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Draftsman.

No. 874,102.

PATENTED DEC. 17, 1907.

F. W. MERRICK.

MACHINE FOR CUTTING LEATHER, &c., INTO CONTINUOUS STRIPS.

APPLICATION FILED FEB. 7, 1903.

3 SHEETS—SHEET 1.

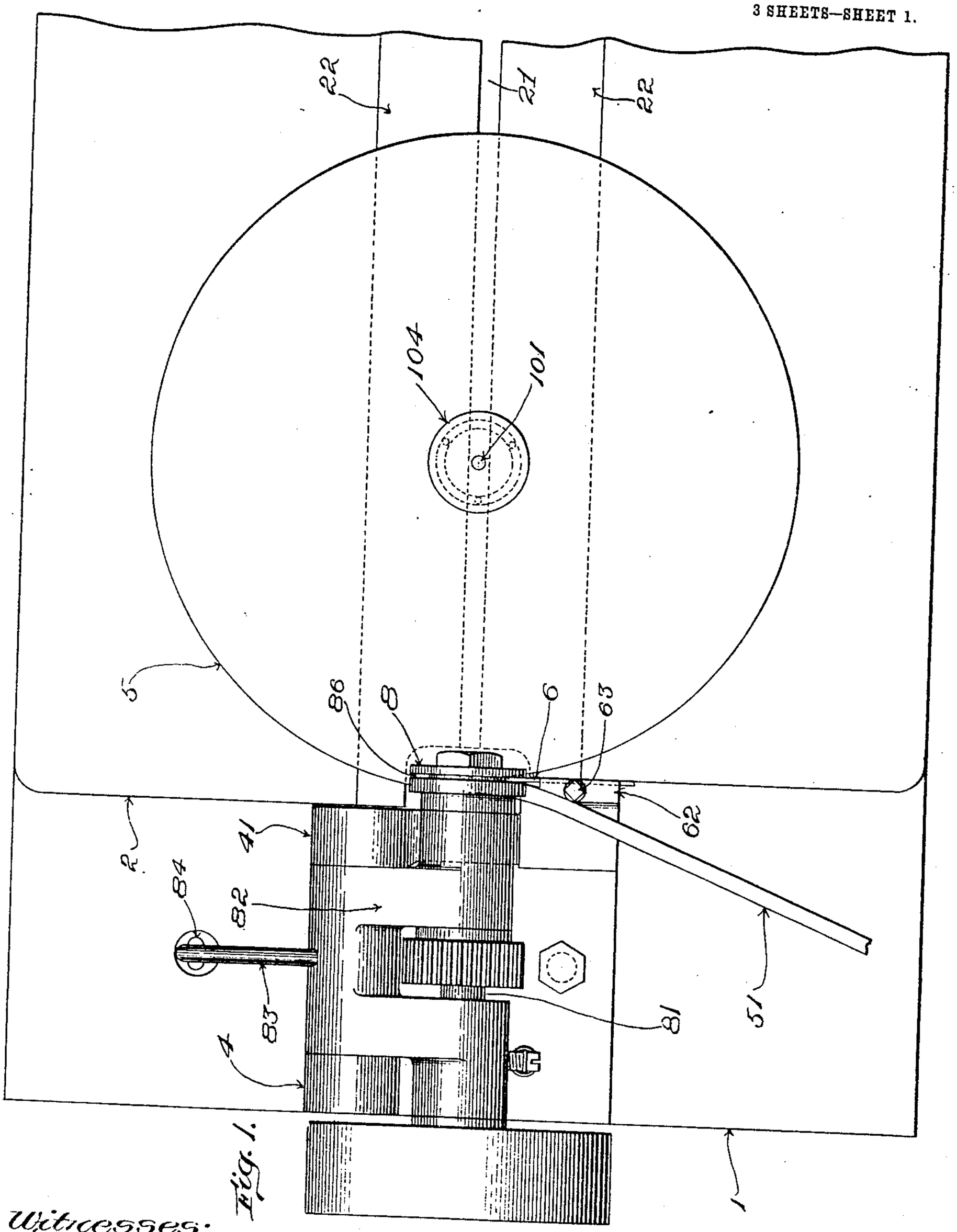

Fig. 1.

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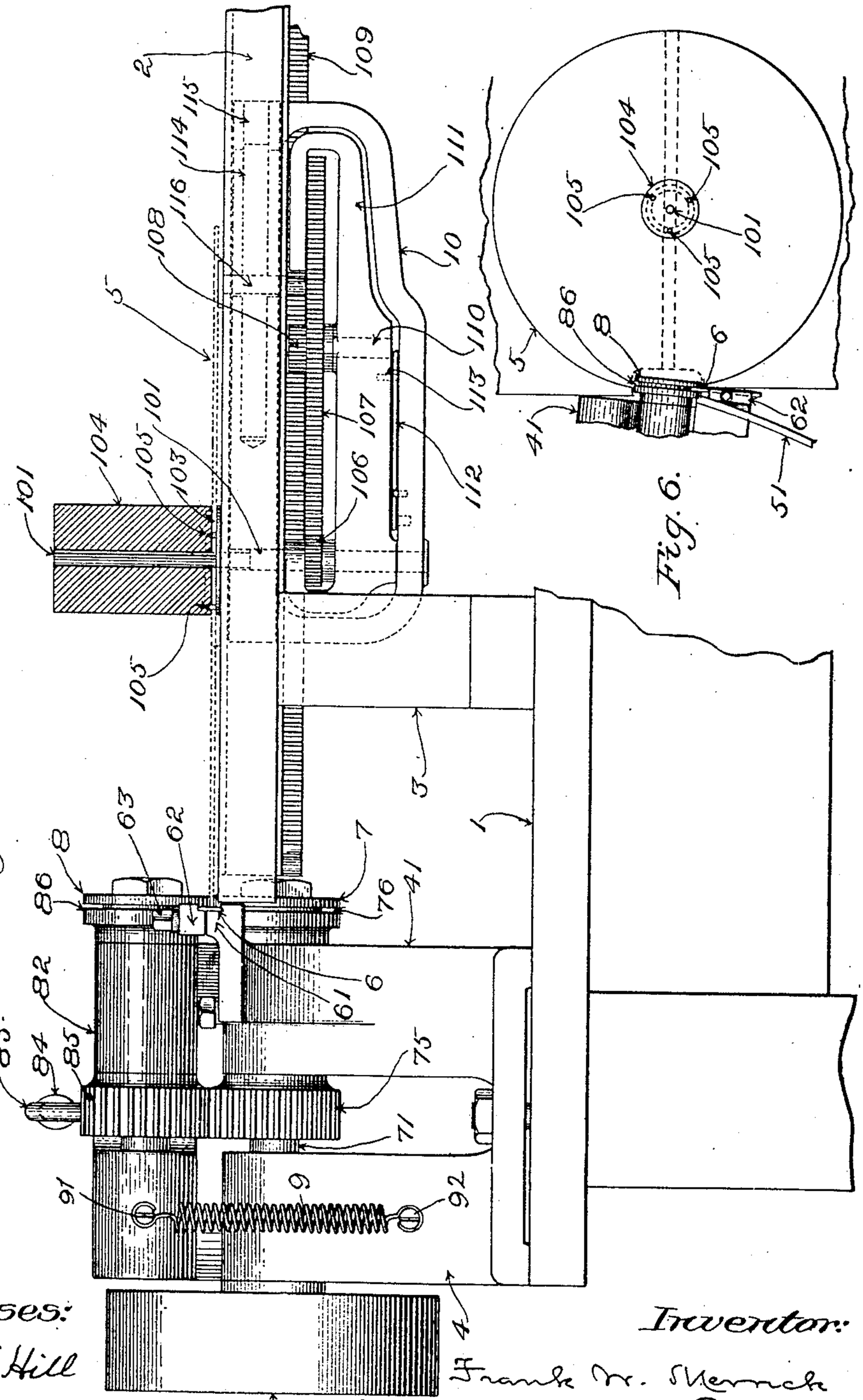

Fig. 2.

Fig. 6.

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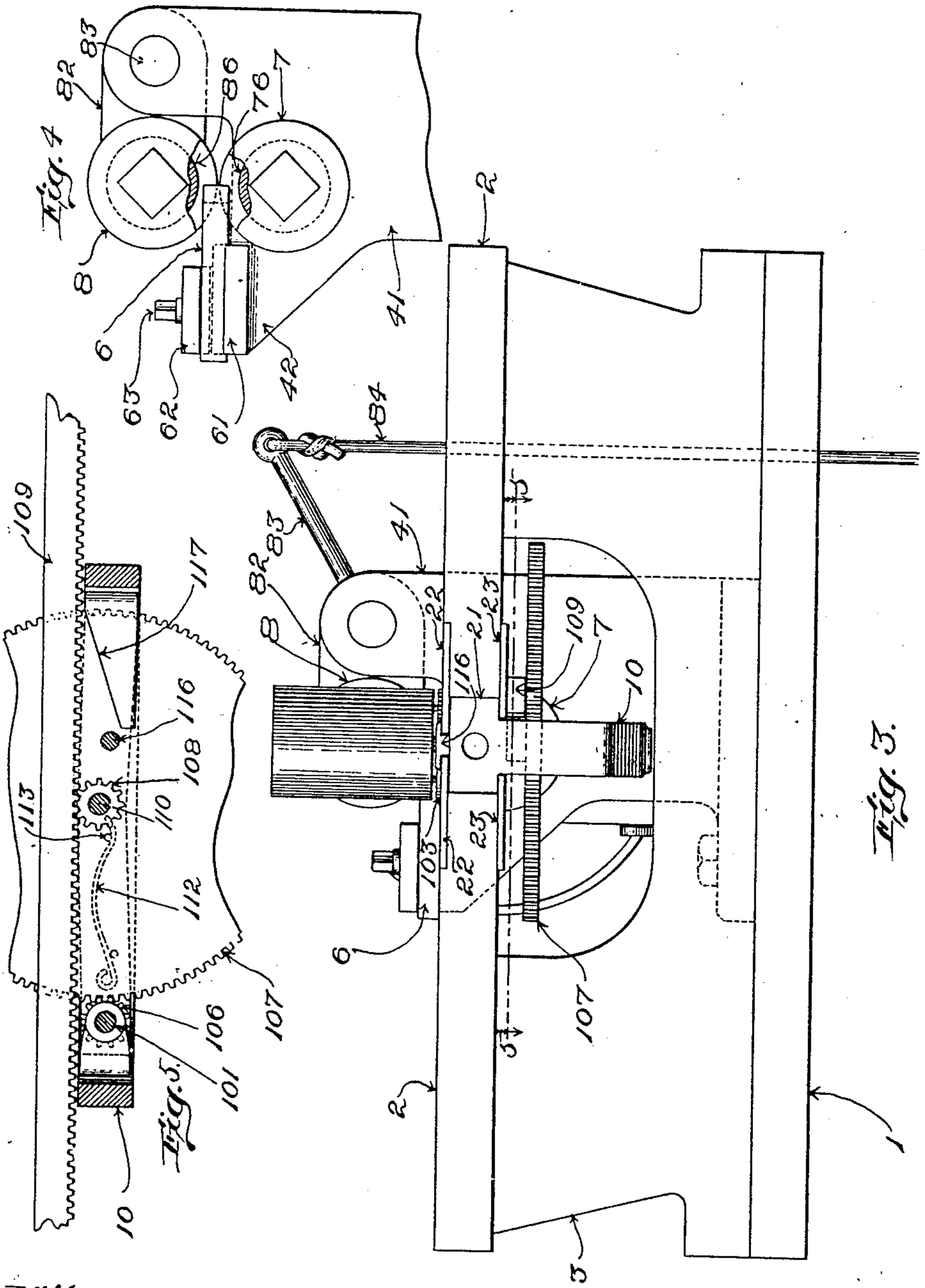

Fig. 4.

Fig. 5.

Fig. 3.

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UNITED STATES PATENT OFFICE.

FRANK W. MERRICK, OF BOSTON, MASSACHUSETTS.

MACHINE FOR CUTTING LEATHER, &c., INTO CONTINUOUS STRIPS.

No. 874,102. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed February 7, 1903. Serial No. 142,269.

To all whom it may concern:

Be it known that I, FRANK W. MERRICK, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Machines for Cutting Leather and other Sheet Material into Continuous Strips, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists, in general, in a machine of novel character which I have devised for the purpose of automatically cutting sheet-material, such, for example, as leather, expeditiously and without waste, breakage, or the like into a continuous strip of predetermined and uniform width.

The invention consists, further, in certain novel features of construction and combinations of parts which are embodied in the machine aforesaid.

The preferred embodiment of my invention is illustrated in the accompanying drawings.

In the drawings, Figure 1 shows in plan a machine containing the said embodiment of the invention, the right hand portions of the main bed and the work-supporting table of the said machine being broken away. Fig. 2 shows the said machine in side elevation, with the same omission. For the sake of clearness, the cylindrical weight which preferably constitutes the upper member of the central clamp for the sheet material is represented in vertical section. Fig. 3 is an end elevation of the machine, looking from the right hand side in Figs. 1 and 2. Fig. 4 is a detail view in side elevation looking from the right in Figs. 1 and 2, showing mainly the feed-rolls and the knife, with certain portions of the rolls broken away in order to illustrate more clearly the relation between the rolls and the working edge of the knife. Fig. 5 is a detail view, partly in section on a horizontal plane immediately below the under surface of the work-supporting table, as indicated by the dotted line 5—5 in Fig. 3. Fig. 6 is a diagram illustrating the relative positions of the knife, feed-rolls, etc.

The main bed of the machine is represented at 1. At 2 is a work-supporting table which is mounted upon vertical supports 3, 3, Figs. 2 and 3, rising from the bed 1. Upon the bed 1, beyond and adjacent to one end of the work-supporting table 2, are mounted the standards 4, 41, supporting the knife, the feed-rolls, and the operating connections of the feed-rolls. The sheet of material, as 5, which is to be cut into a continuous strip, lies upon the upper surface of the work-supporting table 2, it being shown in full lines in Fig. 1 and in dotted lines in Fig. 2. The mechanism by which in the illustrated embodiment of the invention the said sheet is fed transversely or diametrically with relation to the knife in order to occasion a continuous spiral cut and secure the required width of strip is mainly located between the work-supporting table 2 and the bed 1.

The sheet 5 is represented in Fig. 1 as in process of being formed into a narrow strip by a continuous spiral cut, and the said strip is designated 51. The knife by which the sheet 5 is cut into the strip 51 is designated 6. The said knife and the holding means for the same may be variously constructed and arranged. In the present instance, the knife is mounted in a fixed position upon a projection or extension 42 of the standard 41, and is held with its cutting edge in a plane that is vertical with relation to the sheet 5. It is clamped between jaws 61, 62. The knife is herein shown as composed of a strip of suitable material having one end thereof sharpened, the rear part of the knife being received within and between the engaging portions of the jaws 61, 62. Jaw 61 is shown as integral with the standard 41, while jaw 62 is shown formed as a separate plate resting upon the horizontal upper portion of the extension 42 of the standard 41. The stem of a screw 63 passes through a hole made through the loose jaw 62, the threaded portion of said stem being received in a threaded hole that is tapped in the extension 42 of the standard 41.

As indicated in Figs. 2 and 4, the lower jaw 61 is formed with a transverse groove or depression to receive the lower edge of the knife 6, and both jaws are formed with vertical faces, as shown in the said figures, against which one side of the knife rests. By the said groove and vertical faces the knife is retained in the required plane.

Before beginning operation on the machine, the sheet 5 is trimmed to a circular or disk-like form, and when the sheet is placed upon the upper surface of the work-supporting table 2 its marginal portion closely adjacent the periphery of the sheet is presented to the cutting edge of the knife. For the purpose of rotating the said sheet and advancing

thereby the said marginal portion relatively to the knife, to occasion the cutting, I employ rotating feed-rolls, the latter preferably engaging with the marginal portion of the sheet. A pair of such feed-rolls is shown at 7 and 8. For the attainment of the most accurate results in the cutting, these feed-rolls are located immediately adjacent the cutting edge of the knife, as most clearly indicated in Fig. 4, and so as to clamp the marginal portion of the sheet between them at points corresponding closely with the cutting point.

In some embodiments of the invention, the arrangement of the feed-rolls, the construction thereof, and the means of supporting and operating the feed-rolls, may vary from the preferred arrangement which is illustrated in the accompanying drawings. In the said drawings, the lower feed-roll 7 is mounted upon the inner end of the shaft 71, which latter is journaled in suitable bearings that are provided therefor in the standards 4, 41. The said shaft, in the present instance, is the driving shaft for the feed-rolls. It may have employed in connection therewith in practice any suitable means for transmitting rotary movement thereto. I have shown the said shaft 71 as equipped with a band-pulley 72 for the reception of a driving-band for the transmission of power to the shaft 71 from a counter-shaft or the like. The shaft 81 of the upper feed-roll 8 is mounted in bearings in a swinging carrying-frame 82. The latter is hung or pivoted to the upper ends of the standards 4, 41, as shown best in Figs. 1, 3 and 4. It is movably mounted, in order that the upper feed-roll 8 may be caused to approach the lower feed-roll 7 for the purpose of clamping the sheet 5 between the two feed-rolls, or may be moved away from the lower feed-roll so as to release the said sheet, the capacity for movement being provided for, also, in order to permit of the adjustment of the closeness of approach of the two feed-rolls to each other to suit the thickness of the sheet 5, or to vary the compression of the said sheet by the feed-rolls.

For convenience in effecting the separation of the two rolls, when necessary, I have provided means for manually moving the carrier 82, the said means in the present instance comprising an arm 83, extending from carrier 82 and having joined therewith a connection 84, Figs. 1 and 3, extending downward to a suitable treadle or the like which is conveniently located with reference to the operator. The upper feed-roll 8 is pressed toward the lower feed-roll 7 with yielding force, to clamp the sheet of material 5 between the two feed-rolls, by means of a spiral spring, as 9, Fig. 2 having one extremity thereof connected with a screw 91, applied to the carrier 82, and its other extremity connected with a screw 92 applied to the standard 4. For the transmission of rotary movement from the lower feed-roll 7 to the upper feed-roll 8, the shafts 71 and 81, respectively, have fixed thereon the spur-gears 75, 85, respectively, which intermesh, as in Fig. 2, when the upper feed-roll occupies the working position thereof which is represented in the drawings. The peripheries of the feed-rolls 7, 8, are circumferentially grooved, as at 76, 86, Figs. 1, 2 and 4, and the cutting end of the knife 6 projects between the said feed-rolls, into the grooves thereof, as best shown in Fig. 4, its edge preferably being located at the point of nearest approach of the surfaces of the feed-rolls to each other, where the sheet 5 is most firmly held by the feed-rolls, thereby securing the best results in the cutting. Means is provided for preventing the sheet 5 from advancing bodily across the table in the direction of the peripheral feed that is produced by the action of the feed-rolls 7 and 8. In the present instance, this function is performed by the spindle 101, Figs. 1 and 2. The upper portion of the said spindle passes through a hole in sheet 5 at the center of said sheet. Hence, in consequence of the engagement of the said feed-rolls with the marginal portion only of the said sheet at one side of the center of the latter, the action of the said feed-rolls occasions a rotary movement of the disk-like sheet. For convenience of designation, I term the spindle 101 a "center". Suitable provision is made, also, for permitting or causing the sheet to advance transversely or diametrically with relation to the cutting edge of the knife. Thus, the support for spindle 101 is made movable so as to enable the spindle to advance toward the knife by a progressive movement as the cutting of sheet 5 proceeds. Consequently, as the sheet rotates, its marginal portion is cut away spirally by the knife 6 in the form of a continuous strip 51, the operation proceeding without break until the central portion of the disk-like sheet is reached. The advance of the disk-like sheet 5 transversely or diametrically with relation to the cutting edge of the knife 6 may be provided for by various means, and I do not necessarily in embodiments of the broader phases of the invention limit myself with respect thereto.

Having reference to the drawings, the work-supporting table 2 is slotted lengthwise, as at 21. To the edges of the slot 21, at opposite sides of the latter, are applied strips or gibs 22, 22, and 23, 23. These strips or gibs are attached to the upper and under surfaces, respectively, of the table 2, and project part way across the slot, so as to form guides for the slide 10. A portion of the said slide 10 fits the slot 21 and works therein lengthwise of the table toward and from the feed-rolls and knife. Shoulders at opposite sides of the portion of the said slide which is received within the slot 21 rest upon

the strips or gibs 23, 23, and thereby the slide is supported within slot 21, with capacity to move lengthwise of the table 2. The spindle or "center" 101 is mounted upon the slide 10. Preferably, the center or spindle 101 is moved at a certain definite rate toward the cutting point by means of advancing means coöperating with the support therefor to feed the said support and center or spindle relatively to the cutting point at a predetermined relative speed corresponding with the desired width of the strip which is to be produced. Thus, in the present embodiment of the invention the said slide 10 is provided with bearings in which the spindle 101 is mounted, and the said spindle is connected with the sheet 5, at the center of the latter, in such manner as to cause the said spindle to be rotated from the said sheet as the latter is caused to turn by the action of the feed-rolls during the cutting operation. The precise manner of operatively connecting the sheet 5 with the spindle 101 so as to cause the said spindle to rotate in unison with the disk-like sheet 5 may vary in practice, but in the present instance I have shown the upper portion of the spindle 101 rising through the opening between the proximate edges of the upper strips or gibs 22, 22, and carrying a disk 103. The central hole that is made in sheet 5 enables the said sheet to pass over the upper portion of the spindle 101 and rest upon the disk 103. At 104 is a cylindrical weight having a central hole, which enables the said weight to be placed upon the upper portion of spindle 101 so as to compress the central portion of the sheet 5 between the lower end of the weight and the disk 103. At 105, 105, are shown pins or projections with which the disk 103 is provided, the said pins or projections engaging with the sheet 5. The rotary movement of the spindle is made operative to control or occasion the advance of the spindle and its support toward the cutting-point, as follows: A spur-pinion 106 upon spindle 101 meshes with a spur-gear 107 having fast therewith a spur-pinion 108 which meshes with a rack 109. The said rack is mounted in fixed position at the under side of the work-supporting table 2, closely adjacent the opening between the lower strips or gibs 23, 23. The rotation which is transmitted from the sheet 5 to the spindle 101 acts to rotate the gearing 106, 107, 108, and thus the movement of pinion 108 along the fixed rack 109 is provided for. The proportions of the gears are such as to enable the sheet to be advanced at the rate required for the production of the desired width of strip 51. By a change of such proportions, the relative rate of the advance may be varied. Pinion 108 preferably is the change gear. The described mechanism is characterized by the fact that the moving sheet 5 is itself a means of transmitting movement to the devices by which the advance of the sheet in a diametrical direction relative to the cutting knife is controlled or effected.

For the purpose of facilitating the operation of moving the slide 10 by hand lengthwise of the table 2, as when it is desired to move it away from the knife, or adjust it to starting position, provisions are made for enabling the gear-connections to be disconnected whenever desired, thereby rendering the slide free to have communicated to the same manually or otherwise whatever movement lengthwise of the table may be found desirable. To this end, in the present instance, I have mounted the gear 107 and pinion 108 movably upon the slide 10, so as to permit the pinion 108 to be shifted into and out of engagement with the teeth of the fixed rack 109 whenever required. The said gear and pinion are fitted to a stud 110 carried by an arm 111 which is hung upon the spindle 101. In the swinging movements of the arm 111, the gear 107 moves concentrically with relation to the pinion 106, and hence such swinging movements do not disturb the relations of the gear and said pinion 106. By means of a spring 112, which is carried by the slide 10 and acts against a pin 113 projecting from the arm 111, the arm 111 is held normally in a position in which the pinion 108 meshes with the teeth of the fixed rack 109.

For the purpose of enabling the arm 111 conveniently to be moved by hand so as to carry the pinion 108 out of mesh with the teeth of the fixed rack 109, I provide the block 10 with a sliding bolt 114, the said bolt working in a longitudinal hole 115 in the said slide and carrying a pin 116. The upper end of this pin projects within reach at the upper side of the table, as indicated in Figs. 2 and 3, while the lower end thereof projects into position to engage with an inclined or cam-shaped surface 117 on the arm 111. By applying pressure to the upper end of the pin 116 so as to move the said pin and its carrying bolt 114 in a direction to cause the lower end of the pin to bear against the inclined or cam-shaped surface 117 of the arm 111, the latter is moved against the tension of the spring 112 in a direction to disengage the pinion 108 from the rack 109 and render the slide 10 free to be moved within the slot 21 as may be found necessary.

The knife 6 is chisel-edged, and has its oblique surface turned away from the center of the sheet 5. The knife is mounted with its working end inclined slightly toward the center of the sheet 5, as indicated in Fig. 6. The action of the knife in cutting is thereby caused to strain the leather toward the knife. The axes of the rolls, also, preferably are disposed at a slight angle with respect to a radial line passing through the axis of the

center or spindle 101, as indicated in Fig. 6. This position of the rolls causes the latter, in rotating, to draw the sheet 5 in a radial direction toward the knife.

I claim as my invention:—

1. A machine for cutting leather or other sheet-material into a continuous strip, comprising, essentially, a cutter, occupying a relatively fixed position, and means of producing a spiral feed of the sheet of leather or other material to the said cutter, the said means engaging with the uncut portion of the said sheet substantially as described.

2. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls adjacent the cutter engaging with the uncut marginal portion of the sheet to be cut, a centering device engaging with the said sheet, and a support on which the said centering device is movable toward said knife to occasion a spiral feed of the sheet to the knife, substantially as described.

3. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls adjacent the cutter engaging with the uncut marginal portion of the sheet to be cut, a center engaging with the sheet, and means to feed said center toward the cutter, to cause a spiral feed of the sheet to the cutter by the combined action of the parts, substantially as described.

4. A machine for cutting leather or other sheet material spirally into a continuous strip, comprising, essentially, a cutter, feed-rolls engaging with the uncut marginal portions of the sheet material which is to be cut to advance such portion to the cutter, a centering device engaging with the said sheet material, and means acting positively to move the said centering device at a predetermined rate toward the cutter.

5. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls engaging with the uncut marginal portion of the sheet to be cut and means operated by the rotating sheet to feed the latter diametrically with relation to the cutter to occasion a continuous spiral cut in said sheet, substantially as described.

6. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a fixed knife or cutter, feed-rolls engaging with the uncut marginal portion of the sheet to be cut to cause the marginal portion of the sheet to be advanced to the cutter to be cut, a center engaging with the sheet, and means operated by the rotating sheet to feed said center diametrically toward the cutter, substantially as described.

7. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a fixed knife or cutter, feed-rolls adjacent the same engaging with the uncut marginal portion of the sheet to be cut, and operating to advance the same against the said knife or cutter, a centering device engaging with the sheet being cut and partaking of the rotation of the said sheet, and feeding means operated through the rotation of said centering device to feed the sheet toward the cutter, to occasion a continuous spiral cut in said sheet, substantially as described.

8. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls adjacent the same, a centering device for the sheet being cut rotatable by the said sheet, a relatively fixed rack, and means intermediate said rack and centering device and operated by the latter to feed the said device and sheet toward the cutter, substantially as described.

9. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls adjacent the same, a centering device engaging with the sheet being cut and rotating therewith, gearing in operative connection with the said device, and a relatively fixed rack with which said gearing engages whereby the feed of the centering device and the sheet engaged therewith toward the cutter is occasioned, substantially as described.

10. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, means to advance thereto the marginal portion of the sheet being cut, a centering device for said sheet rotatable thereby, means in operative connection with said device for feeding the same toward the cutter, and disconnecting means to release the centering device, substantially as described.

11. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, means to advance thereto the marginal portion of the sheet being cut, a centering device for said sheet rotatable therewith, a relatively fixed rack, gearing intermediate said centering device and rack to regulate the feed of the said device toward the cutter, and a support for said gearing movable to disconnect the latter from the said rack, substantially as described.

12. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, means to advance thereto the marginal portion of the sheet being cut, a centering device for said sheet rotatable therewith, a support for said device movable toward said cutter, a relatively fixed rack, gearing intermediate said device and rack to regulate the feed of the device toward the cutter, and a shipper for said gearing whereby to place the same in

and out of operative relations with said rack, substantially as described.

13. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, an obliquely set cutter, means engaging with the uncut portion of the sheet from which the strip is being produced to advance the marginal portion of the said sheet to the said cutter, and means to gage the width of the strip that is spirally severed from the sheet, the obliquity of the cutter operating to strain the said sheet transversely with relation to the cutter and thereby operating to hold the sheet pressed against the gage to insure uniformity in the width of the strip, substantially as described.

14. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, an obliquely set cutter, means engaging with the uncut portion of the sheet which is to be cut to advance the marginal portion of the said sheet to the cutter, a centering device for said sheet, and means to gage the width of the strip that is being cut, the obliquity of the cutter operating to strain the said sheet radially outward toward the cutter, substantially as described.

15. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls to advance to the cutter the marginal portion of the sheet from which the strip is produced, means to gage the width of the strip that is spirally severed from the sheet, and means supporting the said feed-rolls with their axes oblique or inclined whereby the said sheet is strained transversely with relation to the cutter, substantially as described.

16. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, feed-rolls to advance to the cutter the marginal portion of the sheet from which the strip is produced, a centering device for the said sheet, means to gage the width of the strip that is spirally severed from the sheet, and means supporting the said feed-rolls with their axes oblique or inclined whereby the said sheet is strained transversely with relation to the cutter, substantially as described.

17. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, the obliquely set cutter, the obliquely-set feed-rolls to advance to the said cutter the marginal portion of the sheet from which the strip is being produced, and means to gage the width of the strip that is spirally cut from the said sheet, substantially as described.

18. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, the obliquely-set cutter, the obliquely set feed-rolls to advance to the said cutter the marginal portion of the sheet from which the strip is being produced, a centering device for the said sheet, and means to gage the width of the strip that is spirally cut from the said sheet, substantially as described.

19. A machine for cutting leather or other sheet-material into a continuous strip comprising, essentially, a cutter, a centering device for the sheet being cut rotated by said sheet, a carrier for the said centering device, and feeding means operated through the rotation of the sheet to feed the latter toward the cutter to occasion a continuous spiral cut in said sheet, said means comprising a train which is separable to permit the said carrier to be shifted in position in the direction toward and from the cutter by hand.

20. In a machine for cutting leather or other sheet-material spirally into a continuous strip, in combination, a cutter, feed-rolls, a movable carrier for one of the said feed-rolls, a spring operating said carrier to move such feed-roll toward the other one, and a centering device movable radially toward the cutter.

21. In a machine for cutting leather or other sheet-material spirally into a continuous strip, in combination, a cutter, feed-rolls, a movable carrier for one of the said feed-rolls; a spring operating the said carrier to move such feed-roll toward the other one, means for operating the said carrier to separate the feed-rolls, and a centering device movable radially toward the cutter.

22. In a machine for cutting leather or other sheet-material into a continuous strip, in combination, a fixed cutter, a centering device for the sheet-material, movable toward the said cutter, and grooved feed-rolls receiving the acting end of the cutter in their grooves substantially at the bite of the feed-rolls.

23. In a machine for cutting leather or other sheet-material into a continuous strip, in combination, an obliquely-disposed fixed cutter, a centering device for the sheet-material, movable toward the said cutter, and grooved feed-rolls receiving the acting end of the cutter in their grooves substantially at the bite of the feed-rolls.

24. In a machine for cutting leather or other sheet-material into a continuous strip, in combination, a fixed cutter, a centering device for the sheet-material, movable toward the said cutter, and upper and lower feed-rolls having the bite thereof immediately adjacent the acting end of the cutter.

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

FRANK W. MERRICK.

Witnesses:
CHAS. F. RANDALL,
WILLIAM A. COPELAND.