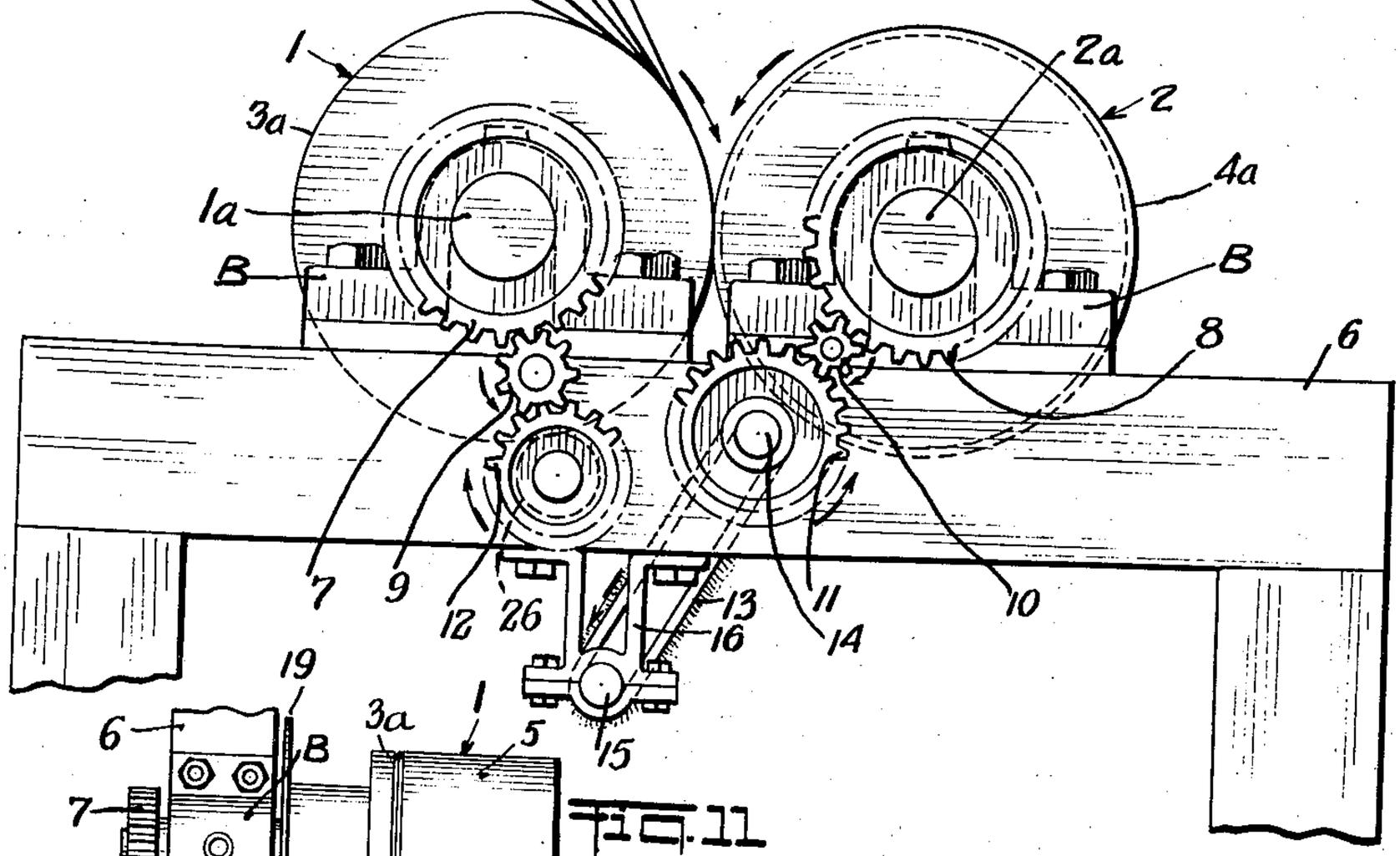
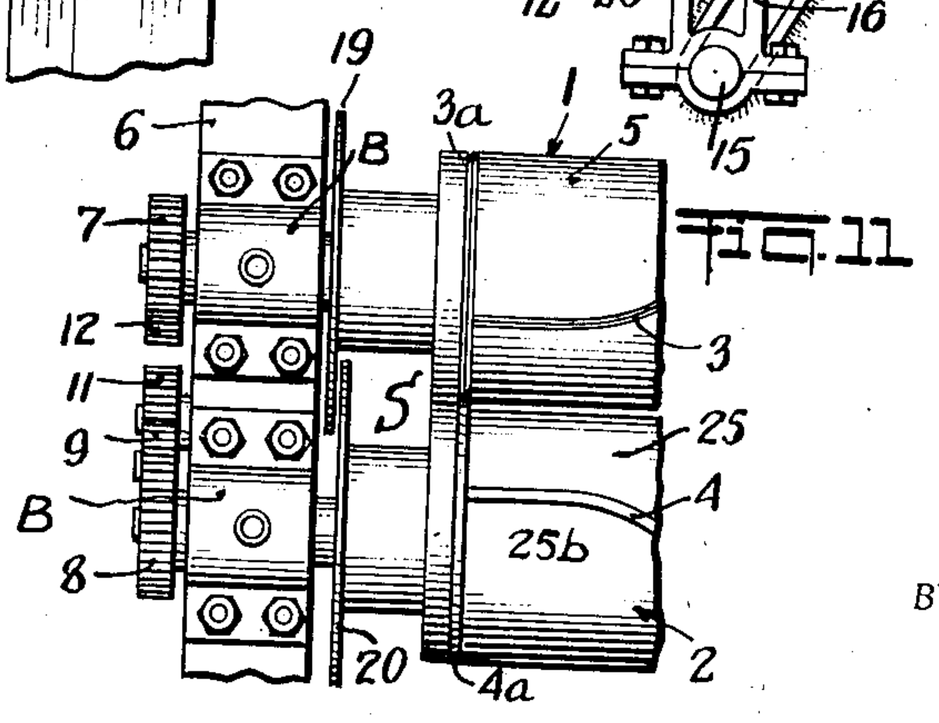


Fig. 11



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MECHANISM AND METHOD FOR CUTTING BLANKS FOR NECKTIES

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FIG. 12

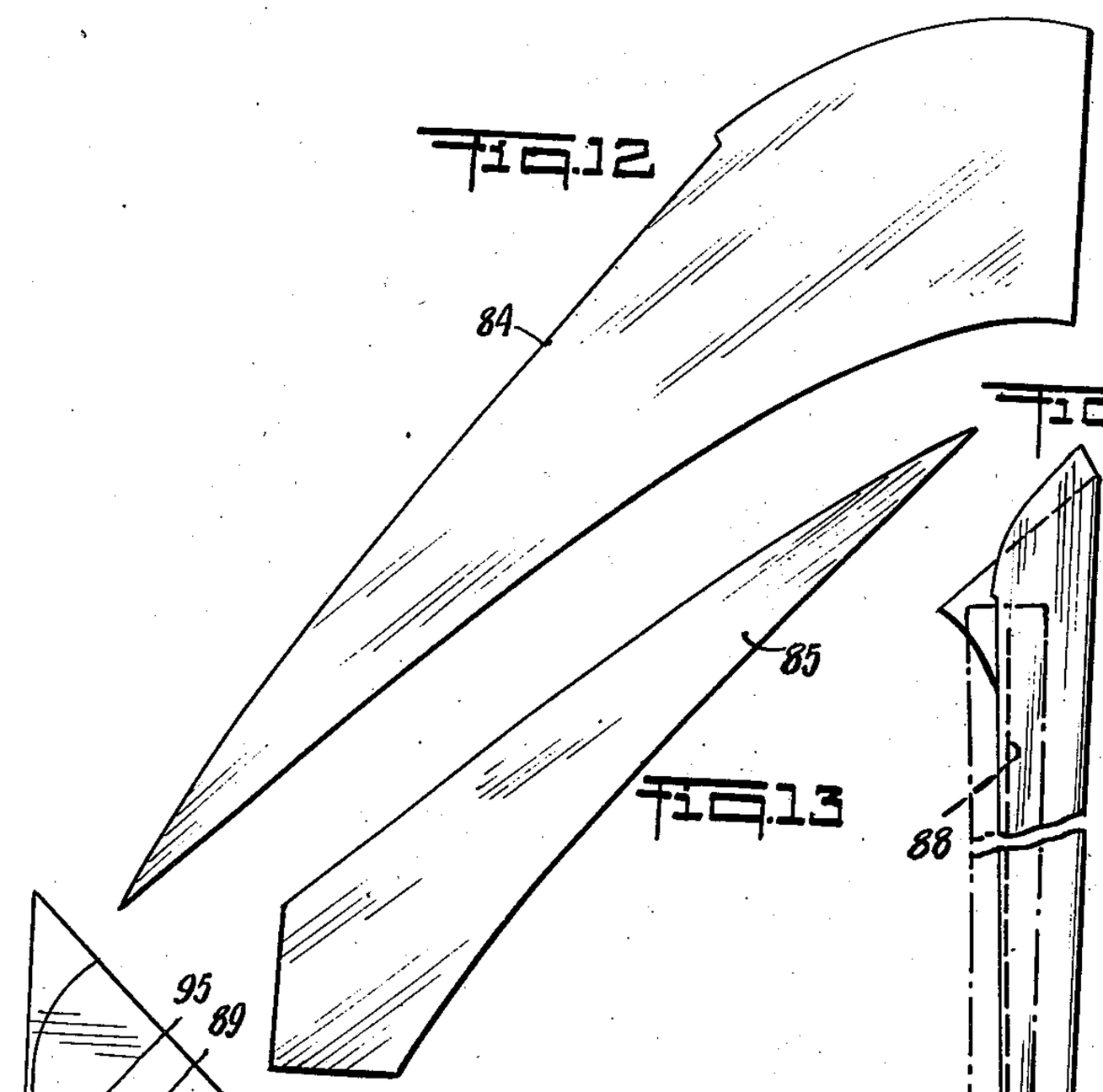


FIG. 13

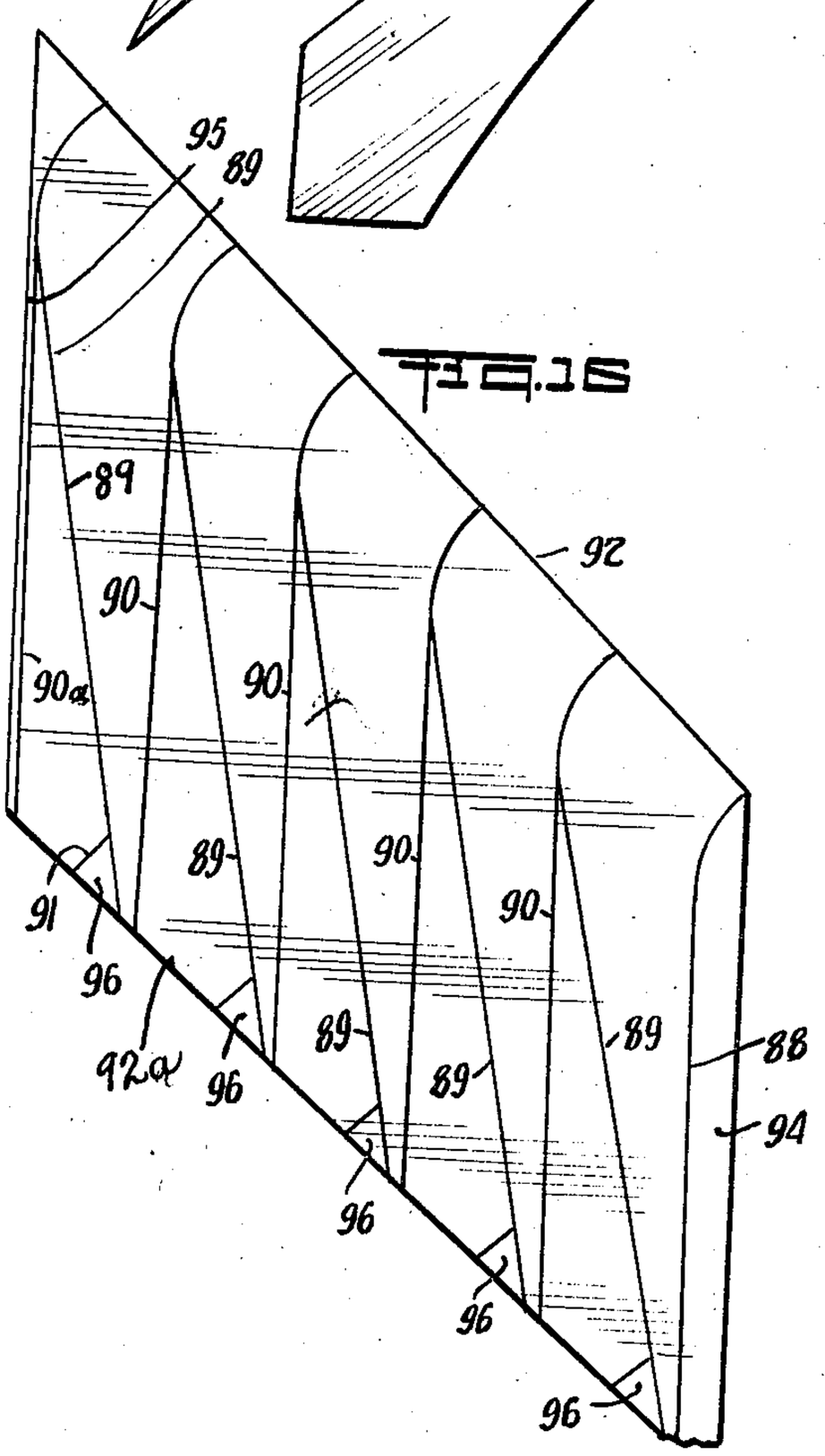


FIG. 14

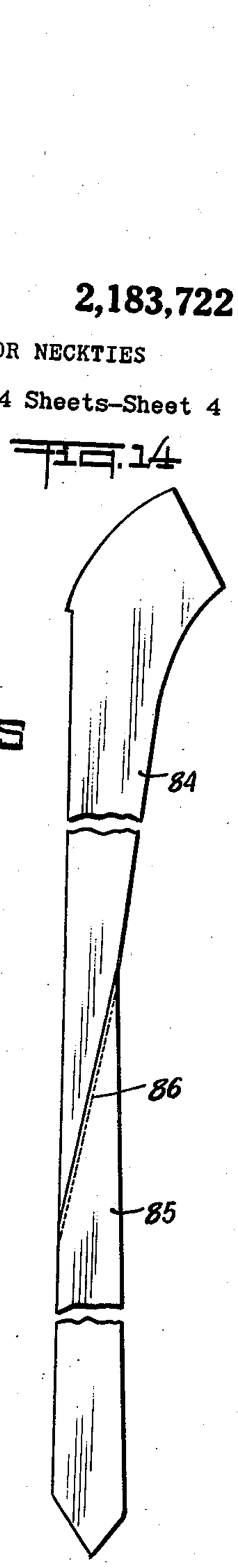
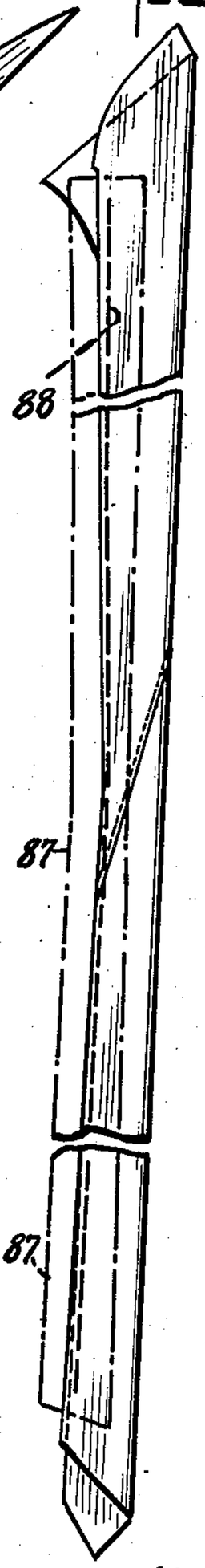


FIG. 15



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Patented Dec. 19, 1939 2,183,722

UNITED STATES PATENT OFFICE

2,183,722

MECHANISM AND METHOD FOR CUTTING BLANKS FOR NECKTIES

Max M. Newman, New York, N. Y.

Application April 10, 1939, Serial No. 267,156

7 Claims. (Cl. 164—28)

My invention relates to a new and improved mechanism and a new and improved method for automatically cutting blanks for making neckties, the linings of neckties, etc. The embodiments illustrated herein are for use in cutting blanks for making four-in-hand neckties. The invention generally applies to automatic means or mechanism for cutting any material into blanks having any shape.

One of the objects of my invention is to provide cooperating rolls having cutting means shaped and located so that a strip or sheet of material can be fed between said rolls and said rolls automatically cut out a blank or blanks of the desired shape out of the material.

Another object of the invention is to provide a simple and reliable device in which the rolls have the aforesaid cutting means affixed or integral with their peripheries.

Another object is to provide a pair of rolls which respectively have cutting projections and abutment projections, said abutment projections and said cutting projections being respectively located in recesses of respective vulcanized layers of rubber which cover the respective rolls or the essential parts thereof.

Other objects of my invention will be set forth in the following description and drawings which illustrate preferred embodiments thereof, it being understood that the above statement of the objects of my invention is intended generally to explain the same without limiting it in any manner.

Fig. 1 is a top plan view of the first embodiment of the improved device.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, and it also shows the reels from which strips or layers of material are fed to the cutting rolls.

Fig. 3 is an enlarged detail section showing portions of the peripheries of the cutting rolls.

Fig. 4 is a planar development of the resilient surface layer of the cutting roll, and of the cylindrical periphery of said cutting roll.

Fig. 5 is a section on the line 5—5 of Fig. 1.

Fig. 6 is a section on the line 6—6 of Fig. 1.

Fig. 7 is a section on the line 7—7 of Fig. 1.

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

Fig. 9 is an elevation, partially in section, on the line 9—9 of Fig. 2.

Fig. 10 is an end elevation of the device.

Fig. 11 is a partial view similar to Fig. 1, showing a modification.

Fig. 12 is a plan view of one of the blanks which is produced by each complete revolution of the cutting rolls.

Fig. 13 is a view of the second blank which is produced at each revolution of the cutting rolls.

Fig. 14 is a plan view illustrating how the blanks which are shown in Figs. 12 and 13 are sewed together so as to produce a complete blank for a single necktie.

Fig. 15 is a plan view illustrating how the blank shown in Fig. 14 is folded longitudinally. It also shows how a lining strip is sewed to said blank.

Fig. 16 is a plan view illustrating a modification of the development shown in Fig. 4.

The device consists essentially of a pair of rolls 1 and 2. The roll 1 is the knife-roll or cutting-roll, and it is provided with a series of knives 3. These knives 3 can be integral projections of the roll 1, which is made of any suitable metal. Said knives can be independent cutting members, which can be suitably affixed to roll 1. The roll 1 is provided with a surface member or with a plurality of surface members 5 which are made of resilient vulcanized rubber or other resilient or yieldable material. These surface members 5 cover the entire surface of the cutting roll 1, save for the knives 3. The knives 3 are located in slots which are provided between the rubber members 5, and the tips of the cutting edges of said knives 3 are substantially flush with the outer surfaces of the members 5, when said members 5 are in normal uncompressed shape. The rubber members 5 can be vulcanized to the cutting roll 1, or else said vulcanized members may be connected to the surface of the roll 1 by any suitable means.

The metal roll 2, which serves as a pressure roll or abutment roll, is provided with integral or detachable projections 4, and with a surface member 25*b* which is also preferably made of vulcanized and resilient rubber. Said member 25*b* can be replaced by a plurality of members. The projections 4 are located so that the material M is cut between the respective knives 3 and the respective associated projections 4. Said abutment projections 4 are located in slits of surface member 25*b*. The outer surfaces of said abutment projections 4 are substantially flush with the outer surface of member 25*b*, when it is in normal uncompressed shape. The rolls 1 and 2 have respective shafts 1*a* and 2*a* which are turnably mounted in suitable bearings B which are located on a table 6. As shown in Fig. 10, the shafts 1*a* and 2*a* are respectively provided with spur gears 7 and 8. The gear 7

meshes with a smaller gear 9, whose shaft is mounted independently of the shaft 1*a*. The gear 9 meshes with a gear 12 which is larger than the gear 9 but smaller than the gear 7. A brush roll 26 is mounted on the shaft of gear 12. Said roll 26 is provided with radially projecting bristles. Brush roll 26 turns in a direction opposite to that of roll 1, so that the bristles of roll 26 clean the surface member 5 and the knives 3 of any adhering material. The gear 8 of the shaft 2*a* meshes with a smaller gear 10, which meshes with a gear 11.

The shaft 14 of the gear 11 is provided with a pulley. An endless conveyor belt 13 is passed around said pulley and around a companion shaft 15. The shaft 15 is mounted in bearings which are supported from the table 6 by means of hangers 16. Said belt 13 may have a smooth surface, but it is preferably provided with outwardly projecting brush bristles, as shown in Fig. 10.

As shown in Fig. 1, the shafts 1*a* and 2*a* are respectively provided with intermeshing and equal gears 17 and 18. The shaft 1*a* is provided with a driving pulley P which is driven by a belt from any suitable source of power. The rolls 1 and 2 are therefore turned at the same angular speed and in opposite directions. At its edges, the roll 1 is provided with circular edge knives 3*a*. The roll 2 is provided at its edges with corresponding integral and circular abutment projections 4*a*. As shown in Fig. 9 the longitudinal edges of the sheet of material M are trimmed between the pairs of edge-knives 3*a* and the edge-projections 4*a*. Said projections 4*a* are shaped like projections 4.

Fig. 5 shows the slots or spaces 5*a* between the resilient and vulcanized rubber members 5, and it also shows how the cutting edge of each knife 3 is substantially flush with the outer surface or surfaces of the adjacent member or members 5, when said members are in the normal uncompressed condition shown in Fig. 5.

In the modification shown in Fig. 11, the edge-knives 3*a* and the edge-projections 4*a* are spaced further away from the bearings B than in the first embodiment. In this embodiment, rolls 1 and 2 are provided with reduced end-portions, to which overlapping disc-like edge guards 19 and 20 are respectively connected. The trimmed portions of the longitudinal edges of the material can therefore fall through the space S.

The operation of the device is as follows:

Any suitable number of strips of material M are wound upon reels R. The material is taken off said reels R, led around suitable idler rolls 60 and the layers of material are caused to abut each other as they pass between the rolls 1 and 2. The knives 3 and the projections 4 are located so as to cut the layers of material into blanks of any suitable shape. The embodiment specifically illustrated herein and which is shown in detail in Fig. 4 is suitable for cutting out tapered blanks which are used in making neckties.

Referring to Fig. 4, it may be assumed that the planar members thereof are bent into cylindrical shape as to form a cylinder whose longitudinal axis will be parallel to the median line which is defined by the points 31, 31*a*. The pairs of points E and F, G and H, C and D, will then coincide. The edges of two of the cutting knives intersect at 32. The edges of two other cutting knives intersect at 33.

Referring to Fig. 4, the cutting members which are located in the slits 5*a* are indicated by respective reference numerals.

The cutting member 37 is a continuation of the cutting member 50, and the cutting member 51 is a continuation of the cutting member 49. The cutting member 37 has an inclined branch 38 which joins the cutting member 35. Therefore the cutting members 50, 49, 37, 51, 38 and 35 and the respective right-hand edge knife 3*a*, form a first tapered die which will cut a blank 84 which is shown in Fig. 12. The two sections of this blank 84 are indicated in Fig. 4 by the reference numerals 201 and 201*a*. The left-hand edge knife 3*a*, the longitudinal cutting member 30, the cutting member 50 and its continuation 37, and the cutting members 35 and 38 form a second tapered die which will cut out a blank 85, having the shape shown in Fig. 13. In Fig. 4 the two sections of said blank 85 are identified by the reference numerals 200 and 200*a*. The left-hand edge knife 3*a*, the longitudinal cutting member 30*a*, the cutting member 49 and its continuation 51, the cutting member 34 and its continuation 52 and the cutting member 52*a* form a third tapered die which will cut out another blank 85. The respective sections of this blank are indicated in Fig. 4 by the reference numerals 202 and 202*a*. In Fig. 13 the blank 85 is shown as having a pointed tip. However in practice, this tip is slightly blunted, since the cutting members 38 and 52*a* are respectively inclined to the associated cutting members 37 and 52.

The cutting member 34, its continuation 52, the cutting member 52*a*, a portion of the cutting member 51, and the right-hand edge knife 3*a* form a fourth tapered die which will cut out another blank 84. The respective parts of this blank are indicated in Fig. 4 by the reference numerals 203 and 203*a*. Hence, at each revolution of the rolls, they cut out two blanks 84 and two blanks 85.

As shown in Fig. 4, the second tapered cutting die extends to the left-hand longitudinal edge of the sheet of fabric and it includes a member 30 which is transverse relative to said left-hand longitudinal edge. The other end of the blank which is formed by said second cutting die, as represented by the areas 200 and 200*a*, is spaced from the other or right-hand longitudinal edge of the sheet of fabric. The first cutting die, which corresponds to the areas 201 and 201*a* of Fig. 4, cuts the fabric up to its left-hand longitudinal edge, and said second and first dies have a common cutting member, namely, the blade 50 and its extension 37. Part of the cutting periphery of the first cutting die is formed by an extension of one of the blades of the second cutting die, namely, that portion of the cutting blade 35 which is located at the right of the member 38. The tapered end of the first cutting die is located at the wide end of the second cutting die.

The third cutting die, as represented by the areas 202 and 202*a*, also cuts a blank up to the left-hand longitudinal edge of the strip of fabric, and said third cutting die includes a member 30*a* which is transverse to the left-hand edge of the sheet of fabric. The third cutting die and the first cutting die have a common cutting blade, namely, the blade 49 and its extension 51 and said extension 51 extends to the right-hand longitudinal edge of the strip of fabric.

The fourth cutting die has the blade-intersection 32 which extends to the left-hand longitudinal edge of the sheet of fabric and said fourth

cutting die includes in its periphery a portion of the cutting blade 51.

These dies therefore cut complete blanks and every one of these blanks has an edge which coincides either with the left-hand longitudinal edge of the strip of fabric, or its right-hand longitudinal edge.

The pieces 82 and 83 are waste.

The blank shown in Fig. 16 has edge cutting-members 88 and 90*a* which have a circular shape in the cutting roll, so that these cutting-members 88 and 90*a* are then equivalent to the edge knives 3*a*. The longitudinal waste-strips which are formed by said edge cutting-members 88 and 90*a* are respectively indicated by the reference numerals 94 and 95 in Fig. 16. The device shown in Fig. 16 has cutting-members 89, 90 and 91 intermediate the edge-cutting-members 88 and 90*a*. The edge cutting-member 90*a* and its associated cutting-members 89 and 91 and the cutting member 92*a* will therefore cut a blank 85. The cutting-member 92, a pair of cutting-members 89 and 90 and the cutting-member 92*a* will form a blank 84 having a slightly blunted tip. The device diagrammatically illustrated in Fig. 16 will cut out waste strips 96.

The device shown in Fig. 16, like the device shown in Fig. 4, has its cutting dies provided with cutting blades or cutting elements which are parallel to the axis of rotation of the cutting roll. These parallel cutting elements are the members 92 and 92*a* in Fig. 16. In Fig. 4 said cutting elements are the members 30 and 30*a*. Likewise, in each embodiment, the cutting members which extend to the narrow end of each said cutting die are inclined to a linear surface element of the periphery of the cutting roll, said linear surface element being parallel to the axis of rotation of the first roll.

As shown in Fig. 14 a pair of blanks 84 and 85 are assembled so as to have a pair of overlapping edges, which are connected by stitches 86. The composite blank shown in Fig. 14 is then folded longitudinally, a lining member 87 is located so as to overlie the folded composite blank, and the folded composite blank and the overlying lining strip 87 are then connected by longitudinal stitches 83. The necktie can then be turned.

Figs. 14 and 15 are wholly diagrammatic since it is well known to form the blank of a necktie from two or more parts, and generally speaking to perform the operations shown in Figs. 14 and 15.

The cut blanks are led away by the conveyor belt 13 and deposited in any suitable receptacle. The resilient or yieldable sleeves 5 and 25*b* grip the fabric so as to feed it uniformly and reliably and to prevent the fabric from wrinkling. Said sleeves have equal outer diameters.

An important feature of the invention as illustrated in Fig. 3, is that the cutting edge of each knife 3 abuts a blunt end-surface of a projection 4, during and also at the completion of the cutting operation.

The abutment members 4 are located and shaped like the cutting-members in Fig. 4 or in Fig. 16, save that said members 4 have blunt surfaces. In prior devices of this type, the cutting members were located and shaped so as to make the cut by means of a shearing action. According to the improved method and mechanism stated herein, the cutting action is performed by pressing the material between a relatively sharp cutting edge and a relatively blunt abutment surface. The outer surface of each abutment member 4 may be planar or substantially planar or it may be of cylindrical shape.

The shape of the outer surface of each abutment member 4 may correspond to the shape of a cylinder which is concentric with the abutment roll 2. If desired the curvature of the outer surface of each member 4 may be less than the curvature of a cylinder which is concentric with the roll 2 and whose radius is equal to the distance between the axis of said roll 2 and said outer surface. Actual experience has shown that the improved mechanism will make clean and uniform cuts in several layers of fabric, even though the knives 3 do not have sharp edges. The resilient or yieldable sleeves 5 and 25*b* are compressed adjacent the respective members 3 and 4, when they cooperate to form the cut. That is, the shafts of the rolls 1 and 2 are mounted in their bearings so that even if there is no cloth or other material between the surface members 5 and 25*b*, portions of said members 5 and 25*b* abut each other and are compressed more or less. This compression of the members 5 and 25*b* may be so slight as to be negligible, or it may be a substantial compression. This compression of the members 5 and 25*b* slightly exposes cooperating members 3 and 4 as they form the cuts in the material.

The bearings B of the cutting roll 1 may be mounted slidably, so that they can be pushed by suitable springs (not shown) towards the bearings of the abutment roll 2. This provides the necessary yielding spring pressure between the cutting knives and the abutments 4. This is conventional per se, so that it is not shown in the drawings. The knives and projections of rolls 1 and 2 are preferably respectively formed by engraving true cylindrical rolls, so that the parts are made with great precision. The rolls 1 and 2 and their integral respective knives and projections are preferably made of the same kind of steel or other metal. This steel is hardened tool steel.

The roll 2 can be hollow and it can be mounted on a sleeve of resilient vulcanized rubber or the like, which is provided on shaft 2*a*. This inner sleeve will provide the desired springy pressure between rolls 1 and 2, for cutting the material. This is also conventional per se, so that it is not shown in the drawings.

For convenience the roll 1 may be designated as the first roll, and the roll 2 may be designated as the second roll. In performing the cutting operation the sheet of material is led between said rolls while they are turned in opposite directions, and said sheet of material is subjected to cutting pressure along predetermined lines, between cutting means located on the first roll and blunt abutment means of the second roll.

The invention is not limited to the use of an abutment roll 2 having projections 4. Therefore whenever I specify the blunt abutment means of the roll 2, I include within the scope of the invention, the use of a pressure roll 2 whose outer diameter is equal to the outer diameter of the abutment means 4.

I have shown preferred embodiments of my invention but it is clear that numerous changes and omissions could be made without departing from the spirit of the invention.

I claim:

1. In combination, a first turnable roll and a second turnable roll, each said roll having an

outer layer of resilient material, means adapted to turn said rolls respectively in opposite directions, the first roll having outwardly projecting cutting means which are located in slots of the respective layer, the second roll having abutment projections which are located in slots of the respective layer, said projections having blunt outer surfaces, the cutting means and the abutment means being shaped and located on their respective rolls so as to exert cutting pressure and cutting action between said cutting means and said blunt outer surfaces on a sheet of material which is fed between said rolls and to cut out from said material a blank of predetermined shape, the outer ends of said cutting means and of said abutment means being substantially flush with the outer surfaces of the respective layers of resilient material, when said layers are in normal uncompressed condition.

2. In combination, a turnable first roll and a turnable second roll, drive means adapted to turn said rolls in respective opposite directions, the first roll having laterally spaced circular knives which are perpendicular to the axis of the first roll, the second roll having circular abutment means having outer blunt surfaces and located to cooperate with said circular knives so as to exert cutting pressure and cutting action between said knives and said blunt surfaces adjacent the longitudinal edges of a sheet of material which is fed between said rolls so as to trim said edges, the first roll also having outwardly projecting cutting means which meet at a plurality of points which are located intermediate said circular knives, some of said cutting means also meeting said circular knives, the second roll having abutment projections having outer blunt edges, said abutment projections being located and shaped so that said blunt surfaces cooperate with said cutting means to exert cutting pressure and cutting action on a sheet of material which is fed between said rolls, said rolls respectively having outer layers of resilient material which are shaped to grip said sheet of material, said cutting means and said abutment projections being located in slots of the respective layers, said cutting means and said abutment projections being shaped and located to cut out of said sheet of material a plurality of tapered blanks at each complete revolution of said rolls.

3. Cutting mechanism for cutting a plurality of blanks out of a sheet of material, comprising a first roll, a second roll, means adapted to turn said rolls in opposite directions, the first roll having a plurality of projecting cutting dies located at its periphery, each said cutting die being tapered so that it has a narrow end and a wide end, the dies being located in continuous succession between the end faces of said first roll, each cutting die having a cutting member at each of its edges, each cutting die having its narrow end located at the wide end of an adjacent cutting die, each cutting die having at least one cutting member in common with an adjacent cutting die, said cutting members being shaped and located to abut corresponding portions of the second roll and in linear contact with said corresponding portions when said rolls are turned, each alternate cutting die having at least one of its respective cutting members which extends to the narrow end of said cutting die intersecting a cutting member of the adjacent cutting die intermediate the ends of said intersected cutting member of the adjacent die.

4. Cutting mechanism for cutting a plurality of blanks out of a sheet of material, comprising a first roll, a second roll, means adapted to turn said rolls in opposite directions, the first roll having a plurality of projecting cutting dies located at its periphery, each said cutting die being tapered so that it has a narrow end and a wide end, the dies being located in continuous succession between the end faces of said first roll, each cutting die having a cutting member a each of its edges, each cutting die having its narrow end located at the wide end of an adjacent cutting die, each cutting die having at least one cutting member in common with an adjacent cutting die, said cutting members being shaped and located to abut corresponding portions of the second roll in linear contact with said corresponding portions, when said rolls are turned, each alternate cutting die having at least one of its respective cutting members which extends to its narrow end intersecting a cutting member of the adjacent cutting die intermediate the ends of said intersected cutting member of the adjacent die, the cutting members of said succession of cutting dies including edge cutting-members which are located respectively at the respective edges of said succession, said edge cutting-members having continuous circular peripheries which are perpendicular to said axis of rotation and being located between the end-faces of the first roll and the other cutting-members.

5. Cutting mechanism for cutting a plurality of blanks out of a sheet of material, comprising a first roll, a second roll, means adapted to turn said rolls in opposite directions, the first roll having a plurality of projecting cutting dies located at its periphery, each said cutting die being tapered so that it has a narrow end and a wide end, the dies being located in continuous succession between the end faces of said first roll, each cutting die having a cutting member at each of its edges, each cutting die having its narrow end located at the wide end of an adjacent cutting die, each cutting die having at least one cutting member in common with an adjacent cutting die, said cutting members being shaped and located to abut corresponding portions of the second roll in linear contact with said corresponding portions, when said rolls are turned, each alternate cutting die having at least one of its respective cutting members which extend to its narrow end intersecting a cutting member of the adjacent cutting die intermediate the ends of said intersected cutting member of the adjacent die, the cutting members of said succession of cutting dies including edge cutting-members which are located respectively at the respective edges of said succession, said edge cutting-members having continuous circular peripheries which are perpendicular to said axis of rotation and being located between the end-faces of the first roll and the other cutting-members, said cutting dies having their wide and narrow ends alternating adjacent one of said edge cutting-members, some of said cutting dies having their wide ends located at the other edge cutting-member.

6. Cutting mechanism for cutting a plurality of blanks out of a sheet of material, comprising a first roll, a second roll, means adapted to turn said rolls in opposite directions, the first roll having a plurality of projecting cutting dies located at its periphery, each said cutting die being tapered so that it has a narrow end and a wide end, the dies being located in continuous succes-

sion between the end faces of said first roll, each cutting die having a cutting member at each of its edges, each cutting die having its narrow end located at the wide end of an adjacent cutting die, each cutting die having at least one cutting member in common with an adjacent cutting die, said cutting members being shaped and located to abut corresponding portions of the second roll in linear contact with said corresponding portions, when said rolls are turned, each alternate cutting die having at least one of its respective cutting members which extend to its narrow end intersecting a cutting member of the adjacent cutting die intermediate the ends of said intersecting cutting member of the adjacent die, the cutting members of said succession of cutting dies including edge cutting-members which are located respectively at the respective edges of said succession, said edge cutting members having continuous circular peripheries which are perpendicular to said axis of rotation and being located between the end-faces of the first roll and the other cutting-members, the narrow ends of the cutting dies which are located adjacent the respective edge cutting-member being spaced from said edge cutting-member and having linear extensions which extend to said respective edge cutting-member.

7. Cutting mechanism for cutting a plurality of blanks out of a sheet of material, comprising a first roll, a second roll, means adapted to turn said rolls in opposite directions, the first roll having a plurality of projecting cutting dies located at its periphery, each said cutting die being tapered so that it has a narrow end and a wide end, the dies being located in continuous succession between the end faces of said first roll, each cutting die having a cutting member at each of its edges, each cutting die having its narrow end located at the wide end of an adjacent cutting die, each cutting die having at least one cutting member in common with an adjacent cutting die, said cutting members being shaped and located to abut corresponding portions of the second roll in linear contact with said corresponding portions, when said rolls are turned, each alternate cutting die having at least one of its respective cutting members which extend to its narrow end, intersecting a cutting member of the adjacent cutting die intermediate the ends of said cutting member of the adjacent die, the cutting members of said succession of cutting dies including edge-cutting members which are located respectively at the respective edges of said succession, said edge cutting-members having continuous circular peripheries which are perpendicular to said axis of rotation and being located between the end-faces of the first roll and the other cutting-members, said cutting dies having their wide and narrow ends alternating adjacent one of said edge cutting-members, some of said cutting dies having their wide ends located at the other edge cutting-member, the narrow ends of the cutting dies which are located adjacent the respective edge cutting member being spaced from said edge cutting-member and having linear extensions which extend to said respective edge cutting-member.

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