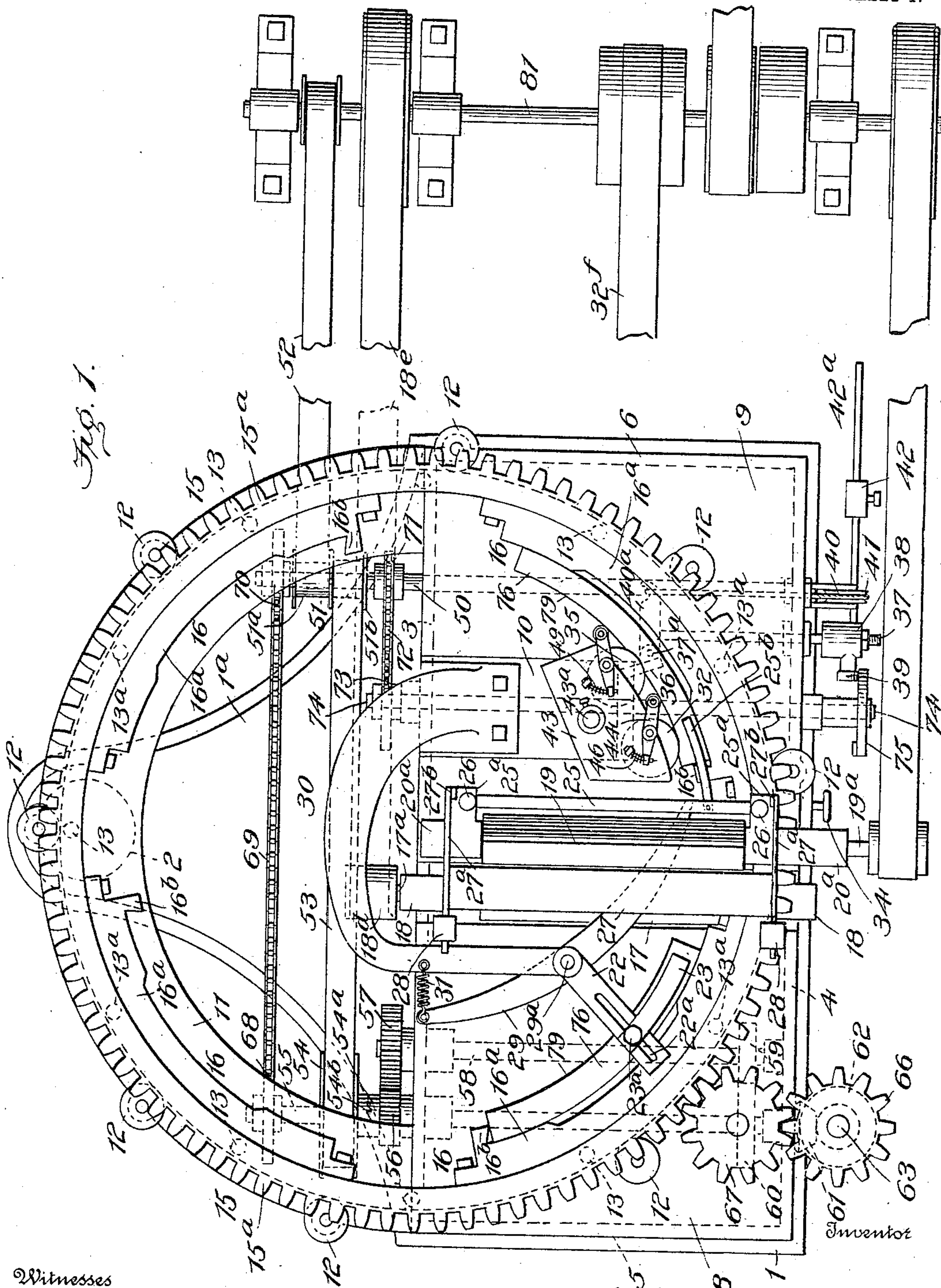


C. W. BORG.
 FELLY FINISHING MACHINE.
 APPLICATION FILED SEPT. 7, 1906.

951,981.

Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.



Witnesses
 Edwin L. Bradford
 C. C. Wright

By Charles W. Borg
 H. A. Bliss

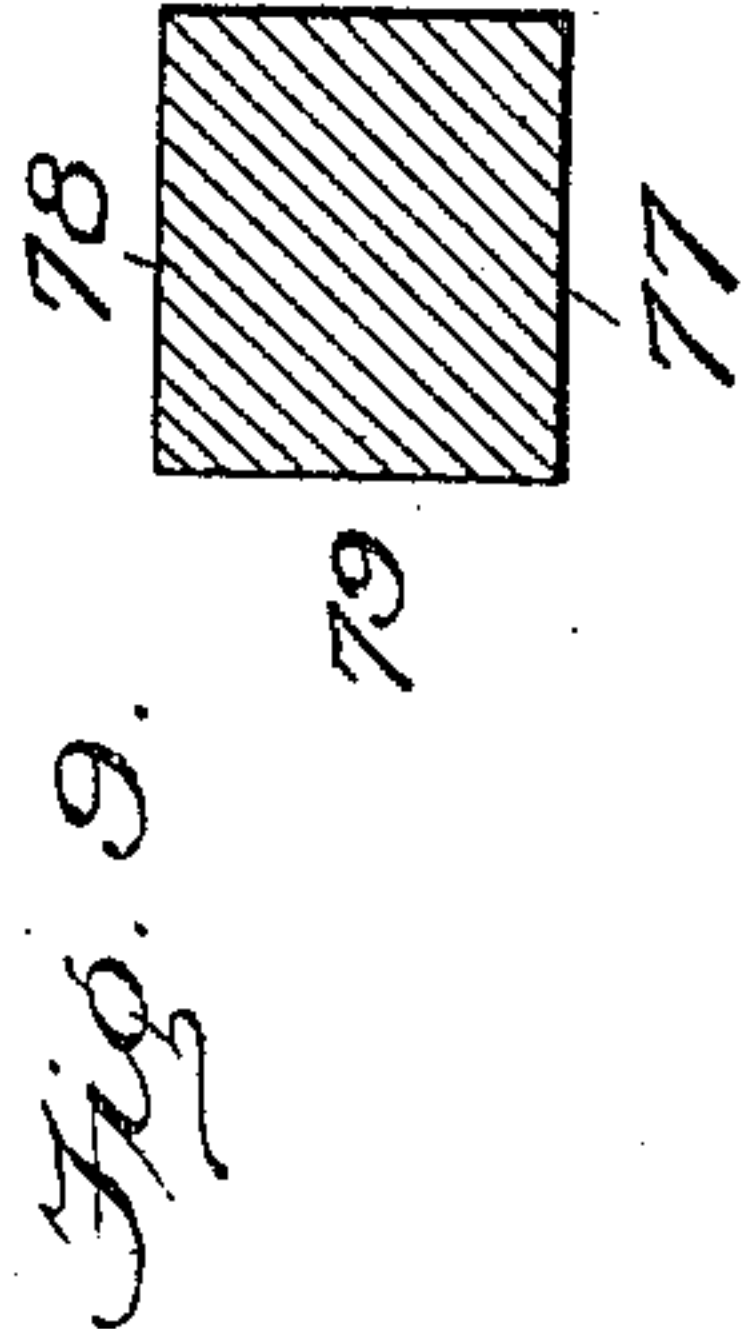
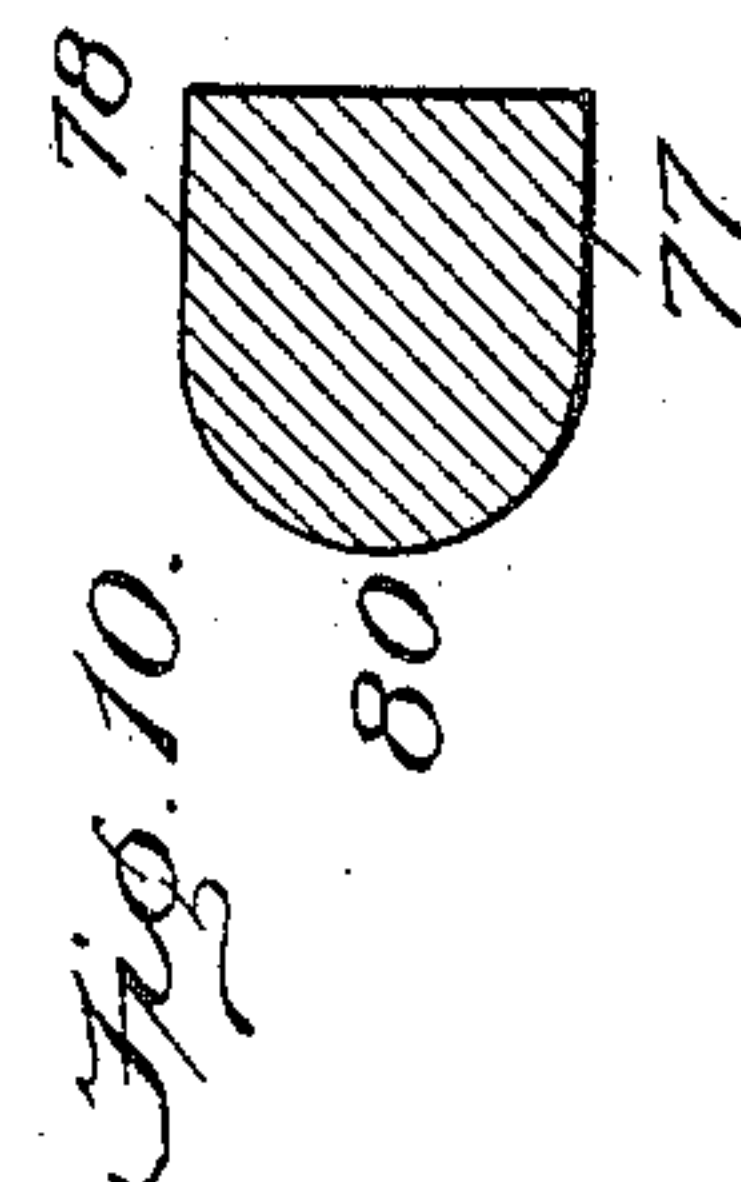
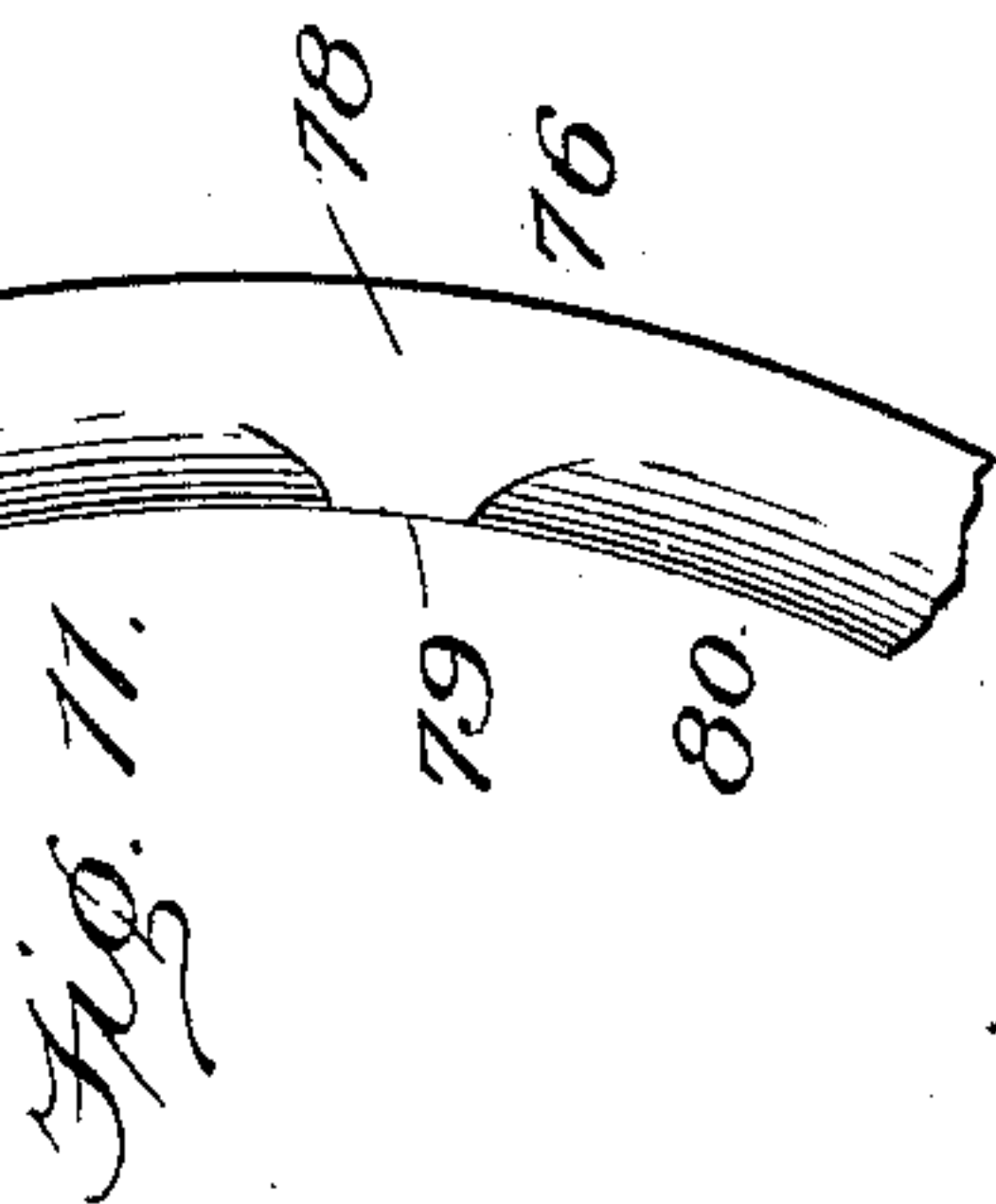
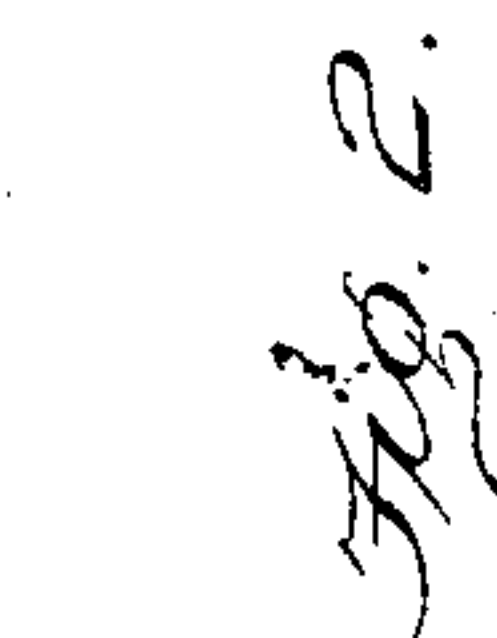
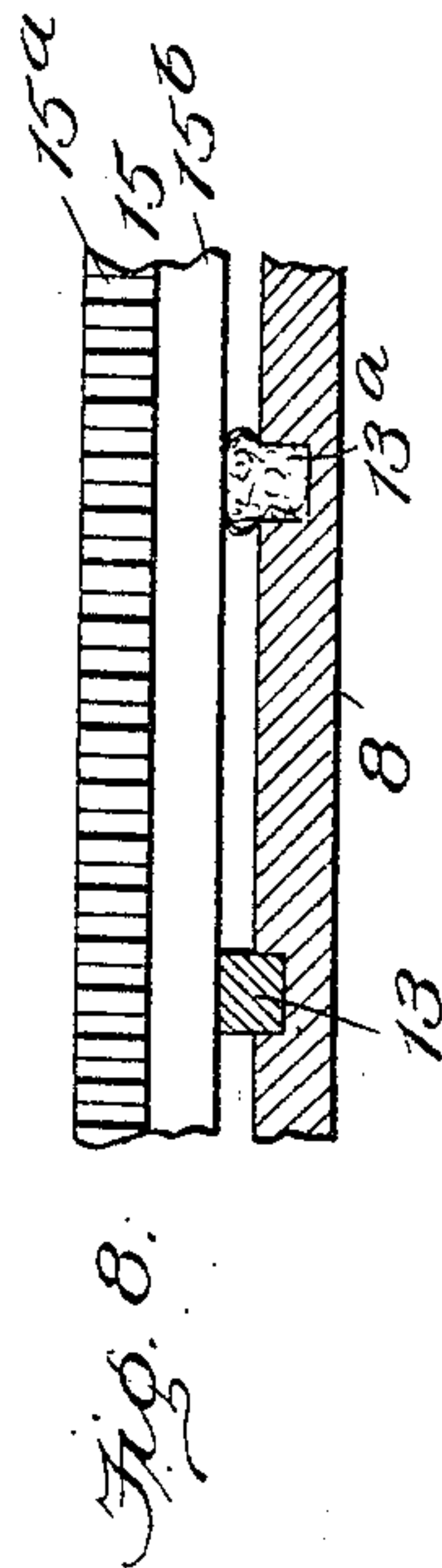
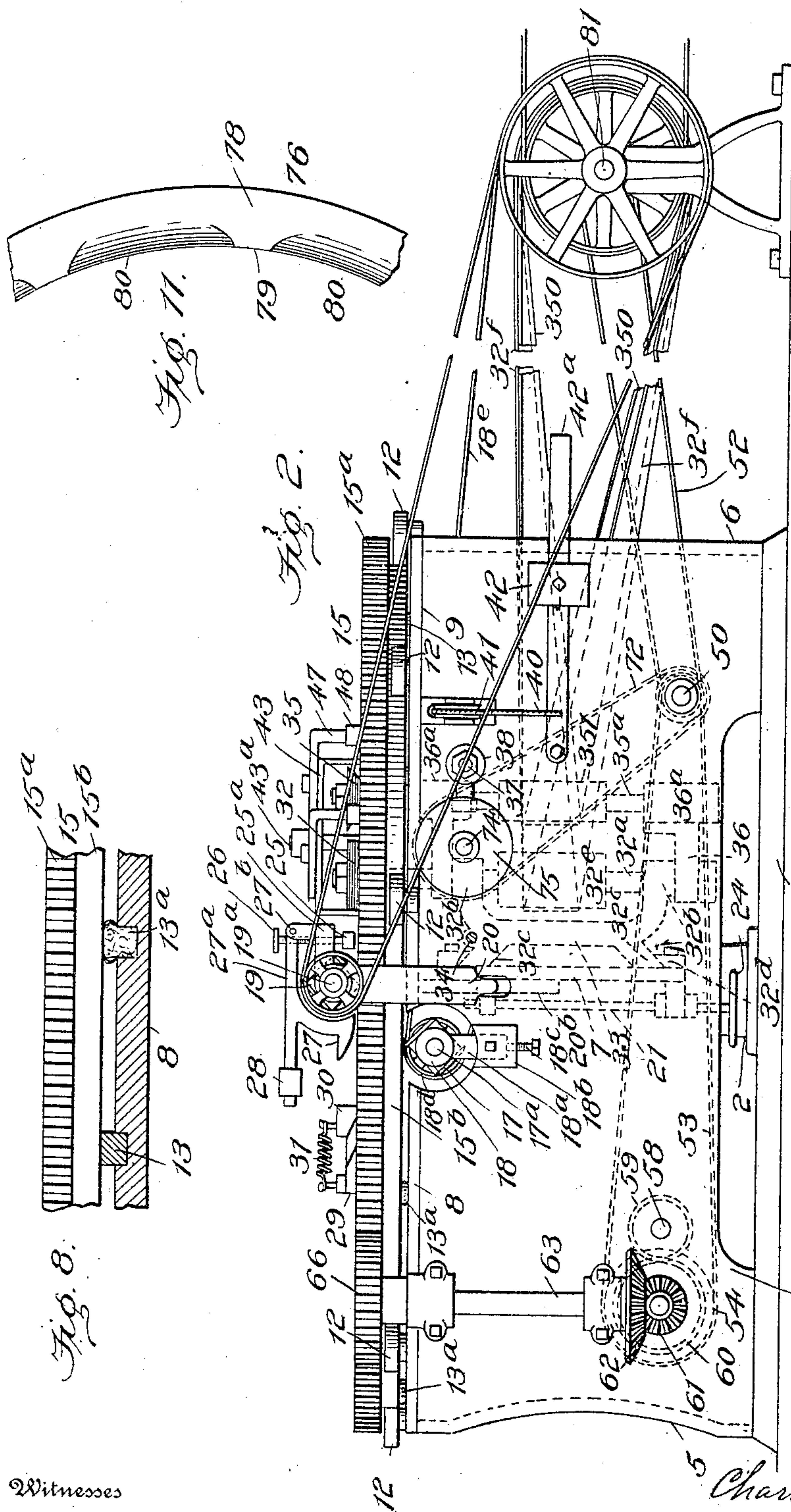
His Attorney

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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

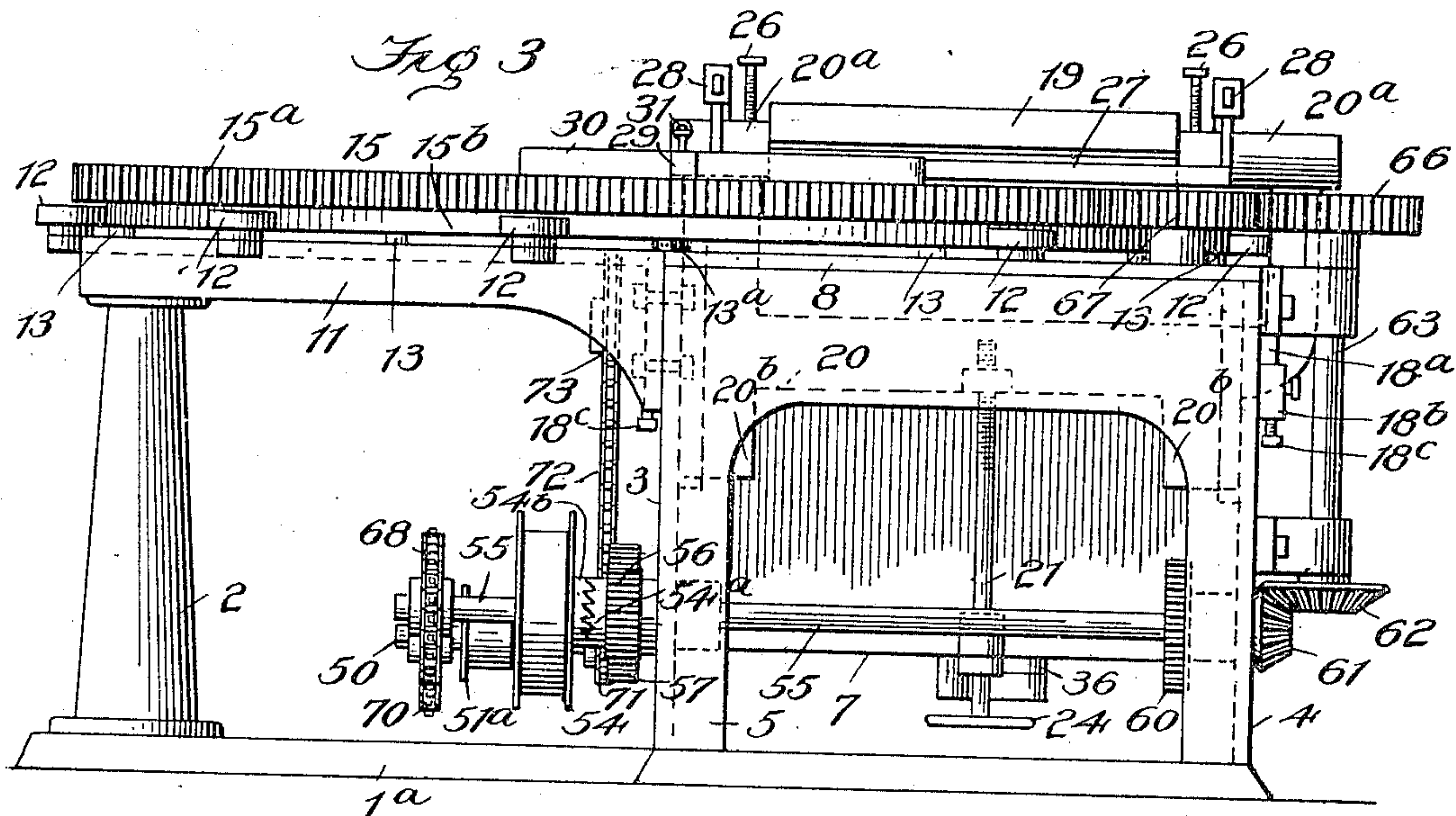


Fig. 4.

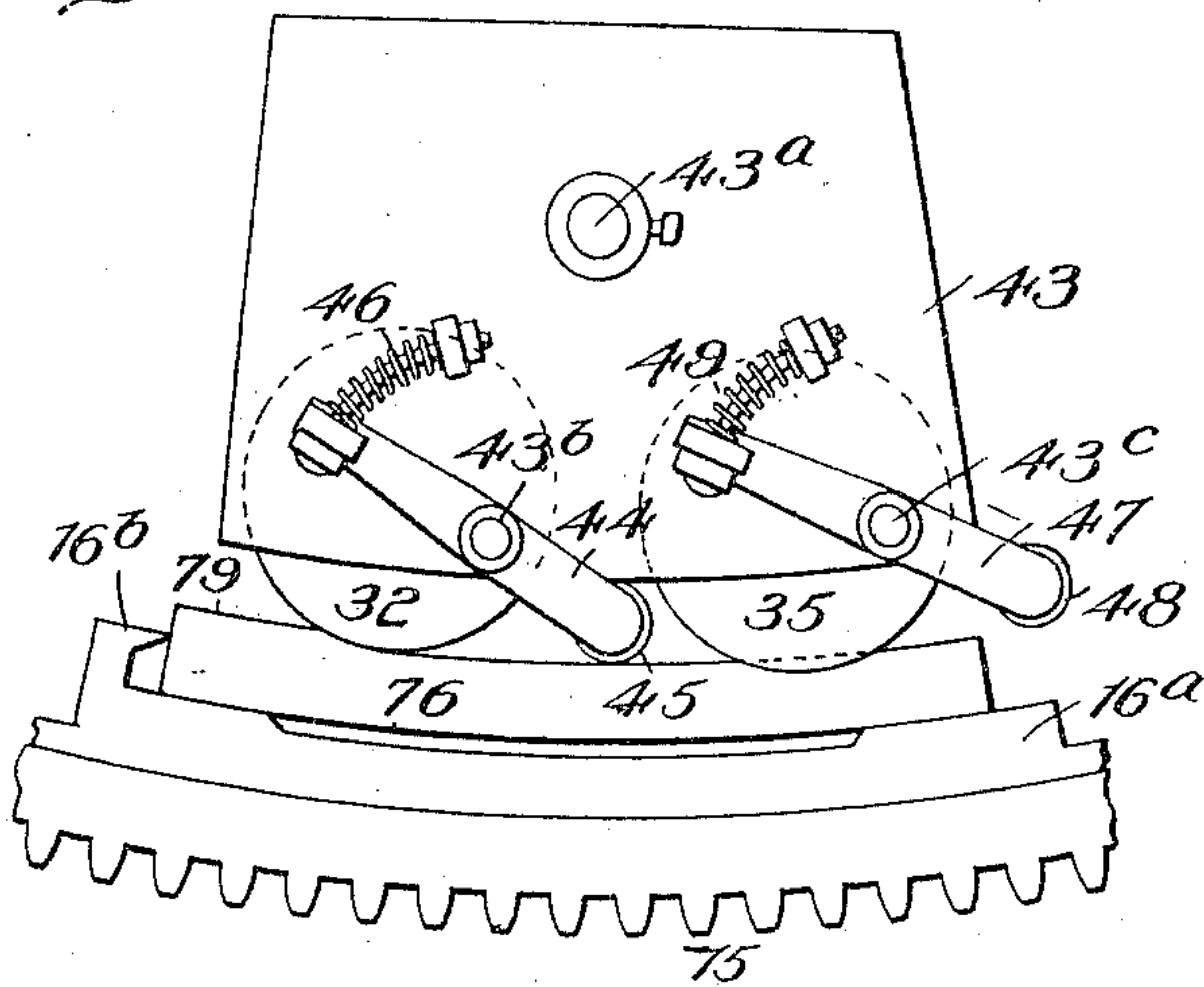


Fig. 6

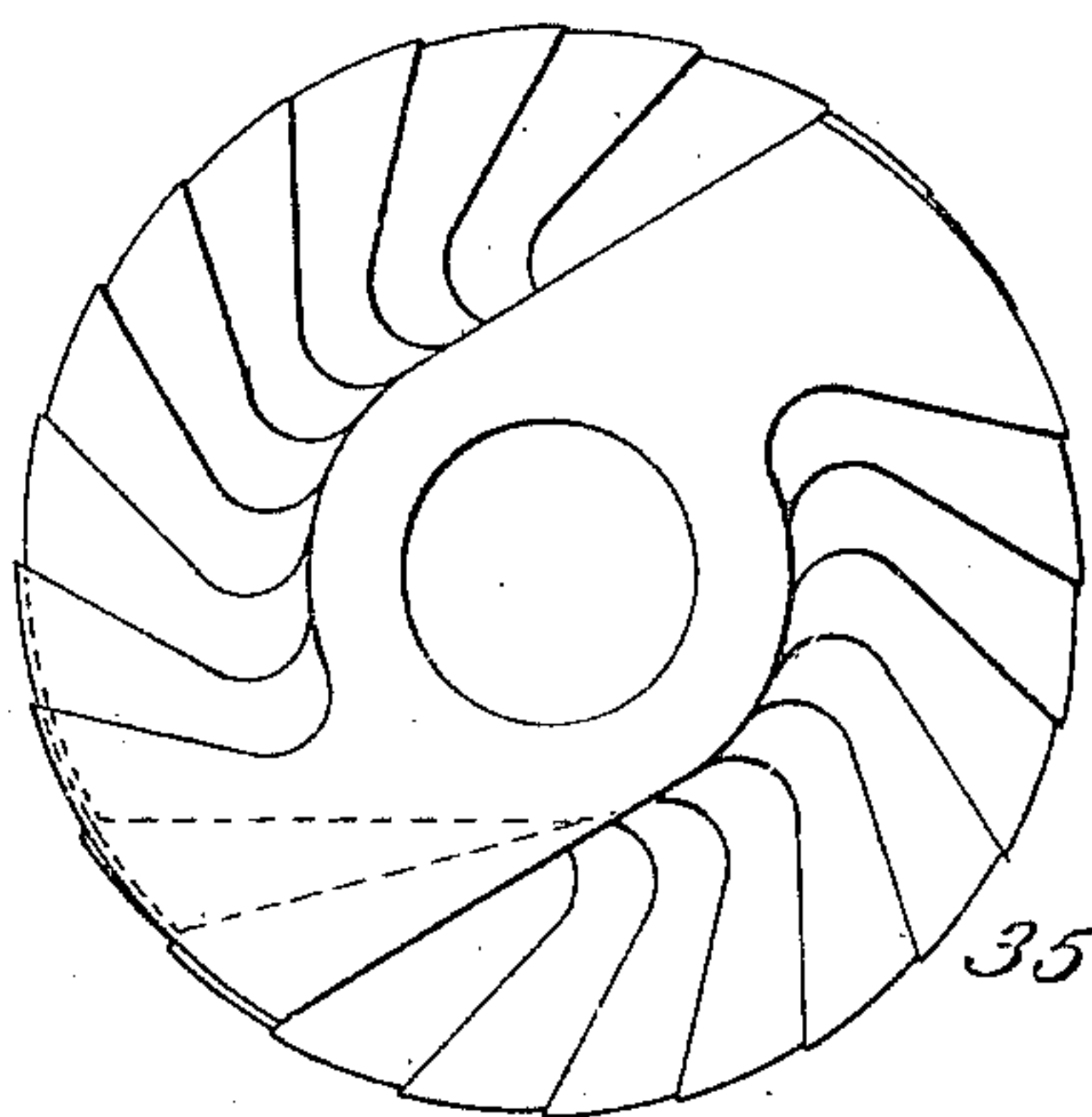


Fig. 5

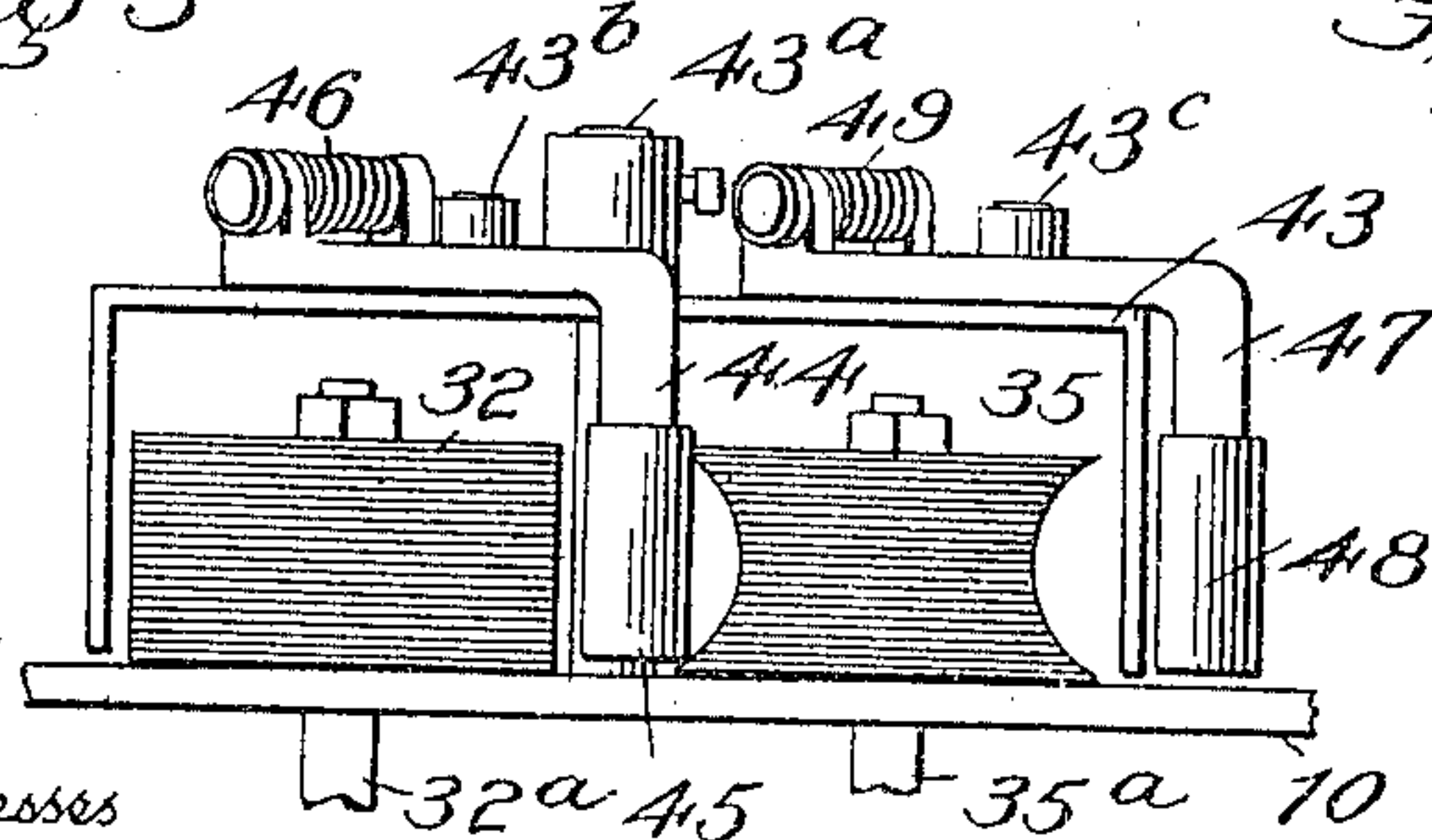
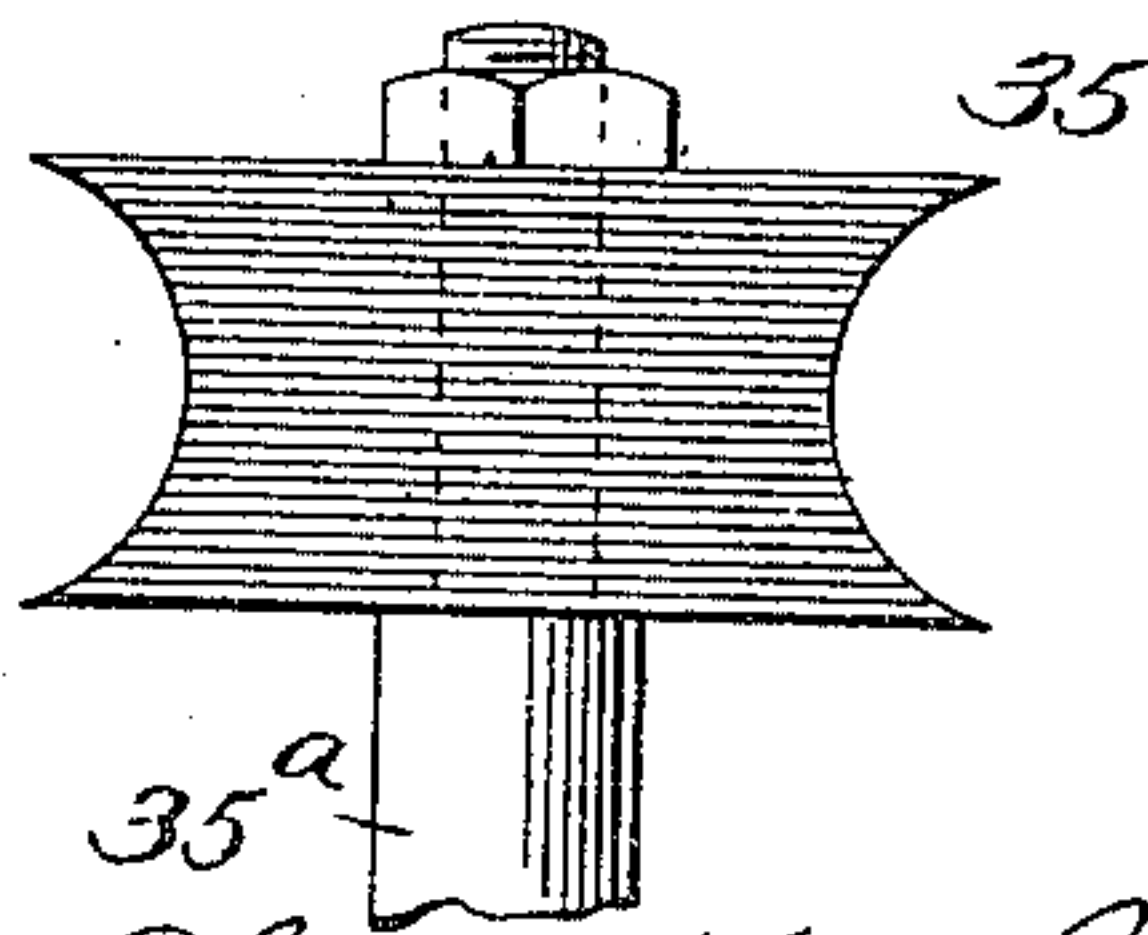


Fig. 7



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. BORG, OF ROCK ISLAND, ILLINOIS.

FELLY-FINISHING MACHINE.

951,981.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed September 7, 1906. Serial No. 333,703.

To all whom it may concern:

Be it known that I, CHARLES W. BORG, a citizen of the United States, residing at Rock Island, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Felly-Finishing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in machines for shaping, planing or dressing the wooden blanks from which wheel fellys are constructed.

The object is to provide a machine having a carrier of such nature that the curved blanks can be carried continuously in a proper path past a series of cutters arranged to act upon the several faces that require dressing or planing; the carrier being adapted to support blanks of different curvatures, and the cutters being adjustable so that they can act properly on blanks of a given curvature, and also act on blanks formed on radii of different lengths.

Figure 1 is a plan view of a mechanism embodying my improvements; Fig. 2 is a side elevation of the machine; Fig. 3 is an end elevation of the frame work with some of the parts detached; Fig. 4 is a top plan view of two of the cutter heads, and showing also some of the adjacent parts; Fig. 5 is an elevation of the parts shown in Fig. 4; Fig. 6 is a top plan view of the cutter head which acts on the inner or concave side of the blank; Fig. 7 is an elevation of the same; Fig. 8 is a detail view, partly in elevation and partly in section, showing the manner of supporting the ring-like carrier. Figs. 9 and 10 are cross sectional views, taken on different planes, of the felly section produced by the machine illustrated in the other views. Fig. 11 is a plan view of a portion of the finished felly section.

In the drawings 1 indicates the main base plate, it being preferably substantially of the conformation shown, having a main rectangular portion and a laterally projecting triangular part at 1^a. Upward from this base plate there rises the standard or upright 2, supported on the aforesaid laterally projecting part of the base frame.

3, 4, 5 and 6 indicate what may be considered a box-like frame, the said numerals indicating the several side walls, respectively.

All of the parts referred to, the base, the upright, and the box frame may be cast

integral, or this part of the structure may be built up of several elements if preferred. And with respect to them there can be such variation or modification as is desired. 60

At 7 there is a vertically-arranged plate or frame piece extending from the side wall 3 to the wall 4, and tying them together, either being made integral therewith or secured thereto. It is shown as located at or near the center of the space or chamber below the table. It is used to support a number of the parts which will be hereinafter referred to. 65

At the upper ends of the parts referred to, and shown at 3, 4, 5 and 6, are placed the table sections 8 and 9. The section at 8 lies immediately below the path of the blanks and serves to support them during the initial part of their travel through the machine. This table section 8 is vertically adjustable to provide for varying the depth of the cut effected by the lower knives, to be later described. The table section at 9 is also supported on the upper edges of the side parts 3 and 4 of the frame. It provides a support for the articles acted on by the machine during the latter part of their travel through it. At its receiving end this table section 9 is elevated somewhat relatively to the upper face of the section 8, in order to properly receive the blank after the action of the under-cutters. 70 75 80 85

10 indicates a table section which is adjustably mounted on the table section 9, it carrying some of the operative parts of the machine, which will be described below. 90

11 indicates a curved metallic arm substantially semi-circular in outline, and having its ends bolted to one of the vertical walls, that at 3, of the box frame above referred to. It extends to and rests upon the standard or post 2, above described, and serves to hold the outer half of the rotary carrier which supports the blanks and carries them through the machine past the cutters. 95 100

15 indicates as an entirety the rotary carrier, or "feed ring", as I term it, for the blanks. It is mounted and supported upon the parts above described. It is not formed with a hub, and lacks a center support. On the other hand, it is rim-supported, and with it are combined a series of anti-friction roller-like holders or bearing devices indicated by 12—12. This rotating table or feed ring has an upper horizontal part 15^a, 105 110

and a downwardly-extending vertical flange 15^b. The supporting rollers, or travelers, 12—12 are arranged so as to bear against the outer wall of the flange and lie in horizontal planes just below the planes of the horizontally-arranged part 15^a of the ring or table. The latter is formed with a series of gear teeth which extend horizontally outward in its upper planes. At intervals there are placed Babbitt-metal supporting pieces 13 immediately below the ring. These are secured to, or seated in, the stationary metallic parts immediately below the ring, some of them in the semi-circular part 11, above referred to, and some of them in the table sections on the opposite side of the ring. The under surface of the feed ring contacts with these, and they provide a rigid, though anti-friction, support for the ring, adapted to hold it firmly in the lines in which it is desired that it shall rotate. In order to further reduce the friction I provide means for lubricating the under-surface of the ring, and this I accomplish by forming cups or pockets at intervals in the metallic parts below the ring. These are provided with quantities of waste or other lubricant absorbent 13^a, Fig. 8, and the latter being saturated with oil, the sliding face of the ring, when passing over them, becomes lubricated to such an extent that the friction is largely overcome. To the inner face of this ring are secured the parts that engage with, hold and advance the wooden blanks. Each of these is indicated as an entirety by 16. As many of them may be employed as the conditions of the machine will permit; four being illustrated in the construction shown. Each comprises a body part 16^a, which is bolted against the ring 15, and a radial shoulder or projection at the rear end, preferably sharpened, or provided with a sharp dog 16^b, adapted to engage with and grip the rear end of a blank piece, the forward propelling of the blank being accomplished by this inwardly-extending projection or dog on the holder 16.

The machine which I have devised and illustrated aims to properly shape and dress the sections of wood which are used as the felly pieces of carriage or wagon wheels, one being shown at 76 in Fig. 11, the desire being to finish the two side faces 77, 78, of the felly piece which are in vertical positions when the wheel is in use, and the inner arc-like surface 79, and, further, to impart to the wood the curvature in cross-section which is desired at a series of places around the circle, as at 80, 80. The wood blanks travel through the machine, lying in a position at right angles to that which they occupy when in place on a vertical wheel, and consequently it is the lower face 77 and the upper face 78 of the blank, (as it lies in the machine), which require dressing and

finishing. The cutter which effects the under face 77 of the wood is indicated as a whole by 17. It is mounted on a shaft 17^a, which is journaled in bearings at 18, one at each end. These are adjustably carried by vertical slides 18^a, fitted to guides 18^b, formed on or secured to the side walls of the box frame above described, adjusting devices suitable for the purpose being shown at 18^c. Upon the inner end of the shaft 18 is the power-receiving pulley 18^d, with which engages the belt 18^e, extending to the main countershaft 81. The cutter head which dresses the opposite or upper face of the blank is indicated by 19. This has a shaft 19^a mounted in bearings 20^a. The bearings 20^a are carried by a frame 20 for supporting the shaft 19^a. This bearing frame has a downwardly-projecting slide-extension 20^b, which is mounted in a vertical slideway on the front face of the transverse plate 7 above referred to. It can be adjusted to and supported in any desired position by means of the adjusting screw 21, provided with a hand-wheel 24 for turning it.

30 indicates a curved bracket arm secured to the aforesaid adjustable table section 10, and extending thence laterally and forward, and then in the opposite direction, laterally, transversely of the machine. At its free end it carries an extension bracket 22, the latter being provided with a compressor spring 23 adapted to loosely engage with the wood blank and press it downward upon the table section 8. This spring 23 is adjustable in relation to the extension 22, the latter having a longitudinal slot 22^a, and a binding screw 23^a, for this purpose.

Immediately behind the top cutter head 19, which dresses the upper face of the blank, there is placed a presser bar 25. It is supported from two arms 25^a, which extend rearward from the bearings 20^a of the upper cutter. 26—26 are supporting and adjusting screws extending vertically through these projecting arms, and carrying this presser bar 25. By turning the screws in one direction or the other, the bar can be raised or lowered, as desired. On the same arms 25^a, extending from the bearings 20^a, is supported the chip breaker. This is indicated by 27, and as concerns its operative parts it may be of any well known form. As shown, it is carried by arms 27^a which extend backward to and are pivoted at 27^b above the projections 25^a. It is provided with one or more adjustable weights 28 by means of which the downward pressure upon the wood can be varied, as desired. To keep the blank down properly, as it is being engaged by the cutters 32—35 at the rear of the upper cutter 19, use is made of a compressor spring 25^b, which is secured to the bar 25 and projects rearward there-

from, the end portion of the spring being so arranged as to lie in the path of the blank and press upon its upper surface to hold it down firmly. In order to hold the blank in proper position, radially, it is desirable to exert pressure upon its inner face as it is moving past the cutters. Such pressure is imparted, in the construction shown, by the presser arm 29. This is pivoted at 29^a to the aforesaid bracket 30.

31 is a spring engaging with one end and tending to press the opposite end toward the path of the blank. It bears against the inner concave side of the blank at points just beyond the upper cutter, and presses it firmly against the ring holder or the carrier 16.

As above remarked, one of the operations to be accomplished is the cutting and dressing of the inner concave side of the felly blank. This is effected by the devices at 32. The cutter proper is formed of a series of plates or disks superposed one upon another, and each having one or more cutting points formed thereon. The cutter head as an entirety is secured to the upper end of the shaft 32^a. This is mounted in bearings at 32^b, one near the bottom of the machine, and one near the top. These bearings are carried by a frame 33, which can be adjusted rectilineally in and out transversely of the machine, it having slide guides at 32^c fitted in guides 32^d, secured to or formed on the rear vertical face of the aforesaid frame web or plate 7. At 34 there is an adjusting screw mounted horizontally in the frame work and engaging with the frame 33, and by means of it the cutter head can be moved inward or outward, either to vary the depth of the cut with respect to the felly of any given radius, or to so position the cutter that fellyes of larger radii or smaller radii can be properly dressed. This cutter head 32 and its shaft 32^a are driven by the pulley 32^e, and the belt 32^f, driven from the countershaft 81.

The final step in the cutting and dressing is, as aforesaid, to produce the curved conformation at intervening sections 80, 80, along the inner or concave faces of the felly elements. The device for this work is indicated as a whole at 35. It is formed with cutters so arranged that their cutting points or edges when rotating generate a form which in cross-section at its edges gives the arc or approximately the arc of a circle. The cutter head is built up of a series of thin plates made on the same plan as are the cutter plates of the head 32, but, considered in series, they increase in radius from the center transverse plane of the head toward the upper and lower ends. These plates are secured to the upper end of the shaft 35^a, which is mounted in bearings 36^a, one at the bottom of the machine and one at the top. These bearings are connected to-

gether by a frame piece 36, hinged to the aforesaid bodily adjustable frame 33 of the cutter head 32, the mounting being such that the axis of the hinging for the head 35 is the axis of the shaft 32^a. This manner of supporting the cutter 35 permits it to be intermittently moved toward and away from the path of the felly blank, and as a result of such lateral movements of the cutter it produces intermittent cuts upon the wood as the latter passes. The devices shown for accomplishing this swinging of the frame 36, and the cutter 35, comprise a rod 37, pivotally connected at 37^a to the frame 36, and means for intermittently moving this rod inward and outward, in timed relation to the travel of the blank. This rod 37 extends horizontally through a bearing seat in the part 4 of the frame. To it is fitted a trip device 38, the latter being of the nature of a sleeve fitted to the rod, and having a lateral projection provided with a roller 39. The rod 37 is threaded and adapted to be adjustably fitted to the trip sleeve. At proper times the trip sleeve and the rod are engaged by a cam on the disk 75, which latter will be more fully referred to below. At each revolution of the cam disk the frame 36 will be moved inward around its axis, and the action of the cutter head 35 on the wood will be temporarily stopped. The cutters, however, continue in rotation. The opposite movement of the cutter head and its frame is caused by the devices shown at 40, 41 and 42. 40 is a chain or cord secured to the arm 40^a at the inner end of the rod 37. This chain or cord passes over a pulley 41, and is adjustably connected to a lever 42^a, which carries an adjustable weight 42. As soon as the cam on the disk ceases its action on the rod 37, the weighted lever instantly restores the cutter head 35 to its operative position in relation to the blank.

The cutter head 35 is actuated from the counter-shaft by means of the belt 350 engaging with the pulley at 351 on the shaft 35^a. The distance to which the cutter head 35 is moved under the action of the above described devices, is relatively so short that its driving engagement with its belt is not interfered with, notwithstanding its being carried at times from one position to another. This belt 350 is arranged in the same vertical planes as the belt 32^f, which drives the shaft of the cutter 32; that is to say, the former travels in a path which lies on the inside of the path of the belt 32^f.

43 is a shield bracket arranged adjacent to and partially covering and inclosing the cutter heads 32 and 35. It is secured to the top of the table section 10 by means of a stud pin 43^a to which fits a sleeve on the shield. Upon the top face of this bracket shield there are stud pivots 43^b and 43^c. To these are pivoted the roller carriers 44

and 47, they being preferably arms mounted at points intermediate of their ends. The arm 44 has a downwardly-turned extension which carries the vertical roller 45, and at
 5 the other end it is connected to the spring 46. This roller bears against the inner, concave, side of the blank as it is passing the cutters 32 and 35. The arm 47 also has a downward-turned end or journal which
 10 supports the roller 48, the opposite end of the arm being normally held by a spring 49.

The above described operative parts can be actuated by any suitable power devices. I have shown the following as means for
 15 transmitting motion and power: At 51 there is a hollow shaft with pulleys 51^a—51^b. The former pulley receives power from the belt 52, driven by the counter-shaft. The pulley 51^b is connected by a belt 53
 20 with pulley 54, which is connected to a short hollow shaft 54^b, loosely mounted upon a shaft 55. The pulley 54 can be connected to the gear wheel 56 by a clutch 54^a. Wheel 56 meshes with and drives the wheel 57 on
 25 countershaft 58. The latter at the opposite end, by pinion 59, engages the spur wheel 60. On one side of the wheel 60 is a bevel wheel 61 meshing with the bevel wheel 62, on a vertical shaft 63. At the upper end
 30 of this shaft 63 is a spur wheel 66, which engages with an idler wheel 67. The latter engages with the teeth of the above described feed ring 15, and when the parts last described are in action the feed ring is
 35 rotated. The shaft 55 carries a sprocket wheel 68, which by a chain 69 is connected to the wheel 70 on the shaft 50, the latter receiving its rotation therefrom. The shaft 50 carries a sprocket wheel 71, which by a
 40 chain 72 is connected with the sprocket wheel 73 on shaft 74. The latter extends across the machine and is provided with the cam disk 75 above referred to.

What I claim is:

45 1. In a machine for planing or shaping felly blanks, the combination of a cutter for the under side of the blanks, a cutter for the upper side of the blanks, a cutter for the inner or concave side of the blanks,
 50 and a carrier for the fellies adapted to travel continuously in one direction past the aforesaid cutters, substantially as set forth.

2. In a machine for planing or shaping fellies or similar articles, a continuously rotating ring-like carrier, means in said carrier for holding the blanks in positions concentric with the carrier, a rotary cutter for the under faces of the blanks, a rotary cutter for the upper faces of the blanks, a
 60 rotary cutter for the concave side of the blank, and a supplemental vibrating cutter adapted to form indentations in the blank, substantially as set forth.

3. In a machine for planing or shaping
 65 fellies or similar articles, the combination

of a carrier ring rotating in one direction continuously, means supported on the carrier ring for holding the blanks concentric with the carrier ring, a cutter for the under side of the blanks, a cutter for the upper
 70 side of the blanks, a cutter for the concave side of the blanks, and a supplemental cutter for producing indentations on the edges of the blanks, mounted on a carrier concentric with the said last described cutter, 75 substantially as set forth.

4. In a mechanism for planing or shaping felly blanks, the combination of a carrier ring adapted to rotate continuously in one direction, a cutter for the lower sides of
 80 the blanks, a cutter for the upper sides of the blanks, a cutter for the inner or concave sides of the blanks, and a supplemental cutter for forming indentations in the sides of the blanks, the last two said cutters 85 being adjustable toward and from the axis of the said blank carrier, substantially as set forth.

5. In a machine for shaping or planing fellies, a rotating or ring-like carrier adapted to be rotated in one direction continuously and to hold the felly blanks concentric with the axis of the carrier, a cutter for the under side of the blanks, a cutter for the upper side of the blanks, a cutter for
 90 the inner or concave edges of the blanks, a supplemental cutter for forming indentations in the blanks, and a support for the last two said cutters adapted to be moved toward and from the axis of the carrier and
 95 to be fixed in different positions, substantially as set forth. 100

6. In a machine for shaping or planing fellies, a rotating or ring-like carrier adapted to be rotated in one direction continuously and to hold felly blanks of longer radii of curvature or felly blanks of shorter radii, a cutter for the under sides of the blanks supported transversely to the path of the fellies and elongated relative to the
 105 width of the fellies whereby it can operate on fellies nearer to and fellies farther from the center of the carrier, a cutter, similarly constructed and arranged, for the upper sides of the blanks, and a cutter for the
 110 inner or concave edges of the blanks positively adjustable toward and from the center of the carrier, substantially as set forth. 115

7. In a machine for shaping or planing fellies, the combination with the means for carrying the blanks and the means for cutting the lower sides and the upper sides thereof, of the cutter for the inner or concave sides of the blanks adjustable toward and from the path of the blanks, and the
 120 cutter for forming indentations in the blanks, the last said cutter being mounted on the axis of rotation of the last aforesaid cutter whereby it can swing in relation thereto, substantially as set forth. 130

8. In a machine for shaping or planing felly blanks, the combination of the carrier for the blanks adapted to travel continuously in one direction and having an open center, means at its periphery for supporting it, blank-supporting devices secured to the said carrier, and means for cutting or planing the upper and lower and the concave surfaces of the said blanks, substantially as set forth.

9. In a machine for shaping or planing felly blanks, the combination with the cutters for the under side, the upper side and the concave side of the blanks, of the ring-like carrier for the blanks having an open center, means at the periphery of the blank for supporting it, and means at the periphery of the carrier for rotating it in one direction continuously, substantially as set forth.

10. In a machine for shaping or planing felly blanks, the combination of means for shaping or planing the under side, the upper side, and the inner or concave side of the blanks, of the carrier for the blanks having an open center, devices at the periphery of the carrier for centering it, anti-friction supporting devices upon which the carrier rests, and means at the periphery for driving the carrier in one direction continuously, substantially as set forth.

11. In a machine for shaping or planing felly blanks, the combination with the blank carrier, of the cutters for the lower side and the upper side of the blanks, the cutter for the concave face of the blanks, the supplemental cutter for forming indentations in the blanks, the frame or hood for the last two said cutters, the yielding levers carried on said cover or frame, and the spring-held pressure rollers for the concave edges of the blanks, substantially as set forth.

12. In a machine for shaping or planing felly blanks, the combination with the blank carrier, the means for cutting the under side and the upper side of the blanks, and the cutters for the inner or concave side of the blanks, of the yielding holder for the blanks adapted to engage with them as they leave the cutters for the upper side of the blanks, the yielding holders engaging with the concave sides of the blanks, and the yielding holder engaging with the upper sides of the blanks when they are passing the cutter which acts upon the concave sides of the blanks, substantially as set forth.

13. In a felly-shaping machine, the combination of a supporting frame, a curved carrier movably mounted thereon, driving means on the convex side of said carrier,

blank advancing means carried on the concave side thereof, yielding blank-guiding means mounted on said frame and adapted to exert pressure against the blank along lines lying in the plane of the curved carrier and adapted to hold the blank against the concave side of the carrier, and a plurality of cutters mounted adjacent to the path of travel of the carrier and adapted to dress the plane surfaces, and dress and shape the concave surface of the blank driven by said carrier; substantially as set forth.

14. In a felly-shaping machine, the combination of a centerless closed carrier, supporting means and peripheral driving means therefor, blank-holders on the inner edge thereof and a plurality of cutters mounted within said carrier and laterally adjustable in the plane of said carrier with relation thereto, substantially as set forth.

15. In a felly-shaping machine, the combination of a horizontally-mounted, curved carrier, driving means on the convex side of said carrier, blank-driving means on the concave side thereof, stationary blank-supports beneath said carrier, yielding guides for depressing the blanks and for holding them against said blank-driving means, and cutters mounted adjacent to the path of travel of said carrier and arranged to simultaneously dress a plurality of sides of said blanks, substantially as set forth.

16. In a wood-working machine, in combination, a supporting frame, a centerless, annular work-carrier movably mounted on said frame, anti-friction supports and peripheral driving means for said carrier, long cutters mounted substantially radially with respect to said carrier for dressing opposite sides of the blank driven thereby, and a table section adjustable on said supporting frame and carrying cutters for finishing the concave face of the blank, substantially as set forth.

17. In a felly shaping machine, in combination, a main frame, a continuously rotating carrier movable thereon, blank-receiving seats on said carrier, an adjustable table section mounted on said frame, an under jointing cutter coöperating with said adjustable table section, a top cutter, a rigid frame section opposing said top cutter, and a plurality of cutters located in the rear of said top cutter for finishing and shaping the inner side of the blanks held in said carrier.

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

CHARLES W. BORG.

Witnesses:

MARSHALL BECK,
W. C. GILMORE.