No. 714,946. Patented Dec. 2, 1902.

# W. F. POIESZ.

## BRAIDING MACHINE.

(Application filed Feb. 19, 1901.)

(No Model.) 4 Sheets—Sheet 1.

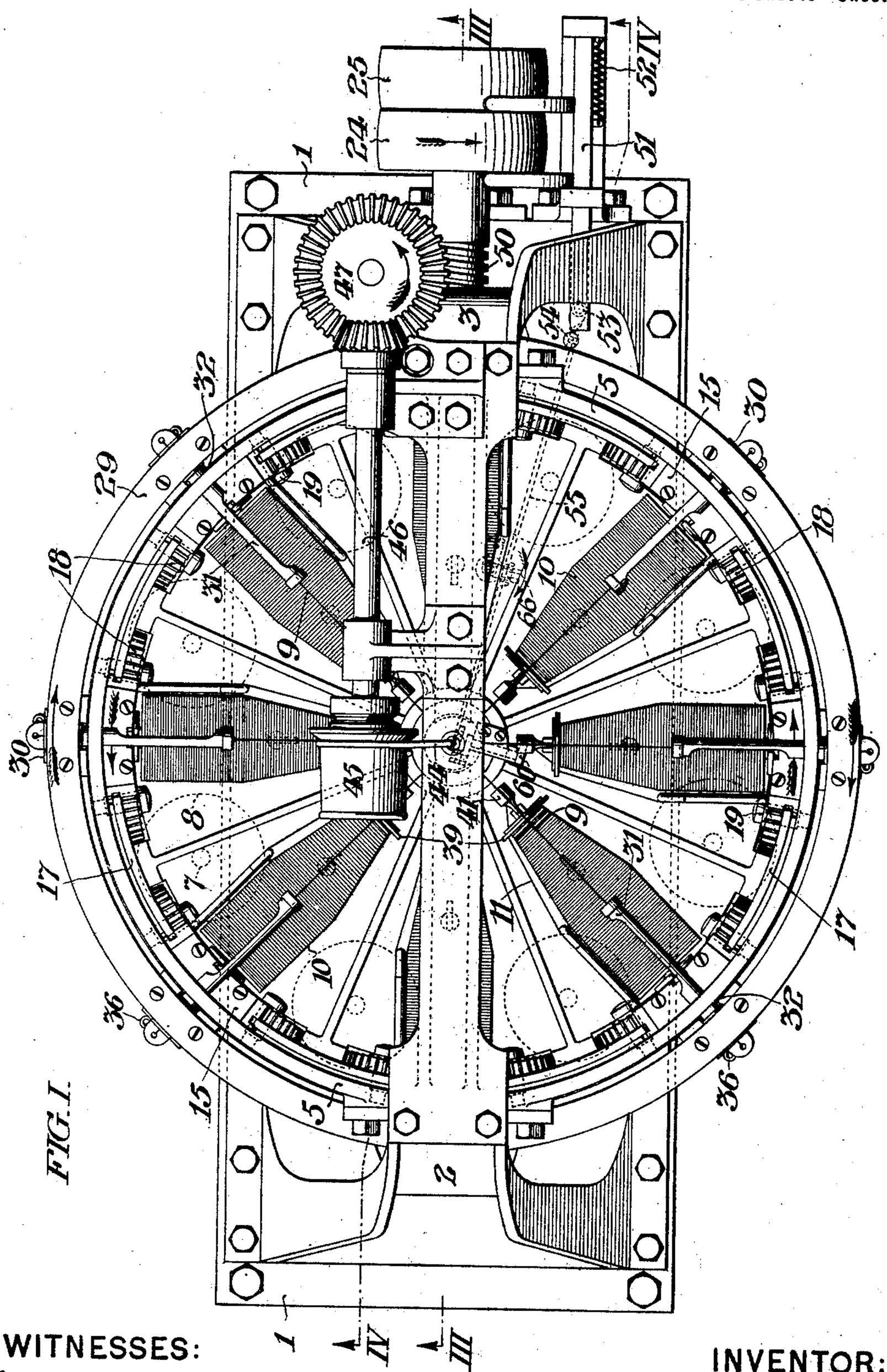


FIG. 1.

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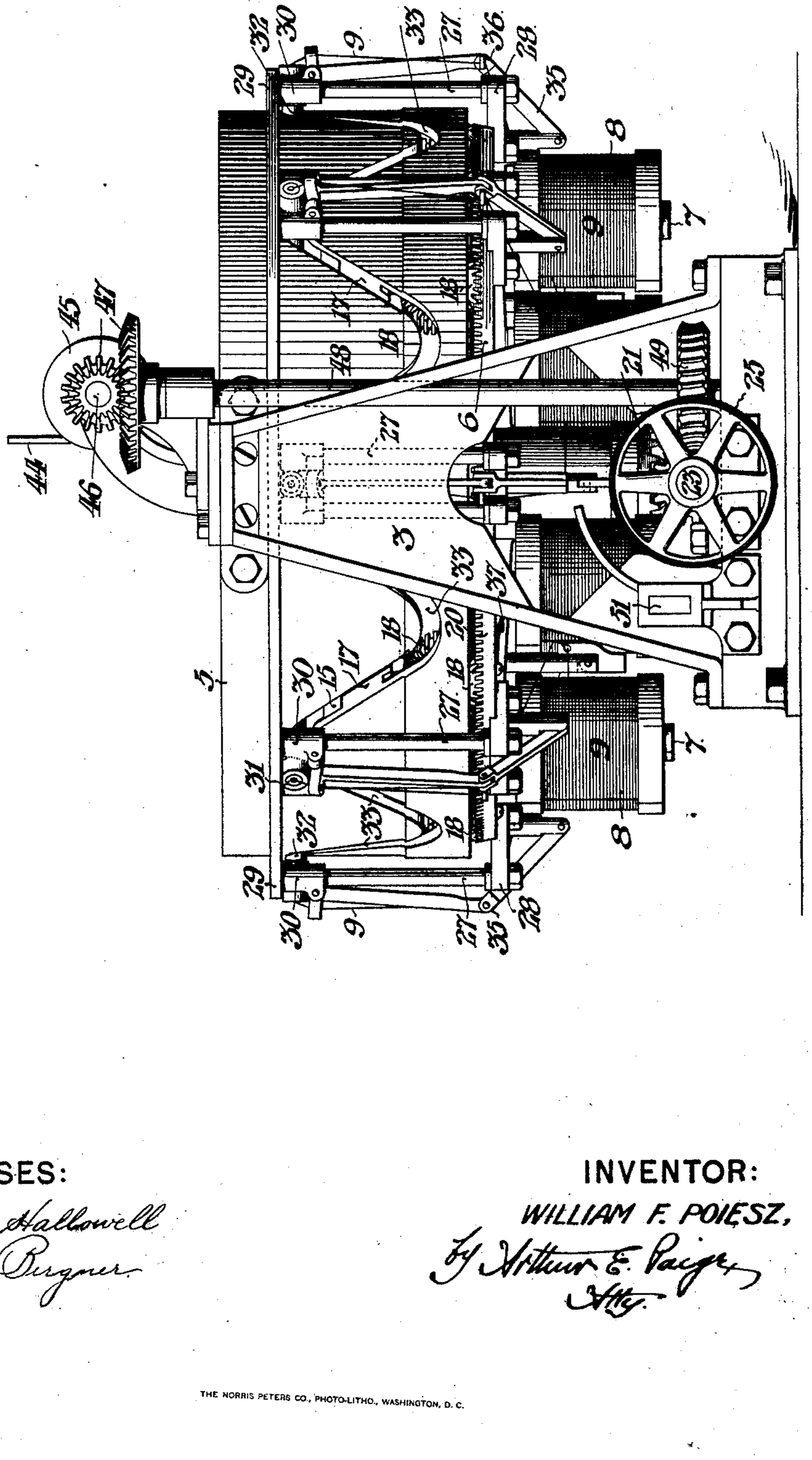
(No Model.) 4 Sheets—Sheet 2.

FIG. II.

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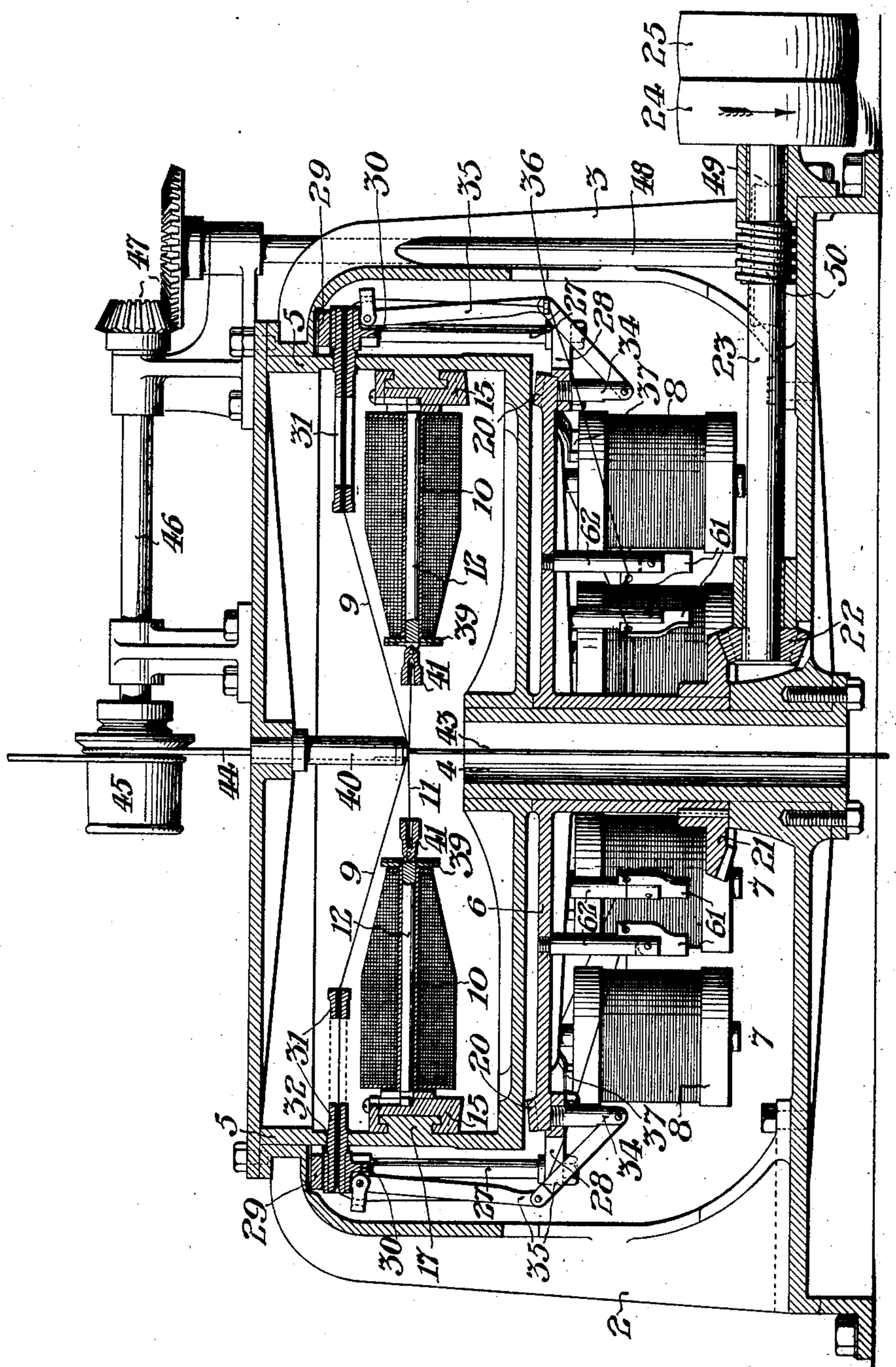
## BRAIDING MACHINE.

(Application filed Feb. 19, 1901.)

(No Model.) 4 Sheets—Sheet 3.

FIG. III.

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## BRAIDING MACHINE.

(Application filed Feb. 19, 1901.)

(No Model.) 4 Sheets—Sheet 4.

FIG. IV.

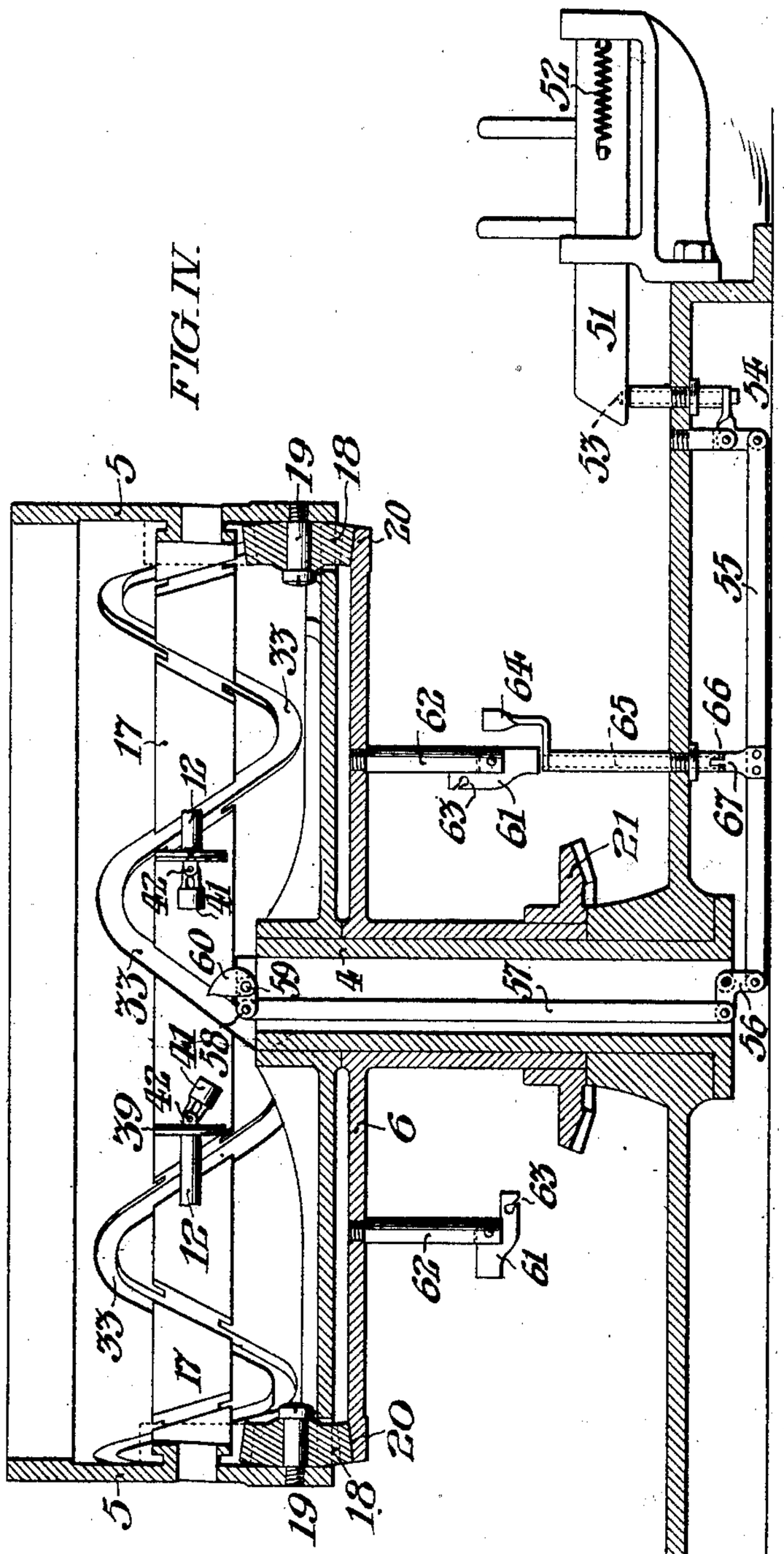



FIG. VII.

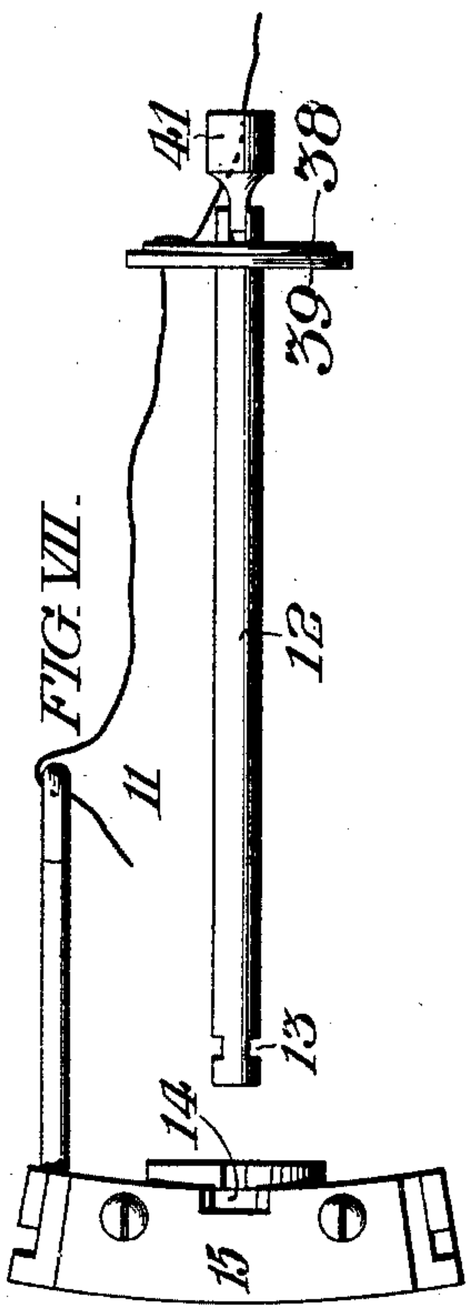



FIG. V

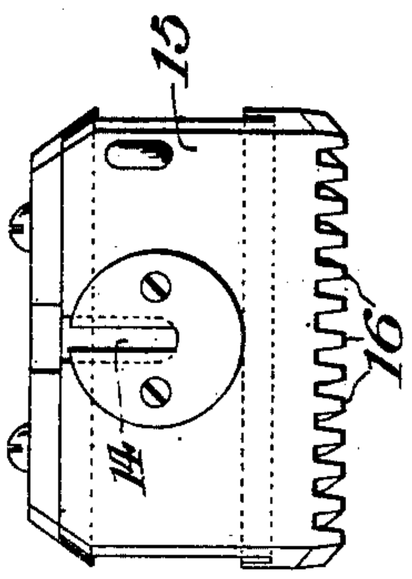
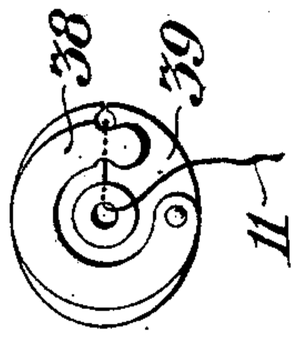



FIG. VIII.

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# UNITED STATES PATENT OFFICE.

WILLIAM F. POIESZ, OF PHILADELPHIA, PENNSYLVANIA.

## BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 714,946, dated December 2, 1902.

Application filed February 19, 1901. Serial No. 47,917. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM F. POIESZ, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Braiding-Machines, whereof the following is a specification, reference being had to the accompanying drawings.

This invention relates to machines of the class comprising means to progress two series of bobbins in relatively opposite directions to form a plaited tube with the threads drawn from said bobbins, which tube may be formed as the covering of an electrical conductor.

It is the object of my present invention to provide a machine of the class described which may be operated at a higher rate of speed than the machines of the prior art; and to this end my improvements comprise simple and efficient means to direct the threads from one set of bobbins under and over the other set of bobbins, means for insuring uniformity in the product by the discharge thereof from the machine in predetermined ratio to the braiding movement of the latter, means for supporting the upper set of bobbins in removable relation with their respective carriers, guides for the respective bobbin-threads so arranged with respect to an automatic belt-shifter as to stop the machine when any one of said guides is freed from its thread either by exhaustion of the bobbin or by breakage of the thread, and other advantageous features of construction hereinafter described and claimed.

In the accompanying drawings, Figure I is a top plan view of a machine conveniently embodying my invention. Fig. II is an elevation of the right-hand end of the machine shown in Fig. I. Fig. III is a sectional view of said machine, taken on the line III III in Fig. I. Fig. IV is a fragmentary sectional view of said machine, taken on the line IV IV in Fig. I. Fig. V is an inner face view of one of the sectoral carriers for the upper bobbins. Fig. VI is a top plan view of the carrier shown in Fig. V. Fig. VII is a plan view of a bobbin-spindle adapted to be removably secured in said sectoral carrier. Fig. VIII is an inner face view of the head of said spindle.

In said figures, 1 is a stationary frame comprising the end standards 2 3 and the central tubular standard 4, which standards support the hollow cam-cylinder 5 in fixed relation with said frame. The drum 6 is mounted for rotation upon said central standard 4 and provided with a series of fixed spindles 7, arranged to carry the series of bobbins 8, provided with threads 9.

The upper series of bobbins 10, provided with threads 11, are mounted upon the spindles 12, having shanks 13 removably fitted in the recesses 14 of the independent carriers 15. Said carriers 15 are each provided upon their lower sides with gear-sectors 16 and mounted to slide upon the track 17, fixed within the cam-cylinder 5. Said carriers are rotated or progressed circumferentially upon said track in equidistant relation by the pinions 18, which are rotated upon stationary studs 19 in the cam-cylinder 5 by their engagement with the gear 20 upon the drum 6, each of said carriers 15 being at all times engaged with at least one of said pinions 18. Said drum 6 being provided at its lower extremity with the bevel-gear 21 in engagement with the bevel-gear 22 upon the main driving-shaft 23, provided with the tight pulley 24 and loose pulley 25, it is to be understood that the arrangement of the parts is such that said drum carrying the lower series of bobbins 8 and the sectoral carriers 15, independently supporting the upper series of bobbins 10, are rotated in relatively opposite directions with respect to the cam-cylinder 5. Said drum 6 is provided at its periphery with slide-bearings parallel with the axis of the cam-cylinder 5 and respectively consisting of pairs of rods 27, stepped in brackets 28 and rigidly connected at their tops by the ring 29. Each of said slide-bearings is provided with a cross-head 30, in which is mounted a tubular thread-guide 31, extending radially inward toward the axis of the cam-cylinder and operatively engaged at 32 with the cam-slot 33, extending through the cylinder 5. Fixed beneath the gear 20 upon the drum 6 are hangers 34, respectively adjoining said slide-bearings, and said hangers 34 are connected with the cross-heads 30 by links 35, provided with the thread-eyes 36 in axial alinement with the pivots of the links, so that the bight of thread extending from each of the lower

bobbins 8 to its thread-guide 31 is maintained of substantially constant length.

The proper tension upon the threads 9 of the bobbins 8 is conveniently secured by the spring-brakes 37, whose outer extremities are attached upon the drum 6, beneath the gear 20, and whose inner extremities rest upon the upper ends of the bobbins 8. The proper tension upon the threads 11 of the bobbins 10 is secured by the springs 38, which are attached at one extremity upon the heads 39 of the spindles 12, which heads also serve to prevent the accidental displacement of the bobbins. Said threads 11 extend to the mouth of the discharge-tube 40, through the thread-guides 41, pivoted at 42 upon the spindles 12, and the threads 9 extend directly from the vertical reciprocatory thread-guides 31 to the mouth of said discharge-tube 40 in such relation that the operation of the machine serves to plait said threads 9 and 11 to form either a tubular cord or a covering for a central core 43.

The ratio of discharge of the finished product 44 with respect to the braiding movement of the machine serving to determine the texture of the braid, I find it desirable to automatically determine the proper ratio by providing a positive feeding device adjacent to the discharge-tube 40 to withdraw the braid 44. In the form of my invention shown I provide the feed-roller 45 upon the countershaft 46, journaled in bearings on the top of the frame 1 and connected with the main driving-shaft 23 by the gearing-train comprising the bevel-gears 47, the vertical shaft 48, and the gear 49. The latter being in mesh with the worm 50 upon the shaft 23, the braiding and feeding movements of the machine are effected at the desired ratio.

In order that the machine may be automatically stopped whenever the threads 9 or 11 need the attention of the operator, I provide an automatic belt-shifting device arranged as follows: The shifter-bar 51 is provided with the spring 52, arranged to shift the belt upon the loose pulley 25 whenever said spring is free to act. However, said bar is normally retained in the position shown in Fig. IV, with the belt upon the tight pulley 24 of the shaft 23 by means of the detent 53. Said detent is provided with a tripping device consisting of the bell-crank lever 54, the link 55, lever 56, link 57, and lever 58. Said lever 58 is fixed upon the rock-shaft 59, mounted for oscillation upon the top of the central standard 4, and provided at its outer extremity with the tripping-lever 60, which normally projects in such relation with the thread-guides 41 as to remain inoperative while said guides are supported above it by the threads 11. However, the relation of the parts is such that when one or the other of said guides 41 is freed from its thread 11 the guide falls to the position shown at the left-hand side of Fig. IV, and in that position encounters the lever 60 and through the links and levers connected therewith depresses the detent 53, frees the shifter 51, and permits the spring 52 to transfer the belt to the loose pulley 25, and thereby stop the machine.

Each of the bobbins 8 is provided with a thread-guide 61, pivoted in a hanger 62 upon the drum 6 and normally held in the position shown at the right-hand side of Fig. IV by the tension of the thread 9, extending through the eye 63. When, however, any one of said guides 61 is freed from its thread 9, it falls to the position shown at the left-hand side of Fig. IV, in which position it encounters the lever 64, fixed upon the vertical rock-shaft 65, which latter is provided at its lower extremity with the lever 66 in engagement with the lug 67 upon the link 55. It is to be understood that said lever 66 is rocked by the guide 61 aforesaid in the direction of the arrow upon Fig. I and that such movement shifts the link 55 and releases the detent 53, and thus stops the machine in the manner above described.

It is characteristic of my present invention that the reciprocatory movement of the thread-guides 31 is effected solely by the individual engagement of said guides in the stationary cam-slot 33, which guides being carried through said slot by the drum 6 are raised and lowered by the latter in proper sequence to avoid the carriers 15, which, as above described, are progressed in the opposite direction. However, I do not desire to limit myself to the precise construction and arrangement of the mechanism hereinbefore described, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a braiding-machine, the combination with a hollow cylinder comprising a sinuous circumferential cam-slot extending therethrough; of a series of thread-guides arranged to reciprocate in a direction parallel with the axis of said cylinder; and means to progress said guides circumferentially with respect to said cylinder and effect their independent reciprocation by their individual engagement in said cam-slot, substantially as set forth.

2. In a braiding-machine, the combination with a stationary hollow cylinder comprising a sinuous circumferential cam-slot extending therethrough; of a series of thread-guides arranged to reciprocate in a direction parallel with the axis of said cylinder; and means to reciprocate said thread-guides by progressing them circumferentially with respect to said cylinder in respective engagement with said cam-slot, substantially as set forth.

3. In a braiding-machine, the combination with a stationary cylinder provided with a sinuous circumferential cam-slot extending therethrough; of a circumferential series of equidistant radial thread-guides entered through said slot and independently reciprocated thereby, substantially as set forth.

4. In a braiding-machine, the combination with a stationary frame; of a stationary hollow cylinder secured to said frame; a sinuous circumferential slot extending through said cylinder; a drum arranged to carry a series of bobbins; a series of independent bobbin-carriers; means to rotate said drum and said carriers in relatively opposite directions; a series of slide-bearings fixed upon the periphery of said drum; and thread-guides respectively mounted for rectilinear reciprocation in said slide-bearings and extending radially through said slot, substantially as set forth.

5. In a braiding-machine, the combination with a stationary frame; of a stationary hollow cylinder secured to said frame; a sinuous circumferential cam-slot extending through said cylinder; a drum arranged to carry a series of bobbins; a series of independent bobbin-carriers; means to rotate said drum and said carriers in relatively opposite directions; a series of slide-bearings, each comprising a pair of parallel rods fixed upon the periphery of said drum; respective cross-heads mounted for reciprocation on said bearing-rods; respective thread-guides fixed in said cross-heads and extending radially through said cam-slot in operative relation therewith; respective hangers fixed upon said drum adjoining said slide-bearings; links connecting the respective hangers and cross-heads; and thread-eyes upon said links in axial alinement with the pivots thereof, substantially as set forth.

6. In a braiding-machine, the combination with an automatic belt-shifter; of a bobbin-spindle; and a thread-guide pivoted to said spindle, and arranged to trip said belt-shifter when freed from its thread, substantially as set forth.

7. In a braiding-machine, the combination with an automatic belt-shifter, consisting of a shifter-bar, a detent normally in engagement therewith, and braiding mechanism operatively connected with said detent; of a series of bobbin-spindles having thread-guides pivoted to their ends and arranged to trip said belt-shifter mechanism when freed from their threads, substantially as set forth.

8. In a braiding-machine, the combination with an automatic belt-shifter; consisting of the shifter-bar 51; the detent 53, normally engaged with said bar; the bell-crank lever 54, connected to said detent; the trip-lever 58; the pivoted lever 56; the links 55, and 57; said pivoted lever and links operatively connecting said trip-lever and said bell-crank lever; the rock-shaft 65, operatively connected to said detent; and the lever 64, on said rock-shaft; of bobbin-spindles having thread-guides pivoted to their ends and arranged to trip said belt-shifter when freed from their thread, substantially as set forth.

9. In a braiding machine, the combination with a stationary frame; of a stationary hollow cylinder secured to said frame; a drum mounted to rotate upon said frame and carry a series of bobbins; a series of independent bobbin-carriers having gear-sectors; a main driving-shaft; bevel-gears connecting said driving-shaft with said drum; a gear upon the periphery of said drum; pinions operatively connecting said drum-gear with the gear-sectors of said independent bobbin-carriers; a counter-shaft; a feed-roller upon said counter-shaft arranged to withdraw the braid from the machine; and means connecting said main driving-shaft with said counter-shaft, arranged to determine the rate of discharge of the braid with respect to the rate of rotation of said bobbin-drum and bobbin-carriers, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 7th day of February, 1901.

WILLIAM F. POIESZ.

Witnesses:
ARTHUR E. PAIGE,
E. L. FULLERTON.