S. J. VERNSTEN.

CONTINUOUS PRESS.

APPLICATION FILED JAN. 27, 1908.

921,921.

Patented May 18, 1909.

3 SHEETS—SHEET 1.

FIG. 1

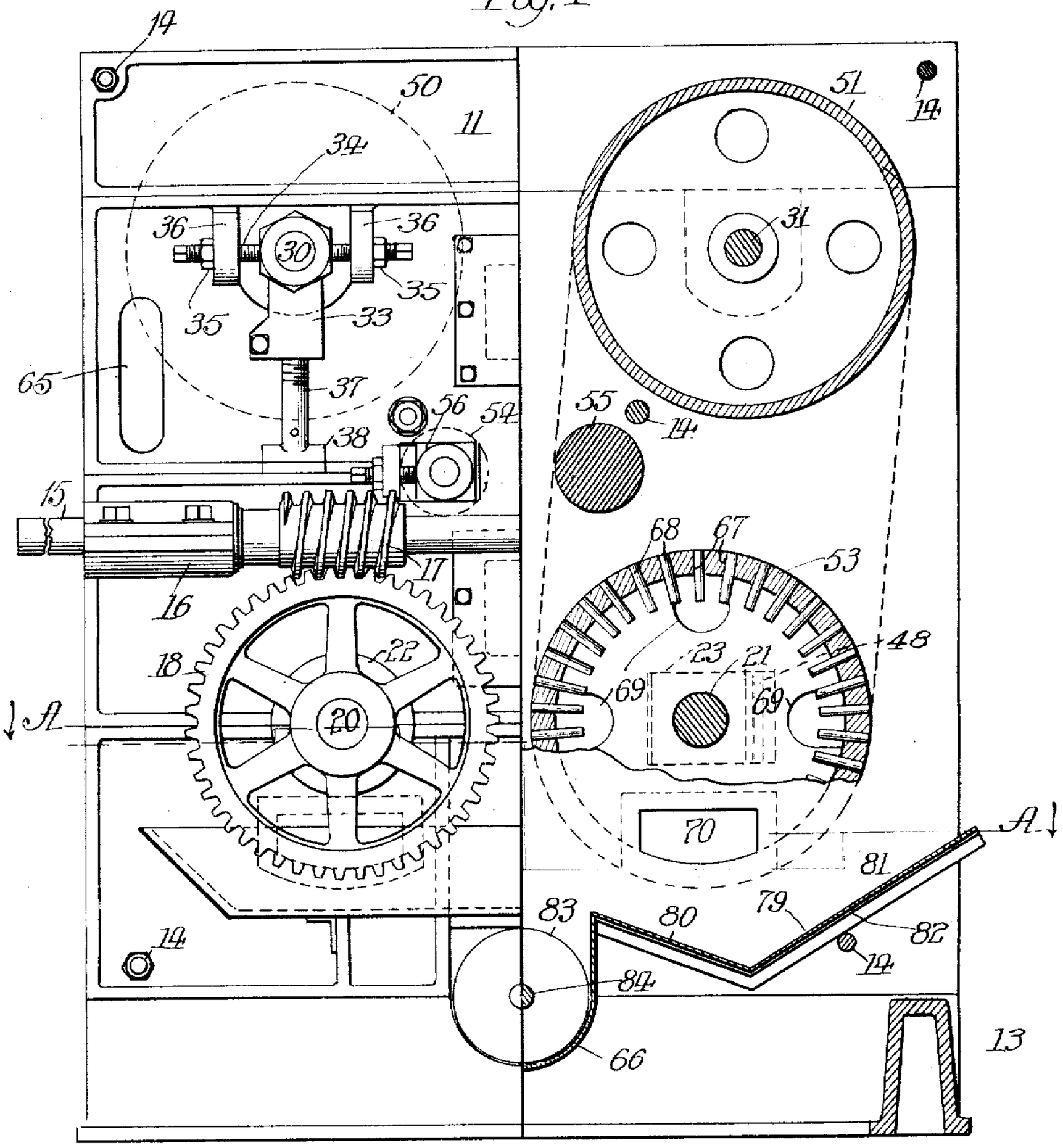

FIG. 6

FIG. 7

FIG. 8

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3 SHEETS—SHEET 2.

Fig. 2

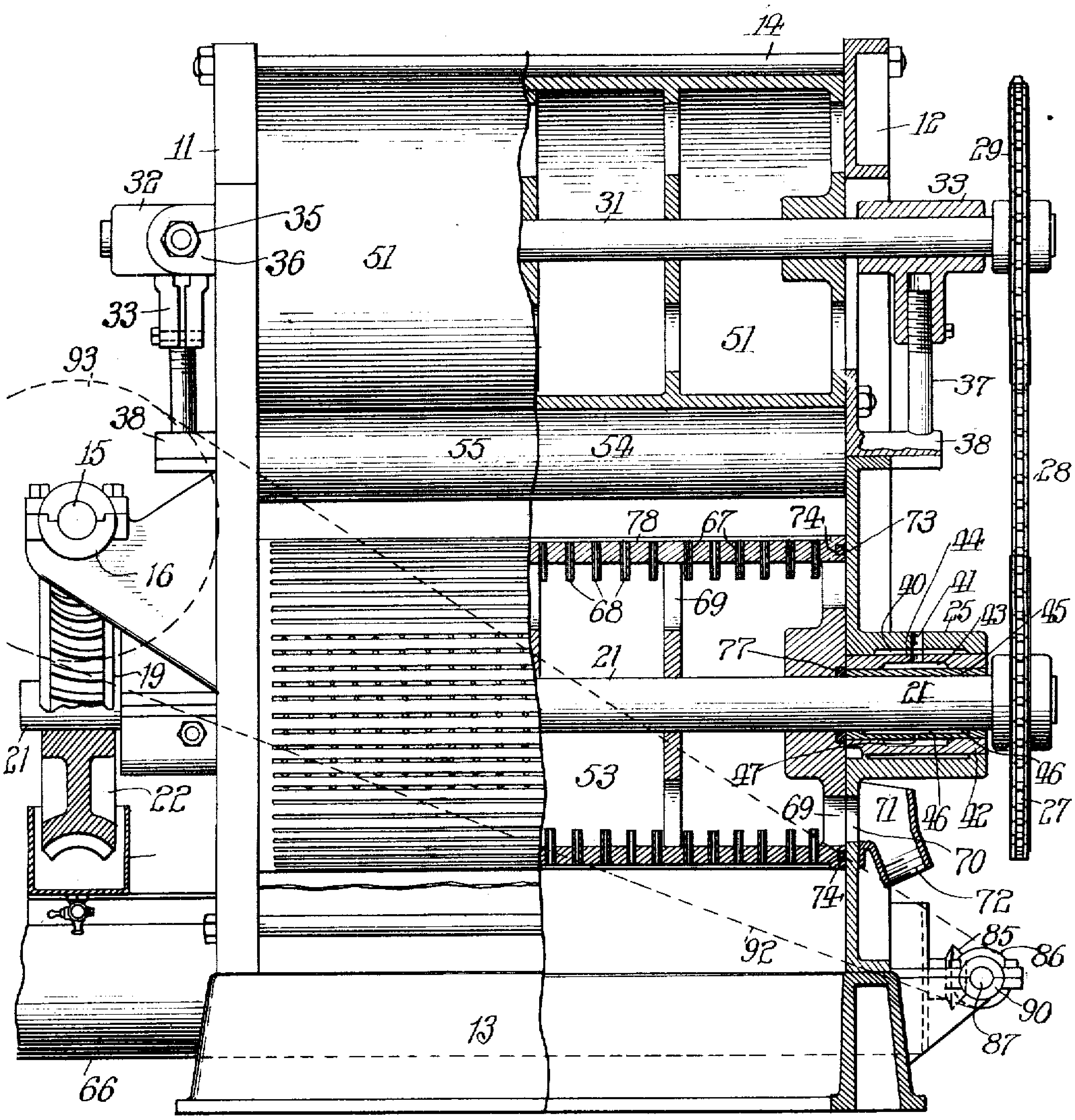
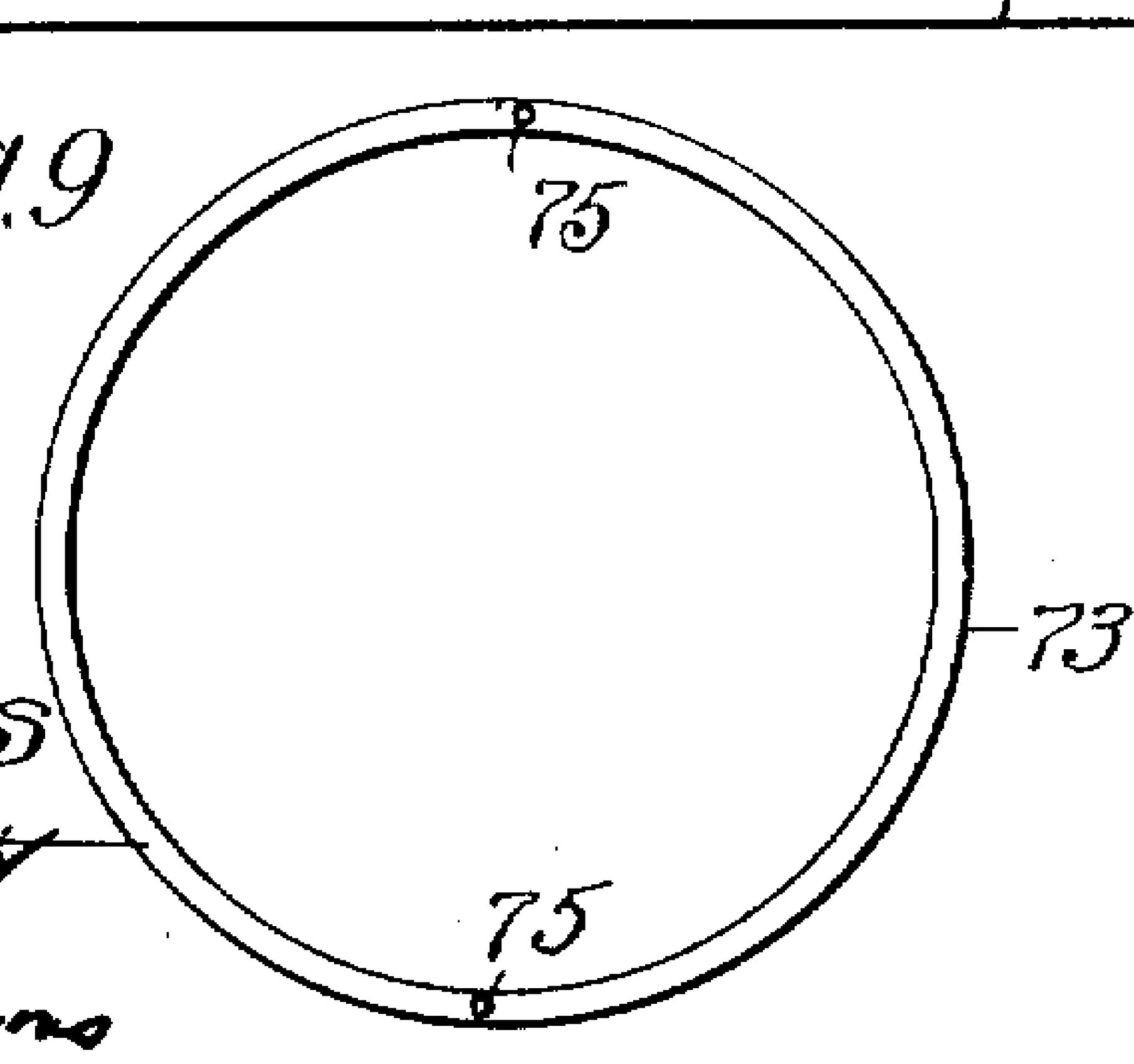


Fig. 9



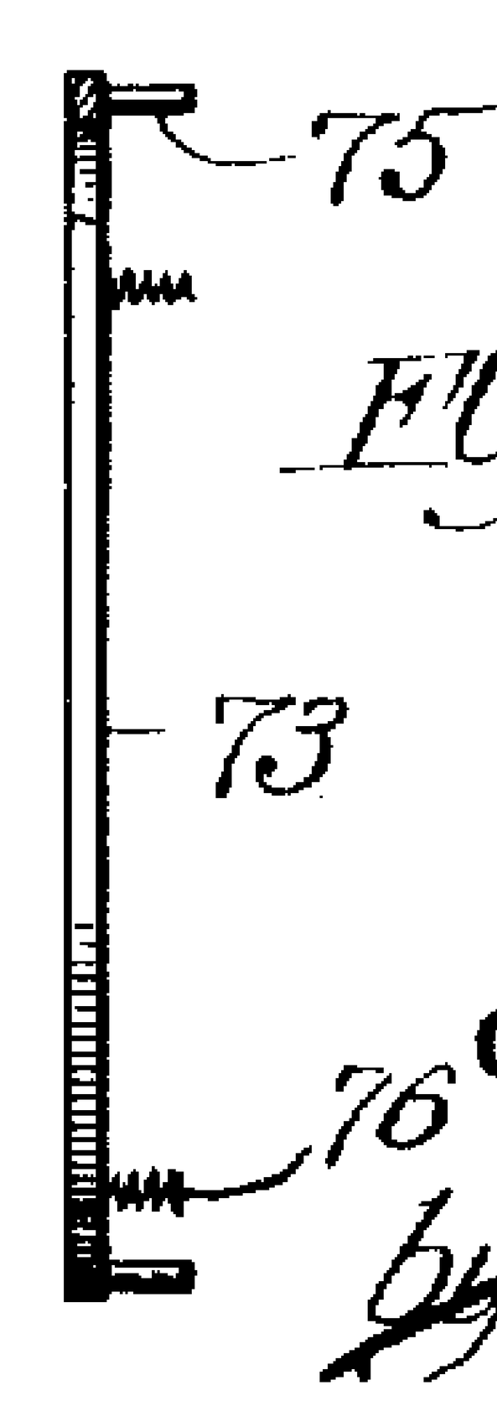


Fig. 10

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3 SHEETS—SHEET 3.

Fig. 3

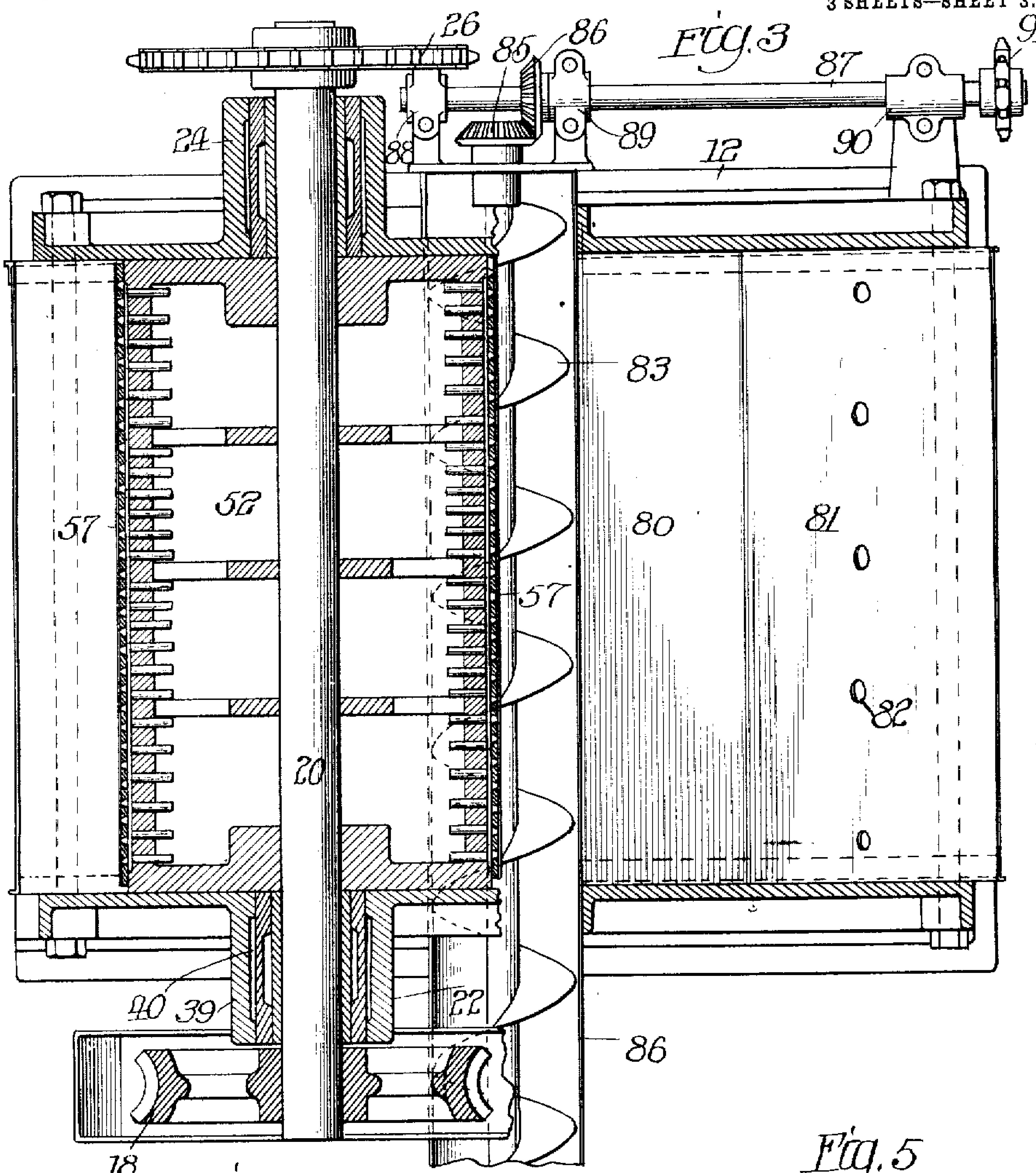


Fig. 4

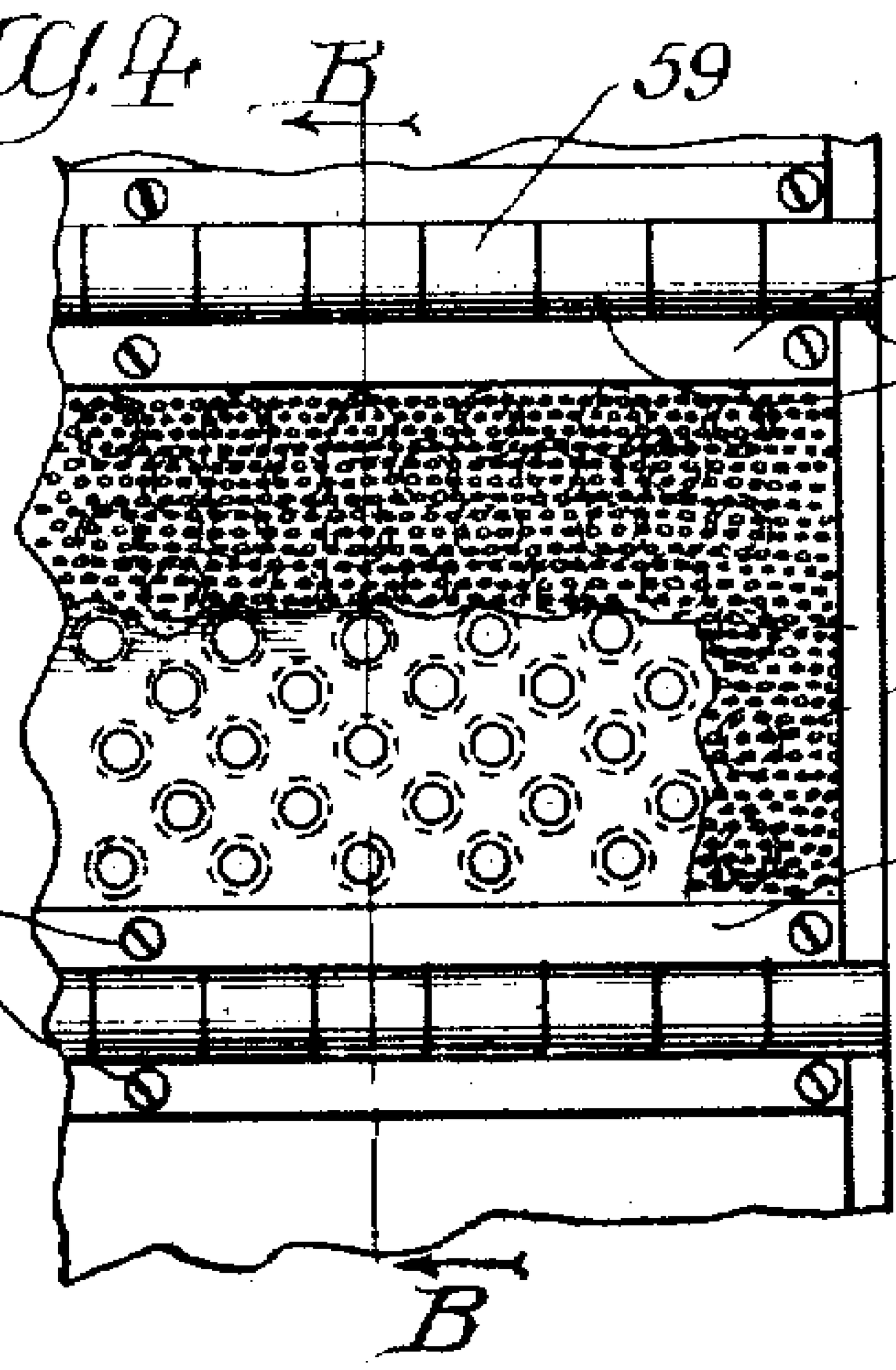
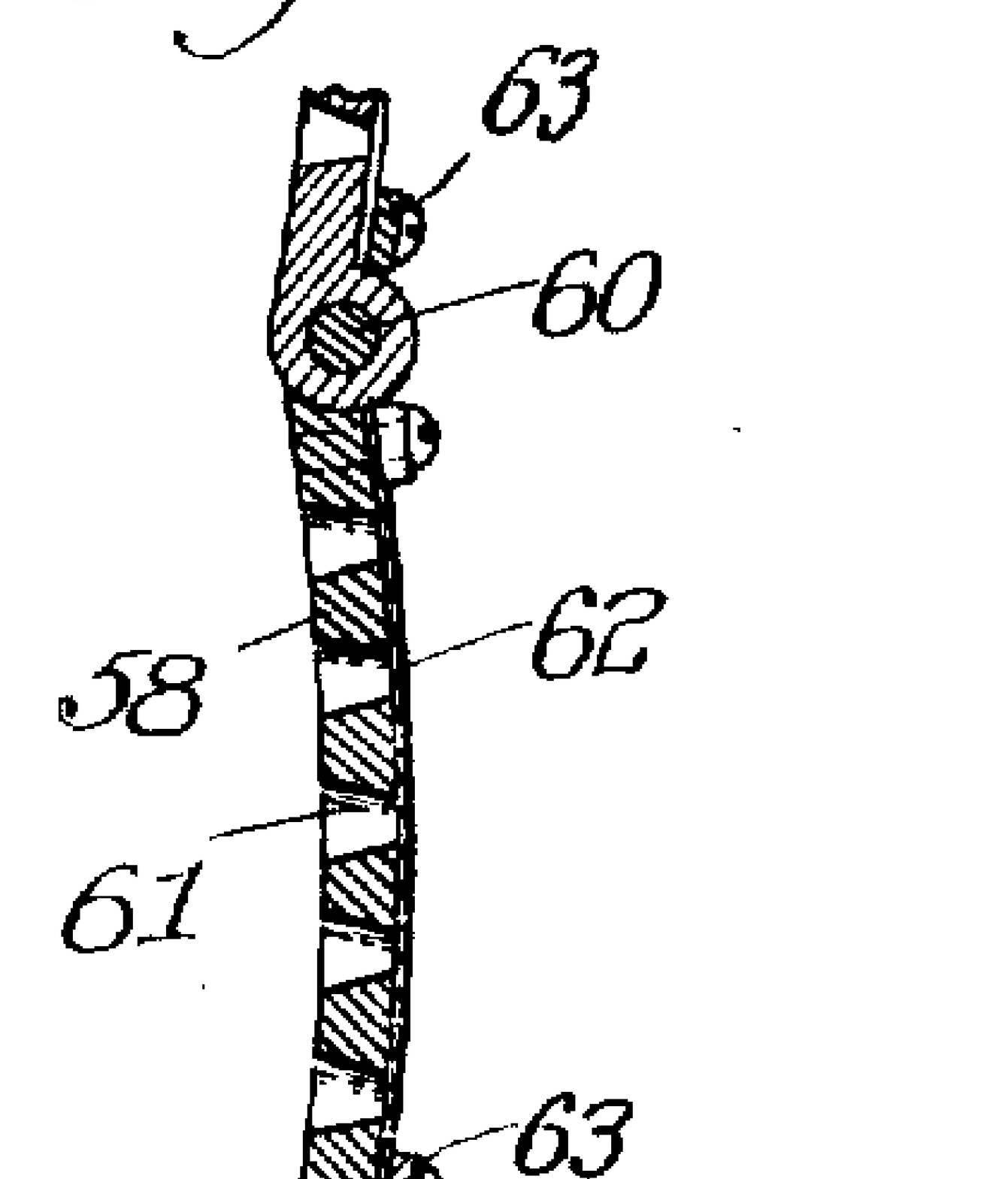


Fig. 5



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UNITED STATES PATENT OFFICE.

SWAN J. VERNSTEN, OF CHICAGO, ILLINOIS.

CONTINUOUS PRESS.

No. 921,921. Specification of Letters Patent. Patented May 18, 1909.

Application filed January 27, 1908. Serial No. 413,927.

To all whom it may concern:

Be it known that I, SWAN J. VERNSTEN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Continuous Presses, of which the following is a full, clear, and exact specification.

My invention is concerned with continuous presses of the type in which the material to be operated upon is fed between two slightly-converging perforated-belts, so as to allow the water, etc., to pass through the belts as it is squeezed from the material as its bulk is lessened by the convergence of the slowly moving belts, and is designed to make such a press thoroughly practical, and efficient in its operation.

To this end, my invention consists of certain novel combinations of elements and structures, which will be described in detail in the body of the specification, and the novel features thereof particularly pointed out in the claims.

To illustrate my invention, I annex hereto three sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Figure 1 is a front elevation of the machine with the right-hand side thereof in central vertical section; Fig. 2 is an end elevation, with the right-hand portion thereof in vertical section through one of the upper and lower drums, and with the belts omitted in order to expose the drums; Fig. 3 is a plan view in section on the line A—A of Fig. 1; Fig. 4 is a detail of a part of the exterior of one of the belts; Fig. 5 is a view of the same in section on the line B—B of Fig. 4; Figs. 6, 7 and 8 (Sheet 1) are side, end and plan views, respectively, of the blocks used in adjusting the bearings of one of the lower drums, and Figs. 9 and 10 are end and side views, respectively, of the packing rings used in connection with the lower drums.

In the preferred embodiment of my invention, the front and rear of the machine are formed of the two frame pieces 11 and 12, which may be cast integrally or built up in any desired manner, their principal function being to furnish supports for the various bearings with which the moving parts of the machine are equipped. The ends of the machine, as seen in Fig. 2, are preferably open, and have at the bottom the connecting base strips 13. The frame pieces are connected and spaced apart at suitable intervals by the tie rods 14. The power is applied to the machine to drive it by means of the horizontal worm shaft 15, which is journaled in suitable bearings 16 on the end plate 11, and this shaft is provided with the pair of oppositely pitched worms 17, which mesh with the worm wheels 18 and 19 secured on the outer ends of the shafts 20 and 21, which are journaled in the bearings 22 and 23 in the frame 11, and 24 and 25 in the frame 12. At their other ends, outside of the bearings 24 and 25, the shafts are provided with the sprocket wheels 26 and 27, which, through the sprocket chains 28, drive the sprocket wheels 29 secured on the corresponding ends of the shafts 30 and 31, which are journaled in the bearings 32 supported from the end plate 11, and 33 supported from the end plate 12. As best seen in Figs. 1 and 2, these bearings 32 and 33 are adjustable, their lateral adjustment being secured by means of the set screws 34 provided with the lock nuts 35, which screws are threaded through apertures in the lugs 36. These bearings are supported vertically and their lateral movement permitted by means of the bolt 37, the upper end of which is screwed into the bottom of the bearing block, while its semispherical lower end is mounted in a correspondingly shaped recess in the bearing lug 38 projecting from the frame pieces. This simple adjustment enables me to move the two shafts 30 and 31 to and from each other as may be necessary in securing the proper distance between the upper ends of the effective portions of the two belts to be described.

The bearings 22 and 24, and 23 and 25, for the shafts 20 and 21, are of a peculiar construction, and in general, as best seen in Figs. 2 and 3, may be said to consist of the external annulus 39 for the bearings 22 and 24, while in the bearings 23 and 25, the corresponding part has an elongated rectangular shape, as indicated by the dotted lines in Fig. 1, in order to provide for the horizontal adjustment of the shaft 21. The annulus 39 preferably has the interior, shallow annular channel 40, and opening into this channel at the top is the oiling aperture 41. The intermediate bearing ring 42 is provided with a similar annular channel 43 on its interior, and an oiling aperture 44 in line with the aperture 41. The innermost

annulus 45, in which the shaft turns, has the longitudinal channel 46 on the interior of the bottom of the sleeve, and this channel 46 is connected by the aperture 47 with the channel 43. The bearing sleeves are held from turning in any desired manner, and it will be evident that if a quantity of oil is poured into the aperture 41, it will fill the channel 43, and some of it will rise through the aperture 47 into the channel 46, and this portion of the oil serves to lubricate the bearing. This construction will preserve the desired degree of lubrication for a long period without any attention whatever. The construction of the lower bearings 24 and 25 is similar to the bearings 22 and 23, except that the bearing members corresponding to 39 are of an elongated, rectangular shape to permit of the horizontal adjustment, and the intermediate members 42 have their exterior square so as to slide in the elongated rectangular aperture.

In order to furnish a convenient method of adjusting the position of the shaft 21 without any difficulty in getting into the bearings owing to the presence of the wheels 19 and 27, I provide a plurality of the adjusting blocks 48, which, as will be seen from Figs. 6, 7 and 8, are merely strips of metal with the recesses 49 therein in order to permit a tool to be inserted therein to facilitate their withdrawal. By using these blocks between the intermediate bearing member and the rear of the exterior bearing member, the position of the shaft 21 can be accurately regulated, and it needs no blocks on the inner side, owing to the pressure of the material operated on holding it back in place.

It will be understood that the shafts 30 and 31 are provided with the drums 50 and 51, which are secured to and rotate with the shafts, and preferably have their exterior surfaces in the form of smooth cylinders. The shafts 20 and 21 carry the perforated drums 52 and 53, and the construction of these drums will be set out more in detail later. It will be understood that a pair of perforated, endless belts, the details of which are to be described, are passed around the drums 50 and 52, and 51 and 53, respectively, and the shafts 20 and 21 are set closer together than the shafts 30 and 31, so that the belts will converge, so that any material thrown between them as they pass over the cylinders 30 and 31 will be squeezed very strongly as the space between the belts diminishes as they pass to the drums 52 and 53. In order to hold the adjacent portions of the belts rigidly between the drums 50 and 52, and 51 and 53, and also to adjust the distance between them at this point, I provide the pair of rollers 54 and 55, which are journaled in four similar bearings 56, which are adjustably mounted in the frame pieces 11 and 12 in the manner clearly indicated in Fig. 1.

The details of the belts 57 are best shown in Figs. 4 and 5, where it will be seen that they are made up of sections, each of which consists of a plate 58, which is curved to correspond with the curve of the periphery of the drums 51 and 53, where cylindrical drums are used, and which might be flat, if these drums were polygonal in cross section and had a number of flat surfaces corresponding in size to the belt sections. These plates 58 are provided with the alternate ears 59, which intermesh so that the hinge rod 60 may connect the sections to form a continuous, substantially flexible belt. The belt is provided with the perforations 61, which are of a considerable size, and as numerous as compatible with the desired strength of the sections, and I find that the best results are secured by making these perforations larger on the interior of the belt than the exterior, and they are preferably of a truncated conical shape, or flaring, as shown. To prevent the material being operated on passing with the moisture through the large perforations 61, I cover the exterior of each section with a sheet of finely perforated metal 62, which is preferably composed of brass, and is secured in place by the strips 63 at the top and bottom, which strips are preferably detachably secured in place by the screws 64 threaded into the plates 58, so that the screen can be readily removed for repairs. In order to enable me to conveniently remove any section of the belt endwise through the framework of the machine, I provide the apertures 65 in the frame, as seen in Fig. 1.

The drums 52 and 53 are designed to receive the moisture from the lower part of the belt, and in order to pass the moisture into the interior of these drums so as to prevent its falling off from the belts and dropping down with the material into the conveyer trough 66, I provide the drums with the perforations 67, and in order to prevent the moisture which tends to run through these perforations when they are in the horizontal position from running out again as they assume a vertical position, I preferably extend the perforations, as it were, by securing the tube 68 on the interior of the drum, and it will be apparent that by employing these tubes, the moisture will have no chance to run out until enough has accumulated in the bottom of the drums to extend above the tops of the tubes, and I provide means for draining the drums, as best seen in Fig. 2, where it will be seen that the drums have the apertures 69 which register with sufficient frequency with the apertures 70 formed in the end piece 12, and provided with a spout 71, which is internally threaded, as seen at 72, so that it may be connected

with a waste pipe provided to carry away the moisture. In order to secure the best results with this arrangement, it is advisable to make the bearings between the ends of the drums 52 and 54 water tight with the interior of the frame pieces 11 and 12, and, for this purpose, I employ the metallic packing rings 73, which are mounted in the grooves 74 in the ends of the drums, and have the pins 75 to prevent their turning, and the springs 76 to press the rings against the frame pieces, the pins and springs, of course, being located in suitable recesses extending inward from the grooves 74. Additional packing 77 may be interposed between the ends of the drums and the packing rings 45, but this is not so important. While the perforations 67 alone might be depended upon to carry away the moisture from the perforations 61, I preferably insure the moisture being carried away by providing the longitudinal grooves 78 extending lengthwise of the drums and locating the perforations 67 in these grooves. By the arrangement shown, it will be seen that the bulk of the water squeezed out of the material will pass into the interior of the drums 52 and 53, and be discharged through the waste pipes connected with the spouts 71. However, to take care of whatever moisture might escape from the drums and whatever material might drop therefrom, I provide the sheet-metal troughs 79, which extend across the machine between the frame pieces and beneath the drums, and the shorter, inner, inclined portions 80 of which are connected with the upper edges of the conveyer trough 66, while the other portion 81 extends up higher and to the outer edge of the machine, so that any material accumulating in the troughs can be raked out. In order to permit the moisture to escape from the troughs and not overflow into the conveyer trough 66, I provide the perforations 82 in the troughs just below the level of the upper edges of the sides 80 and the conveyer trough 66. Then, as the material accumulates in the trough, it can be scraped up and thrown back into the top of the machine to re-squeeze this portion of the material. The conveyer trough 66, which receives the squeezed material, is provided with some conveying apparatus, such, for instance, as the screw 83 secured on the shaft 84, and this shaft 84 is journaled at one end in a suitable bearing in the frame piece 12, and is provided at this end with the miter gear pinion 85, which meshes with a miter gear pinion 86 secured on the horizontal shaft 87 journaled in the bearings 88, 89 and 90 secured to the frame piece 12. The outer end of the shaft 87 is provided with the sprocket wheel 91, which is driven through the sprocket chain 92, indicated in Fig. 2, by the sprocket wheel 93, indicated in dotted lines in Fig. 2, secured on the end of worm shaft 15. By these driving connections of the conveyer shaft with the drums, it will be evident that the conveyer is rotated in synchronism and at the proper rate of speed relative to the drums so that the material is carried off as fast as it is compressed.

While I have herein shown and described a novel journal bearing, I do not herein claim the same, but reserve the subject thereof for a divisional application.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a device of the class described, the combination with the pair of opposed perforated belts, of the corresponding pair of drums for the lower turn of the belts having the perforations therein to admit the moisture from the material through the belts into the drums, and means for driving said belts.

2. In a device of the class described, the combination with the pair of opposed perforated belts, of the corresponding pair of drums for the lower turn of the belts having the perforations therein to admit the moisture from the material through the belts into the drums, tubes on the interior of the drums forming extensions of the perforations, and means for driving said belts.

3. In a device of the class described, the combination of the frame, with the pair of opposed perforated belts mounted to run therein, the pair of drums for the lower turn of the belts having the perforations therein to admit the moisture from the material through the belts and into the drums, packing interposed between the ends of the drums and the frame, and discharge apertures and spouts in the frame at the lowest level of the interior of the drums.

4. In a device of the class described, the combination with the pair of opposed perforated belts, of the corresponding pair of drums for the lower turn of the belts having longitudinal grooves therein in their peripheries and perforations extending from the grooves to the interior of the drums to admit the moisture from the material through the belts and into the drums, and means for driving said belts.

5. In a device of the class described, the combination with the perforated belt and an opposing abutment, of the drum for the lower turn of the belt having the perforations therein to admit the moisture from the material through the belt into the drum,

and the tubes on the interior of the drum forming extensions of the perforations, for the purpose described.

6. In a device of the class described, the combination of the frame, with the perforated belt mounted to run therein, and an opposing abutment, of the drum for the lower turn of the belt having the perforations therein to admit the moisture from the material through the belt into the drum, the packing interposed between the ends of the drum and the frame, and the discharge aperture and spout in the frame at the lowest level of the interior of the drum.

7. In a device of the class described, the combination with the perforated belt and an opposing abutment, of the drum for the lower turn of the belt having the longitudinal grooves therein in its periphery, and the perforations extending from the grooves to the interior of the drum to admit the moisture from the material through the belt and into the drum.

8. In a device of the class described, the combination with the perforated belt and an opposing abutment, of the drum for the lower turn of the belt having the longitudinal grooves therein in its periphery, and the perforations extending from the grooves to the interior of the drum to admit the moisture from the material to the belt and into the drum, and the tubes on the interior of the drum constituting extensions of the perforations, for the purpose described.

9. In a device of the class described, the combination with the frame, of the perforated belt adapted to move in said frame, and an opposing abutment against which it acts, of the drum for the lower turn of the belt having the longitudinal grooves therein, and the perforations extending from the groove to the interior of the drum, the packing interposed between the ends of the drum and the frame, and a discharge aperture and spout in the frame at the lowest level of the interior of the drum.

10. In a device of the class described, the combination with the perforated drum, of the frame in which said drum is journaled, the packing rings interposed between the ends of the drum and the frame, means for passing water through the perforations into the drum, and a recess in the frame at the lowest level of the interior of the drum to discharge the water therefrom.

11. In a device of the class described, the combination with the frame, of the pair of upper drums journaled therein, the pair of lower drums journaled therein having perforations therein to admit the moisture from the material, the perforated belts on said drums converging to squeeze the material carried between them permitting the moisture to pass through the belts into the lower drums, and means for adjusting one of said pair of lower drums to and from the other.

12. In a device of the class described, the combination with the frame, of a pair of upper drums journaled therein, a pair of lower drums journaled therein having perforations therein to admit the moisture from the material, perforated belts on said drums converging to squeeze the material carried between them permitting the moisture to pass through the belts into the lower drums, a pair of opposed tensioning rollers adapted to coöperate with the inner surfaces of the adjacent sides of the belts, and means for adjusting said rollers to and form each other.

13. In a device of the class described, the combination with the frame, of a pair of upper drums journaled therein, a pair of lower drums journaled therein, perforated belts on said drums converging to squeeze the material carried between them, trough-shaped settling pans beneath the pair of lower drums extending higher up on the outer sides thereof and having the perforations on that side below the level of the top of the other side.

14. In a device of the class described, the combination with a frame, of a pair of upper drums journaled therein, a pair of lower drums journaled therein, perforated belts on said drums converging to squeeze the material carried between them, a pair of trough-shaped settling pans beneath the pair of lower drums extending higher up on the outer sides thereof and having the perforations on that side below the level of the top of the other side, and a conveyer trough between the pans and connected with the inner sides thereof.

15. In a device of the class described, the combination with a frame, of a pair of upper drums journaled therein, a pair of lower drums journaled therein, perforated belts on said drums converging to squeeze the material carried between them, a main shaft for driving said drums, a conveyer trough and conveyer therein below and between the lower drums, and gearing between the conveyer and the main shaft for driving the conveyer in synchronism with the drums.

16. In a device of the class described, the combination with the frame, of a pair of upper drums journaled therein, a pair of lower drums journaled therein, perforated belts on said drums converging to squeeze the material carried thereby, said belts being made up of detachable sections, and apertures in the frame in the plane of the movement of the belts through which the detached sections can be removed.

17. In a device of the class described, the combination with the frame, of a pair of upper drums journaled therein, a pair of

lower drums journaled therein, perforated belts on said drums converging to squeeze the material carried between them, and adjustable bearings for the upper pair of drums, comprising the bearing blocks, the horizontal set screws coöperating therewith, and the vertical set screw having the rounded lower end adapted to rock in a correspondingly shaped bearing on the frame.

In witness whereof, I have hereunto set my hand and affixed my seal, this 21st day of December, A. D. 1907.

SWAN J. VERNSTEN. [L. S.]

Witnesses:

JOHN H. MCELROY,
JNO. FLAHERTY.