No. 838,903. PATENTED DEC. 18, 1906.

D. N. ROBERTSON.

SKIVING MACHINE.

APPLICATION FILED JAN. 13, 1904.

4 SHEETS—SHEET 1.

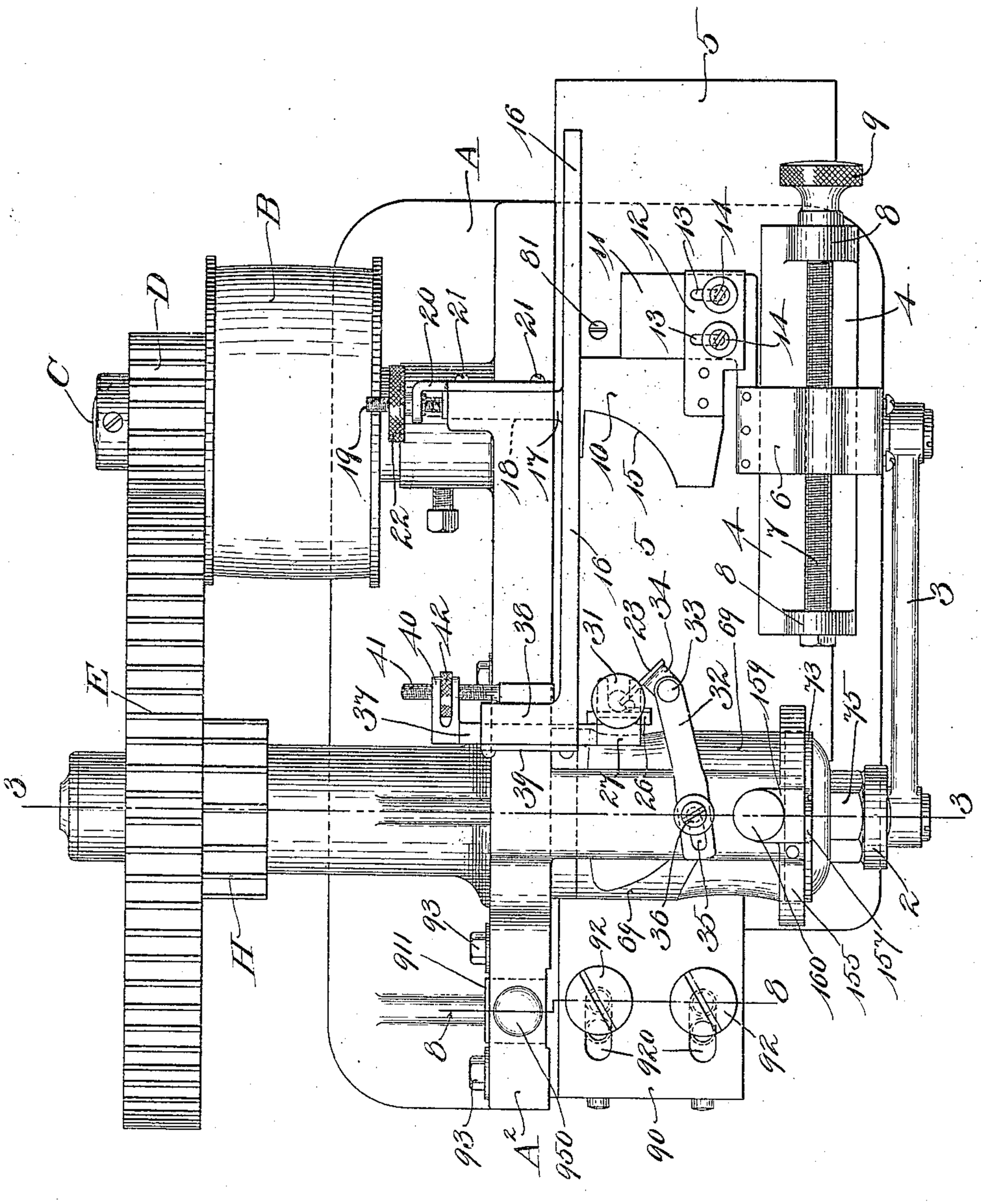

FIG. 1.

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George D. Gibson

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attys.

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4 SHEETS—SHEET 2.

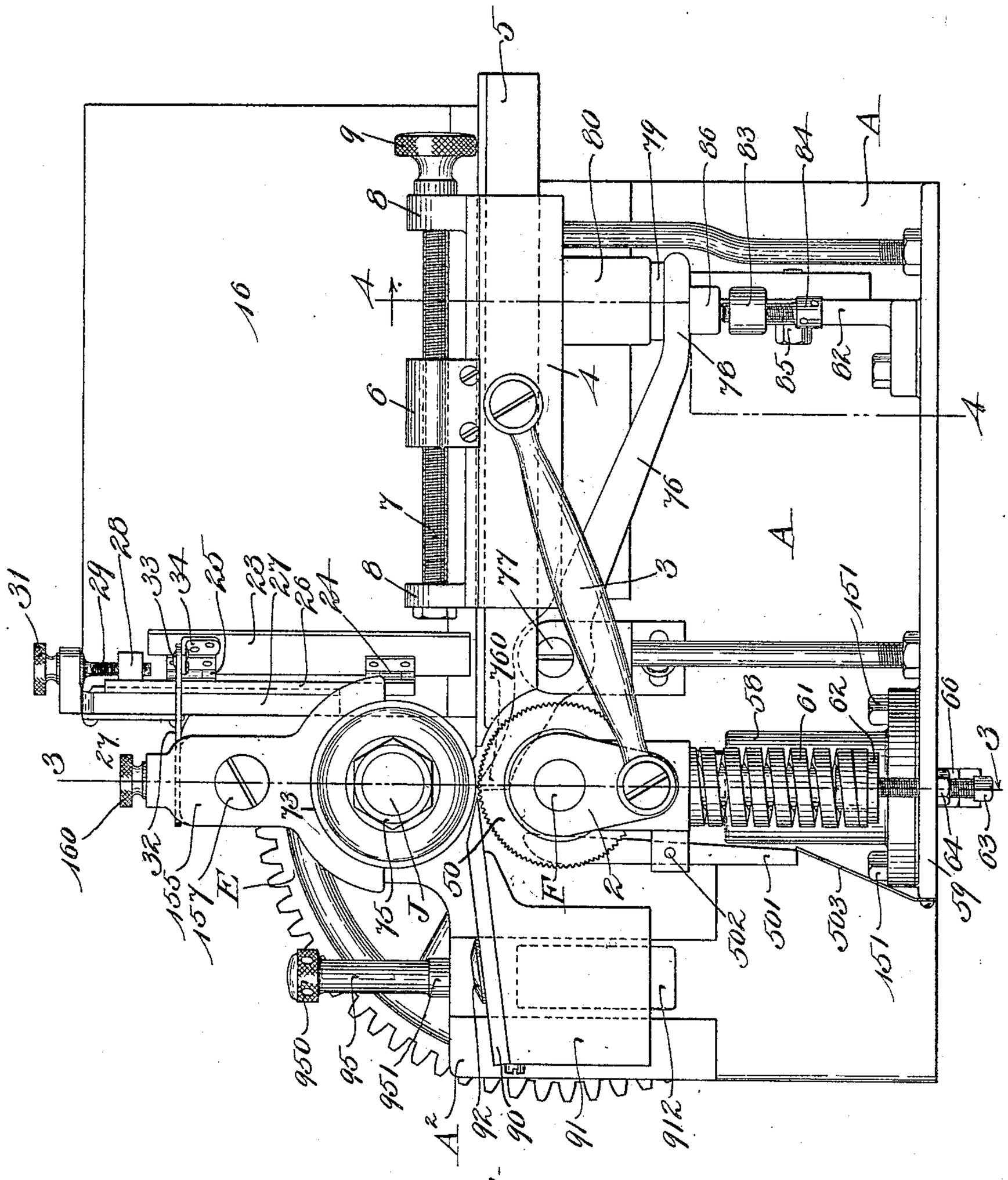

FIG. 2.

WITNESSES:

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4 SHEETS—SHEET 3.

FIG. 3.

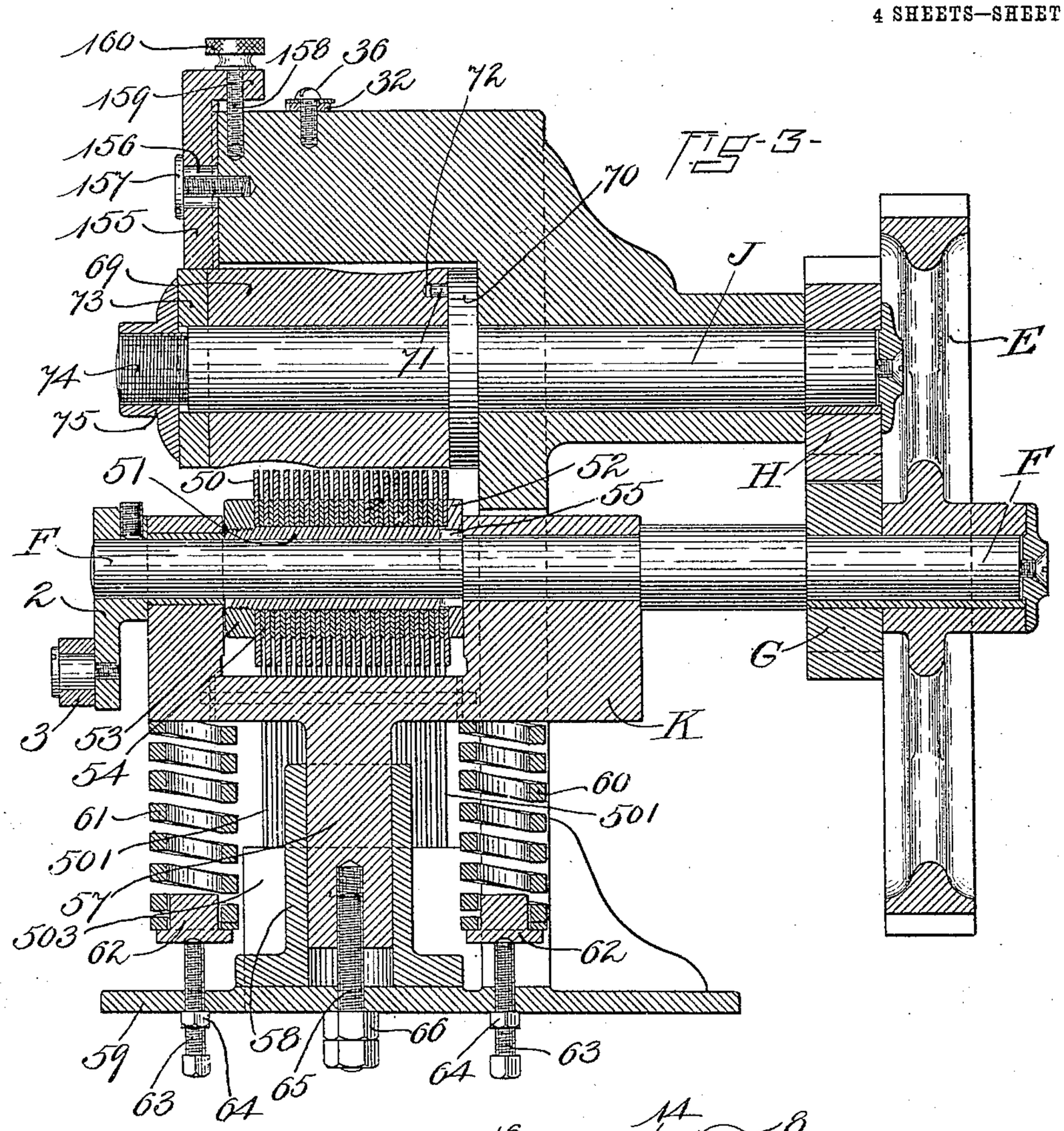
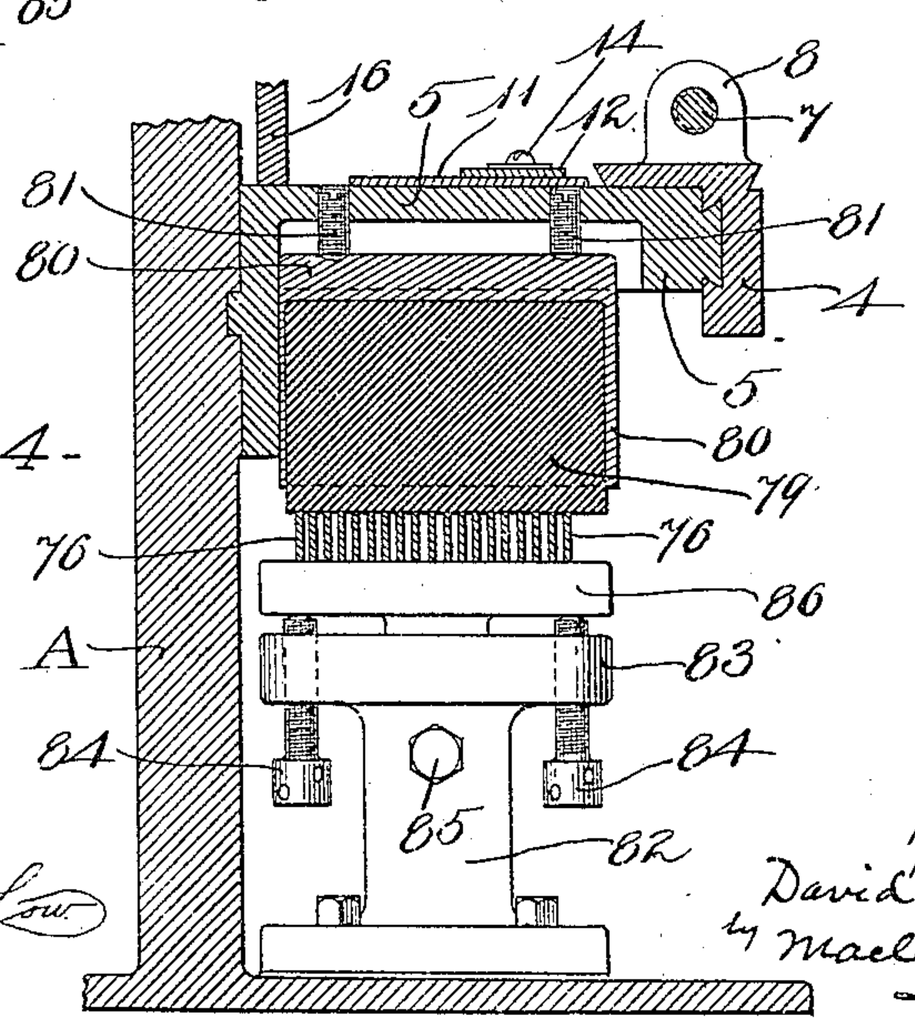


FIG. 4.



WITNESSES:
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No. 838,903. PATENTED DEC. 18, 1906.

D. N. ROBERTSON.

SKIVING MACHINE.

APPLICATION FILED JAN. 13, 1904.

4 SHEETS—SHEET 4.

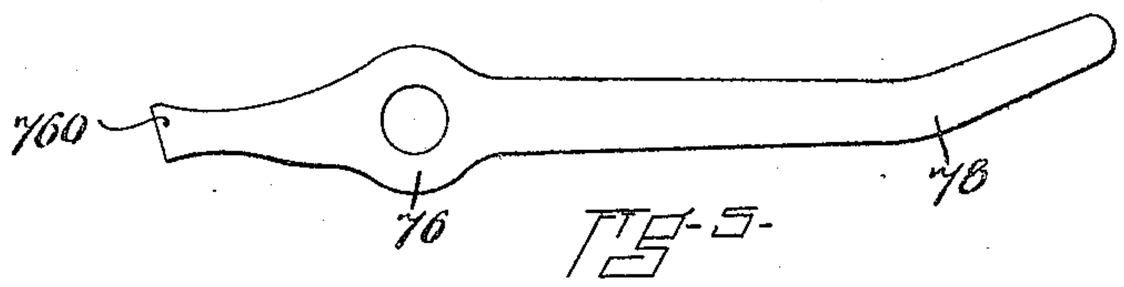

FIG-5-

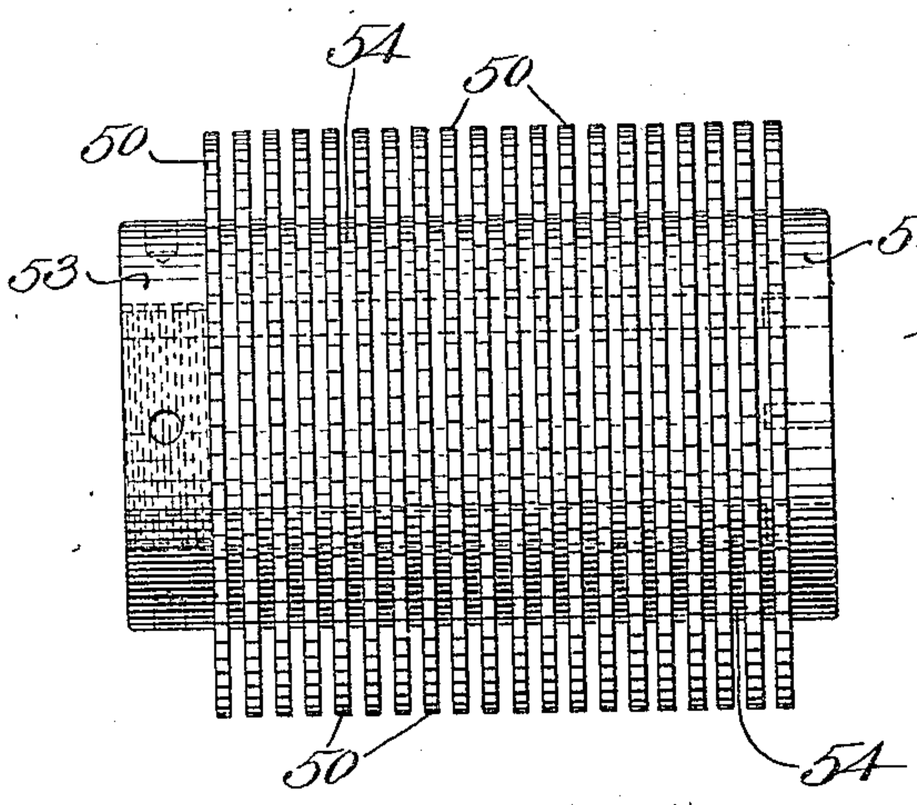

FIG-6-

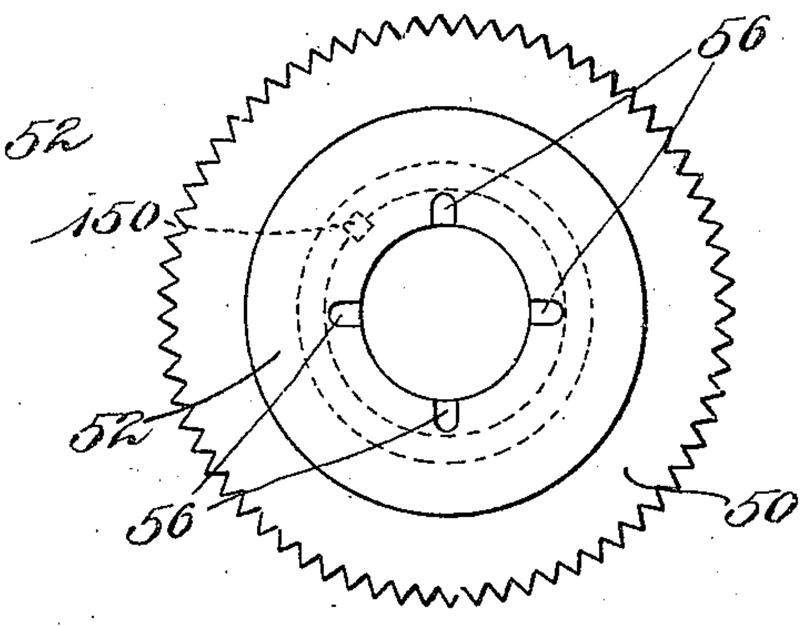

FIG-7-

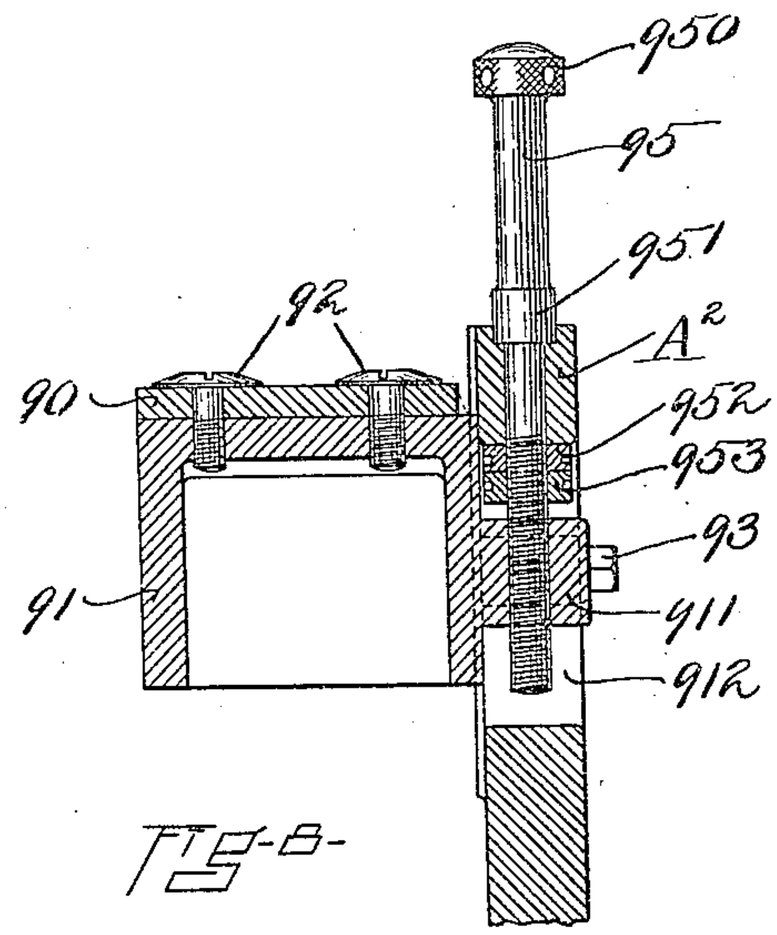

FIG-8-

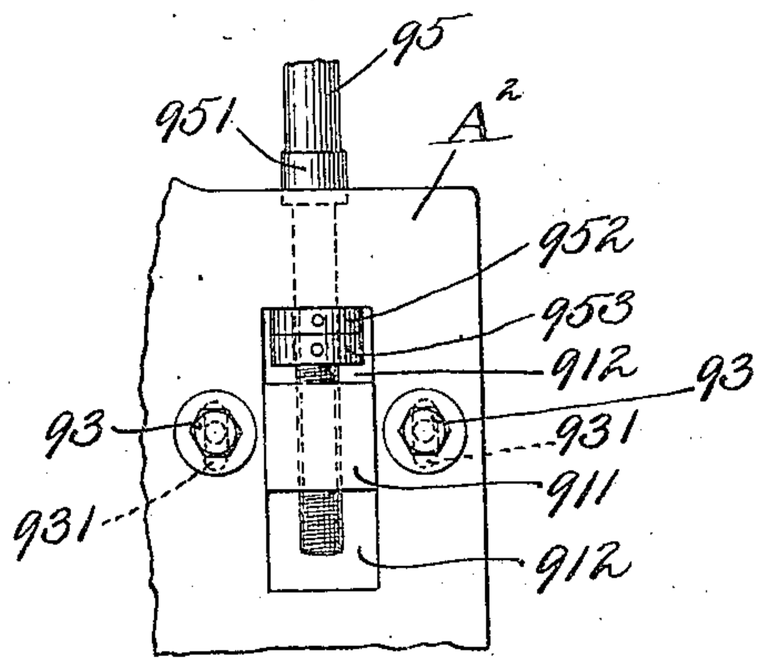

FIG-9-

WITNESSES:
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INVENTOR:
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by Macleod Calver & Randall
Attys.

UNITED STATES PATENT OFFICE.

DAVID N. ROBERTSON, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO WILLIAM LA CROIX AND ONE-HALF TO EDWARD W. LA CROIX, OF LYNN, MASSACHUSETTS.

SKIVING-MACHINE.

No. 838,903. Specification of Letters Patent. Patented Dec. 18, 1906.

Application filed January 13, 1904. Serial No. 188,821.

To all whom it may concern:

Be it known that I, DAVID N. ROBERTSON, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Skiving-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object an improvement in leather-skiving machines of the kind employed in skiving blanks for box-toes, boot and shoe counters, and the like.

The invention will be fully understood from the following description, in which reference is made to the accompanying drawings, and the novel features thereof are pointed out and clearly defined in the claims at the close of the specification.

In the drawings, Figure 1 is a plan view, and Fig. 2 a side elevation, of a machine embodying my invention. Fig. 3 is a section on line 3 3 of Figs. 1 and 2. Fig. 4 is a section on line 4 4 of Fig. 2 looking in the direction of the arrow on said Fig. 2. Fig. 5 is a detail showing one of the pressing-fingers. Fig. 6 is a detail showing the feed-wheels and the sleeve on which they are mounted. Fig. 7 is an end view of the parts shown, Fig. 6. Fig. 8 is a section on line 8 8, Fig. 1. Fig. 9 is a side view of a portion of the frame, showing the means employed for the vertical adjustment of the knife.

The machine as shown in the accompanying drawings is designed to be placed upon a bench of convenient height and is provided with a suitable frame portion A, in and upon which the operating parts are mounted and supported. A driving-pulley is shown at B, Fig. 1. This pulley is mounted upon a stud C and has rigidly connected therewith a pinion D, which meshes with a gear E, fast on the shaft F. A gear G, also fast on the said shaft F, is in mesh with a gear H on an upper or counter shaft J. The shaft F is journaled in a movable yoke K, hereinafter more fully described, and the shaft J is journaled in suitable bearings in the frame A, as will be clear from Fig. 3. The shaft F actuates the feed-wheels and the reciprocating feeder by means of which the blanks to be skived are fed one at a time to the feed-wheels.

For the purpose of actuating the reciprocating feeder the shaft F is provided with a crank 2, (see Figs. 2 and 3,) which is located at the front of the machine. A connecting-rod 3 is pivoted at one end to the crank and at the other to the side of a sliding carriage 4, which is dovetailed on the edge of the table or work-support 5, as shown, Fig. 4. The carriage 4 has mounted thereon a horizontally-adjustable block or carrier 6, through which a threaded adjusting-screw 7 passes. At either end of the carriage 4 the adjusting-screw 7 passes through brackets 8 on said carriage 4, and it is provided at one end with a milled head 9, by means of which it may be turned. The turning of the screw 7 operates to move the sliding block 6 lengthwise, and thereby to effect an adjustment of the feed-plate 10, which is secured to and slides with the said carrier.

To the inner edge of the block or carrier 6 (see Fig. 1) is firmly secured a plate 11, which projects over the table or work-support 5. The feed-plate 10 is provided with a plate 12, which projects rearwardly directly over the plate 11 and serves to secure the feed-plate 10 to the plate 11, while at the same time permitting an adjustment of the feed-plate 10 in a direction transversely of the table 5. The plate 12 is provided with slots 13, through which pass securing-screws 14, which serve to fasten the plate 12 to the plate 11 and at the same time permit adjustment of the plate 12 and the feed-plate 10, as previously stated. It will be clear that the carrier 6 together with the plates 11 and 12 and the feed-plate 10 are all secured together and that any adjustment of the carrier 6 by means of the adjusting-screw 7 will effect an adjustment of the feed-plate 10 toward or from the feed-wheels and skiving-knife. The front edge of the feed-plate 10, which comes in contact with the blank in the act of feeding it forward to the feed-wheels, may be cut away in the form of one end of a blank, as shown at 15, Fig. 1, to give the blank a more certain bearing on the feed-plate and to facilitate the placing of the pile of blanks in position on the table 5.

At the inner edge of the work support or table 5 is located a vertical gage-plate 16, Figs. 1 and 2. The straight or least-rounded

edge of the blanks to be skived are laid against the face of the gage-plate 16, and they are thereby guided so as to pass over the feed-rolls and onto the skiving-knife in the proper manner. In order that the gage-plate 16 may be moved in a direction transversely of the table 5 for the purposes of adjustment, the plate or guide 16 is provided with a stud 17, which projects through a hole or bearing at 18 in the frame of the machine. The free end of the stud 17 is threaded, as at 19, and projects through a bracket 20, which is rigidly secured to the frame of the machine by screws 21. A thumb-nut 22 is freely revoluble in the bracket 20 and upon the threaded end of the stud 17 and operates when turned to move the stud 17 and the gage-plate 16 in a direction transversely of the table 5.

As before stated, the blanks to be skived are placed in a pile one above the other upon the work-table 5 with their straight edges against the gage-plate 16. In order that but one blank—and that the lowermost one of the pile—may be carried forward to the feed-rolls at a time, I provide the hinged gage 23, having its lower end at a distance above the work-table slightly greater than the thickness of a blank. As the machine is required to be used with blanks of varying thicknesses and widths, I make this gage 23 adjustable vertically and transversely of the work-table 5 in the following manner: The gage-plate 23 is hinged at 24 and 25 to a vertically-sliding plate or block 26, which is dovetailed to the support 27. A thumb-screw 29, having a milled head 31 and with its lower end engaging the lug 28, is provided, by turning which the block or plate 26 is caused to move upwardly or downwardly relatively to the part 27 on which the said plate 26 is dovetailed. In this way a vertical adjustment of the hinged gage 23 is obtained.

In order that the gage 23 may be securely set at any point in its swing upon the hinges 24 and 25, I provide a slotted connection 32, which is pivoted at one end 33 to a lug 34, secured to the rear face of the gage 23. (See Figs. 1 and 2.) The other end of the connection 32 is slotted, as shown at 35, and by means of a set-screw 36, which passes through the slot and into the top of the frame, (see Fig. 3,) the connection 32 and the attached gage 23 may be set and firmly held in any desired position within the limits of the slot 35.

Although the connection 32 is fastened substantially rigidly to the gage 23 and to the top of the frame, this does not interfere with the vertical adjustment of the gage 23, because such vertical adjustment is very slight by reason of the small variation in the thickness of the blanks to be skived, the play in the joints and the yield in the connection being sufficient for this purpose.

To effect an adjustment of the hinged gage 23 bodily in a direction transversely of the table 5, I form the part 27 with an arm or lateral projection 37, (see Fig. 1,) which is fitted to slide in a recess in the end 38 of the gage-plate or side guide 16, but independently thereof. The said recess is closed by means of a plate 39, secured in place by screws or the like. The arm 37 has at the rear or free end thereof a forked bracket 40, through which passes a threaded stud 41, which is fast to the end 38 of the gage or guide 16. In the fork of the bracket 40 and on the stud 41 is a thumb-nut 42. By turning the nut 42 the said nut, together with the bracket 40 and part 37, is caused to travel independently relatively to the guide 16, thus effecting an adjustment of the guide 23 toward or from the face of the guide 16. It will be seen from the foregoing that the hinged guide 23 is supported by the side guide 16 and is adjustable vertically and transversely with relation thereto. The said shaft F (see Fig. 3) also carries the lower member of the feeding device by which the blank is fed onto the skiving-knife. The said lower member comprises a series of wheels or disks 50, having toothed or serrated edges, said disks being mounted upon a sleeve or spool 51, having at its inner end a head 52, preferably formed integral with the cylindrical body portion and having at its outer end a head 53, which is screwed onto said body portion as will be clear from Fig. 3. The disks or wheels 50 may vary in number as desired and are separated from each other by a series of washers 54, (see Figs. 3 and 6,) which are preferably of substantially the same diameter as the heads 52 and 53 of the spool or sleeve upon which the disks or wheels 50 are mounted. The said disks or wheels 50 are of greater diameter than the said washers, and the projecting portions of the said wheels 50 are separated by spaces, which receive the ends of the presser and clearer fingers hereinafter described. These spaces appear clearly in Figs. 3 and 6.

The spool 51 is keyed to the shaft F by means of a key 55, which is set rigidly in the shaft so as to project slightly above the surface thereof, as shown. The projecting portion of the key 55 fits a corresponding slot in the end of the sleeve or spool 51. In practice I provide four of these key-slots in the said spool or sleeve, as shown at 56, Fig. 7, and place them equidistant on the said spool or sleeve, as shown. By this means the spool may be shifted with reference to the shaft F and cause the wear of the feed wheels or disks 50 to be distributed throughout their peripheries. If no means of shifting these disks with reference to their actuating-shaft were

provided, the disks would wear at certain points of their periphery, while intermediate points would show no wear. This may be overcome by shifting the said disks a quarter of a turn with reference to the shaft F, and the arrangement of key and slots described provides means whereby this shifting may be effected and the sleeve or spool rigidly secured on the shaft in its new position. By mounting the feed disks or wheels 50 on a spool or wheel, as described, the whole series of disks may be shifted together or may be otherwise changed or manipulated much more easily and conveniently than is the case when the said feed wheels and disks are mounted directly on the shaft. It will be understood that all the feed disks or wheels 50 and intermediate spacing-washers 54 are keyed to the spool or sleeve 51. The key is shown at 150, Fig. 7.

The shaft F is journaled in a block or yoke K, (see Fig. 3,) which is cut away centrally to accommodate the feed-disks 50 and the sleeve 51 and which is provided with a downwardly-projecting portion 57, which fits within a cylindrical guiding and supporting portion 58, mounted on the bed 59 of the machine and secured by bolts 151. (See Fig. 2.) Since the blanks which are to be skived vary in thickness, the feed-disks must be so mounted as to yield downwardly slightly when a thick blank is passing through. This is provided for by mounting the block K upon stiff spiral springs 60 and 61. (See Figs. 2 and 3.) The lower ends of the said springs are provided with caps 62, which rest on the ends of adjusting-screws 63, having check-nuts 64 thereon. As will be clear, the adjusting-screws 63 are inserted in tapped holes in the bed 59 and project downwardly through it. They serve to regulate the tension of the springs 60 and 61 and the resulting pressure applied by the feed-wheels to the blank as it goes through the rolls. The downwardly-projecting portion 57 of the block K, which projects within the cylindrical support 58, is tapped at its lower end and is provided with a screw-bolt 65, which carries a check-nut 66. The said screw 65 projects upwardly through a hole in the bed 59 slightly larger in diameter than the said screw-bolt 65 and serves to regulate the position of the block K—*i. e.*, the block K is pressed upwardly by springs 60 and 61, but is held from moving upwardly beyond the point desired by the screw 65. The upper member of the feed device consists, essentially, of a die-roll or matrix 69, which is mounted on the shaft J. This die-roll or matrix 69 is hollowed or cut away at portions of its periphery in the manner familiar to those skilled in the art to accommodate the thicker portion of the blanks which are to be skived, so that as the blank passes through the machine it will be cut away more at the edges than toward the central portions and will thus be thinned down at the edges, as is required.

For the purpose of securing the die-roll or matrix 69 in place the shaft J is provided with a disk 70, securely splined on the shaft. On the face of the disk 70 is set a pin 71, which projects into a corresponding hole 72 in the end of the matrix 69. By providing a series of holes like the hole 72 the matrix 69 may be set in any desired position with relation to the shaft J. This permits the ready adjustment or removal of the matrix, as also secures the easy and exact positioning of the matrix on its shaft. If desired, the matrix may be splined or otherwise attached to its shaft in the usual manner. At the outer end of the matrix 69 I place a disk or washer 73, and outside the disk, on the threaded portion 74 of the shaft J, I place a nut 75, which serves to hold the matrix 69 in place on the said shaft.

At 155 is shown a support or reinforcement, (see Figs. 2 and 3,) which in part takes the upward thrust of the matrix. This support 155 is provided with a vertical slot 156, through which a securing-screw 157 passes into the frame of the machine. Vertical adjustment of the support 155 is obtained by means of the adjusting-screw 158, which passes through the offset lug 159 at the top of the support 155 into the frame. The adjusting-screw 158 has a milled head 160, by means of which it may be readily turned.

For the purpose of holding the blank while it is being skived firmly against the roll or matrix 69 a series of pressing-fingers 76 is provided. The operative ends of these fingers occupy the spaces between the feed wheels or disks 50 in the manner well known to those skilled in the art. The said fingers are each of the shape shown, Fig. 5, and are pivoted on a rod 77, which is parallel with the shaft F, on which the feed-wheels 50 are mounted. The fingers occupy an inclined position in the machine, as seen in Fig. 2. In this figure the outside finger only of the row of pressing-fingers is seen; but one of these pressing-fingers is provided for each of the spaces between the feed-disks 50. I have designated the end of the finger which occupies the space between the feed-disks 50 by 760. The lower ends of the said fingers are slightly bent, as shown at 78, in order that they may lie in a horizontal position beneath the block 79. (See Fig. 4.) In this figure the ends of the fingers 76 are seen in cross-section. I make the block 79 of elastic or resilient material and find that ordinary pure rubber furnishes a very suitable and convenient material. This block of elastic material 79 is partially inclosed in a casing 80, (shown in

elevation in Fig. 2 and in section in Fig. 4,) which serves to contain the block of rubber and to hold the same in proper position.

I find the use of a block of elastic material which lies over and is common to a series of fingers which are arranged closely adjacent to each other to be more efficient, economical, and convenient in practice than a series of springs one for each pressing-finger. By this means great evenness of pressure is obtained, with a resulting uniformity and improved quality in the product. This result is partly due to the fact that as the fingers 76 are somewhat close together there is a coaction between them due to the common pressure-spring afforded by the block 79 of elastic material. Thus when one finger is forced against said block a depression is produced in said block on both sides thereof which affects the closely-adjacent fingers, thus somewhat distributing the movement and the pressure both upon the block of elastic material and the blank which is being skived, producing a more evenly skived article than where separate springs, one for each presser-finger, are employed. Moreover, by the use of the elastic block the wear on the fingers is found to be less than when separate springs are employed and is more evenly distributed. Also the annoyance and loss due to breakage of springs are entirely avoided, and adjustment to vary the spring-pressure by adjustment of the elastic block is more easily, more accurately, and more quickly effected.

Above the casing 80, engaging small holes drilled into the upper surface of the block 79, is a pair of set-screws 81, tapped through the plate 5, which serve to adjust the pressure upon the fingers.

The fingers 76 (see Figs. 2 and 4) are supported from below upon a movable pedestal. This pedestal consists of a base 82, firmly screwed to the bed of the machine, and terminates in an upper surface having lugs 83 projecting at each side for the reception of adjusting-screws 84. Pivoted to the pedestal 82 by a bolt 85 is a supporting-piece 86, upon which the lower edges of the fingers 76 are supported. By means of the adjusting-screws 84 the supporting-piece 86 may be swung about the pivot 85, thereby lifting one side of the row of fingers and depressing the other side of the row of fingers and producing a correspondingly greater pressure upon the piece of leather to be skived as it passes between the feed-disks 50 and the matrix 69. By means of these fingers 76, as before stated, the blank is pressed into the uneven surfaces of the matrix until the hollows therein are filled with the blank. When the hollows in the matrix are thus filled with the material of the blank, so that the upper ends 760 of the fingers can no longer press any of said material into the said hollows, the upper ends 760 of the said fingers are depressed by increased thickness of the leather of the blank as it goes through between the matrix 69 and the feed-disks 50, thereby swinging the fingers about their pivot 77 and causing their lower ends to rise against the block of elastic material 79. By this means I am enabled to apply to the leather as it goes through the machine any desired amount of yielding pressure and, furthermore, to apply greater pressure to one side of the blank than to the other, if so desired. I find this arrangement very successful, because the leather is crowded into the hollows in the matrix very hard, thus producing a finished piece conforming exactly to the style required from a given matrix.

I will now describe the construction and mode of operation of the knife which I use in connection with my machine.

Referring to Figs. 1, 2, 8, and 9, the knife is therein shown and marked 90. It is a bevel-knife placed at an angle, with the bevel upward and its point projecting toward the bite of the feed-disks 50 and matrix 69. In order that the knife 90 may be vertically adjustable, I support it upon the inclined top of a supporting-box 91 and firmly attach it thereto by means of the large flat-headed screws 92, which pass through slots 920 in the knife, and thereby permit the knife to be set nearer to or farther from the bite of the feed-rolls. The supporting-box 91 is firmly held against a portion A^2 of the frame A by means of two cap-screws 93 and is vertically guided by a rib 94 (see Figs. 1 and 8) upon the side of the portion A^2 of the frame A, the knife-supporting box 91 having in its side a corresponding vertical groove. The said rib and groove are to be seen in dotted lines in Fig. 8. In the side of the portion A^2 of the frame A are slots 931, in which the cap-screws are allowed a slight vertical movement with the movement of the knife-supporting box 91. Projecting inwardly from the side of the knife-supporting box 91 is a square lug 911, which is vertically guided in a corresponding vertical guideway 912, made in the side of the portion A^2 of the frame A. I drill a hole through the frame A down into the guideway 912 and apply therein an adjusting-screw 95, having thereon a milled head 950 and a collar 951. The lower end of the said adjusting-screw 95 is screw-threaded and engages the lug 911 on the side of the knife-supporting box 91 and serves to move the knife-supporting box 91 up and down as the adjusting-screw 95 is rotated upon its axis. Above the lug 911 and upon the said adjusting-screw 950 I place two nuts 952 and 953, which serve as stops to limit the upward motion of the knife-supporting box 91 and the knife carried thereon

in order that the knife may not come in contact with the surface of the matrix 69 and do damage either to the knife or to the machine. These nuts or stops 952 and 953 may be placed at any desired point on the adjusting-screw 50 in order that the movement of the knife may be stopped at exactly the right height.

Between each of the feeding-disks 50 I place a clearing-finger 501. (Best seen in Figs. 2 and 3.) These clearing-fingers are pivoted at 502, and their lower ends are outwardly pressed by the spring 503, thus holding their upper ends firmly against the washers 54 between the feed-disks 50 and serving to prevent the space between the feed-disks from becoming clogged by dust or small portions of leather from the blanks which go through the machine. I find these clearing-fingers important, because any dirt or accumulation of leather in the space between the pairs of feed-wheels 50 causes the pressing-fingers 76 to be forced upward toward the matrix with an undue pressure.

What I claim is—

1. In a leather-skiving machine, the combination of a matrix, feed-wheels, pressing-fingers arranged closely adjacent to each other and extending between the said feed-wheels, and a block of elastic material, as rubber, bearing upon the ends of the pressing-fingers and by which the said fingers are maintained with a yielding pressure in contact with the leather to be skived, substantially as described.

2. In a leather-skiving machine, the combination of a matrix, feed-wheels, pressing-fingers arranged closely adjacent to each other and extending between the said feed-wheels, a fixed abutment, and a block of elastic material, as rubber, between the ends of the pressing-fingers and the said abutment, said block of elastic material bearing with a yielding pressure on the said fingers so that the latter are maintained in yielding contact with the leather to be skived, substantially as described.

3. In a leather-skiving machine, the combination of a matrix, feed-wheels, pressing-fingers arranged closely adjacent to each other and extending between the said feed-wheels, a fixed abutment, a block of elastic material, common to a number of fingers, between the ends of the pressing-fingers and the said abutment and yieldingly maintaining the said fingers in contact with the leather, and adjusting means behind the said abutment whereby the position of said elastic block may be changed to vary the pressure applied by the fingers to the said leather to be skived, substantially as described.

4. In a leather-skiving machine, the combination of a matrix, feed-wheels, pressing-fingers arranged closely adjacent to each other and extending between the said feed-wheels, a fixed abutment, a block of elastic material, common to a number of fingers, between the ends of the pressing-fingers and the said abutment, and a movable support beneath the ends of the said pressing-fingers whereby the fingers are permitted to be pressed by the elastic material against the leather to be skived with a pressure determined by the position of the said support, substantially as described.

5. In a leather-skiving machine, the combination of a matrix, feed-wheels, pressing-fingers arranged closely adjacent to each other and extending between the said feed-wheels, a fixed abutment, a block of elastic material, common to said fingers, between the ends of the latter and the said abutment, and a support beneath the ends of the said pressing-fingers pivotally mounted and movable in a plane transverse to the plane of the pressing-fingers, whereby the various fingers are permitted to be pressed by the elastic material against the leather to be skived with a differential pressure determined by the position of the said support, substantially as described.

6. In a leather-skiving machine, the improved blank-guiding mechanism comprising essentially, a side guide parallel to the line of motion of the work and adjustable transversely thereof, and a hinged front gage carried upon the said side guide and movable therewith, substantially as described.

7. In a leather-skiving machine, the improved blank-guiding mechanism comprising essentially a side guide having a recess therein, said side guide being parallel with the line of motion of the work and adjustable transversely thereto, a front gage supported on the said side guide, a supporting-arm engaging said recess in the said side guide and means engaging the said supporting-arm for adjusting the position of the front gage with relation to the said side guide.

8. In a leather-skiving machine, the improved blank-guiding mechanism comprising essentially a side guide having a recess therein, said side guide being parallel with the line of motion of the work and adjustable transversely thereto, a front gage supported upon the said side guide, a supporting-arm engaging said recess in the said side guide and a thumb nut and screw engaging said supporting-arm for adjusting the position of the front gage with relation to the said side guide.

9. The improved lower feed-roll for leather-skiving machines comprising essentially, a shaft having a keyway therein, a key therefor, a sleeve upon the said shaft for the reception of feed-disks and washers, said sleeve having a plurality of equidistant slots for the reception of the aforesaid key whereby the said sleeve may be placed in varying positions

upon the said shaft, and feed-disks and washers upon the said sleeve, substantially as described.

10. In a leather-skiving machine, the combination of a knife, a matrix, a feed-roll beneath the said matrix, a frame having ways therein and a floating supporting-yoke for the said feed-roll guided in said vertical ways upon the frame of the machine, springs beneath the said yoke, adjusting means for the said springs, and a stop whereby the upward movement of the said yoke is limited, substantially as described.

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

DAVID N. ROBERTSON.

Witnesses:
WM. A. MACLEOD,
ALICE H. MORRISON.