H. G. ROGERS.

MACHINE FOR CONVERTING PULP INTO SHEETS.

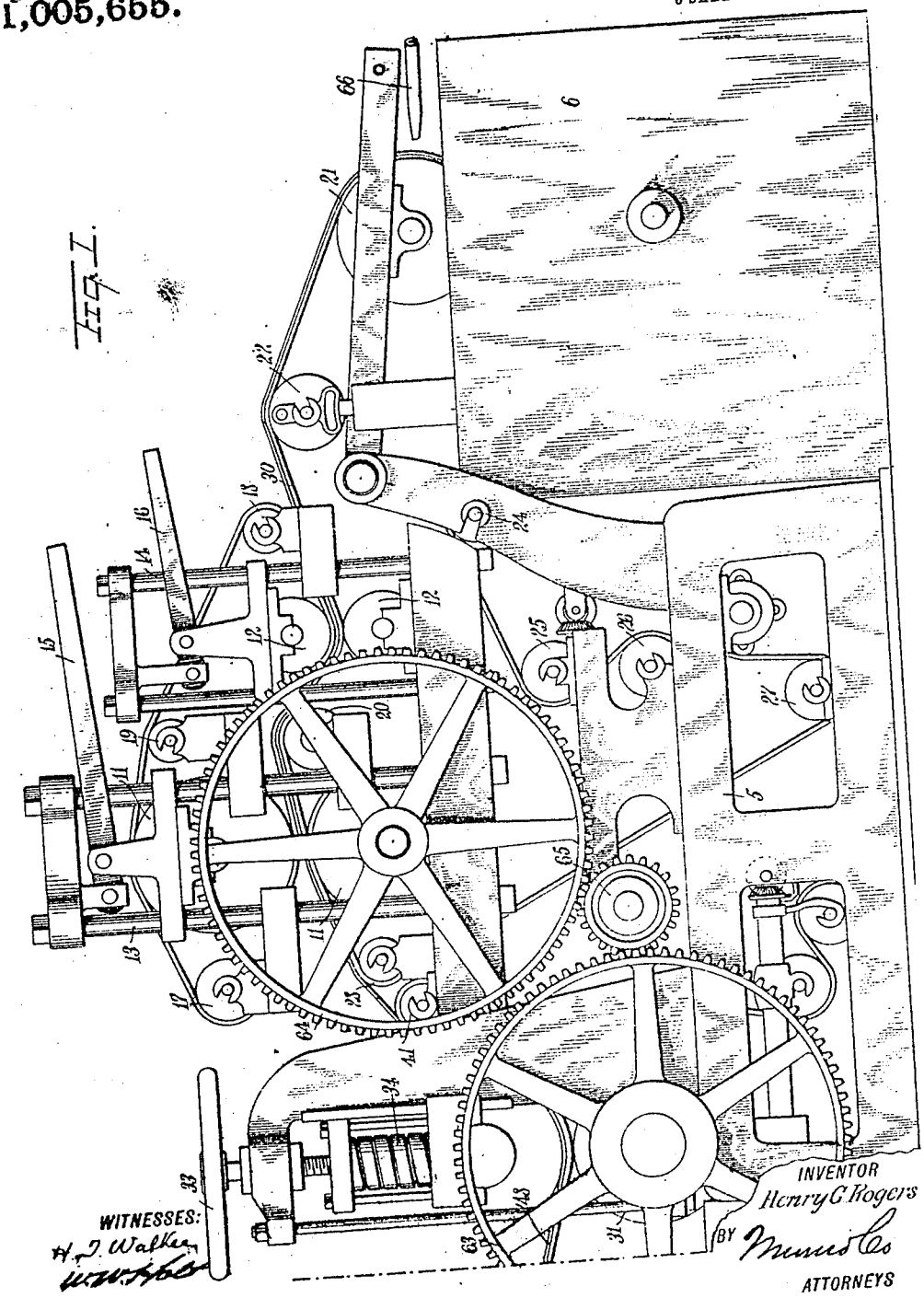
APPLICATION FILED JUNE 24, 1910.

Patented Oct. 10, 1911.

1,005,655.

6 SHEETS—SHEET 1.

Fig. 1.



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6 SHEETS—SHEET 2.

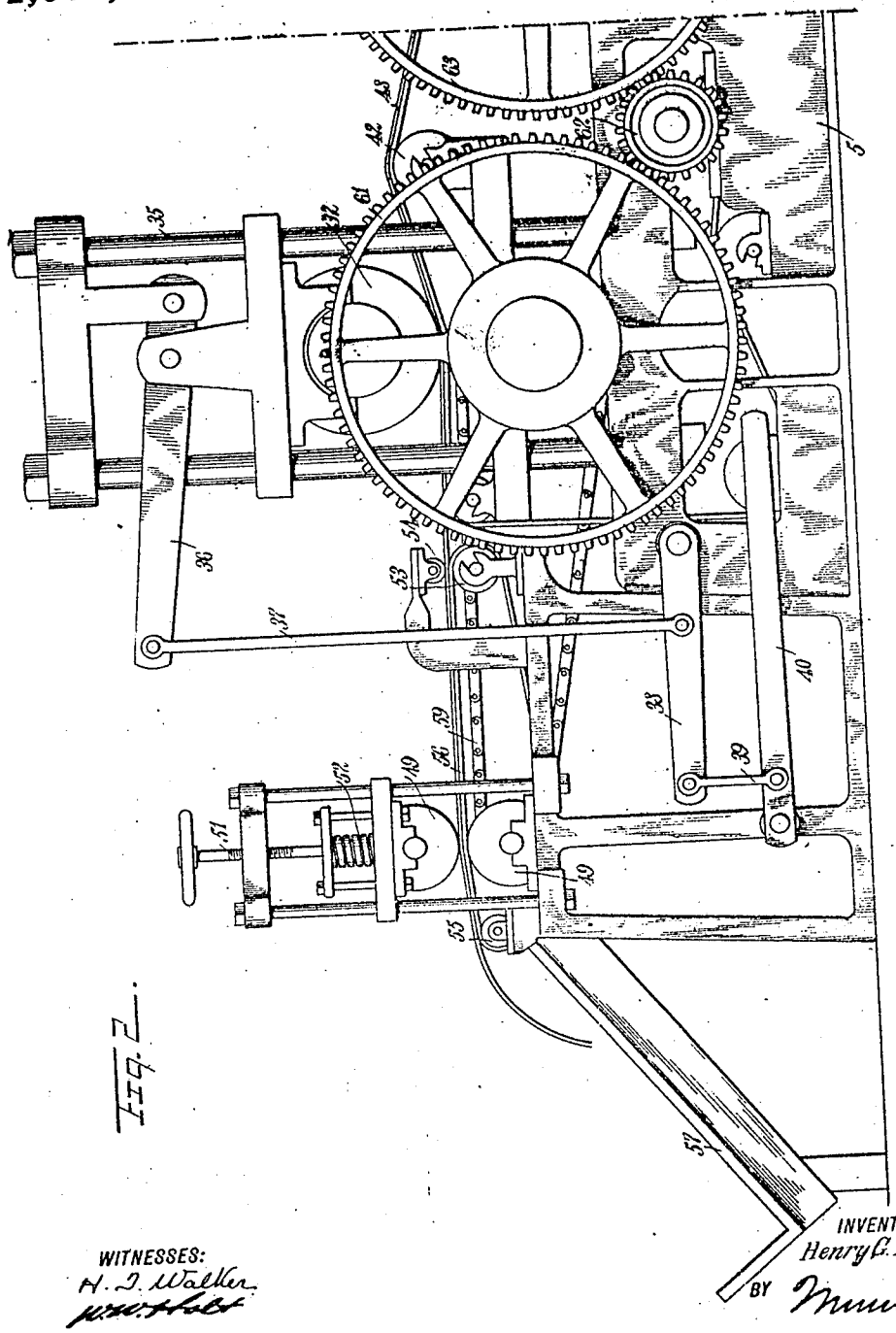

Fig. 2.

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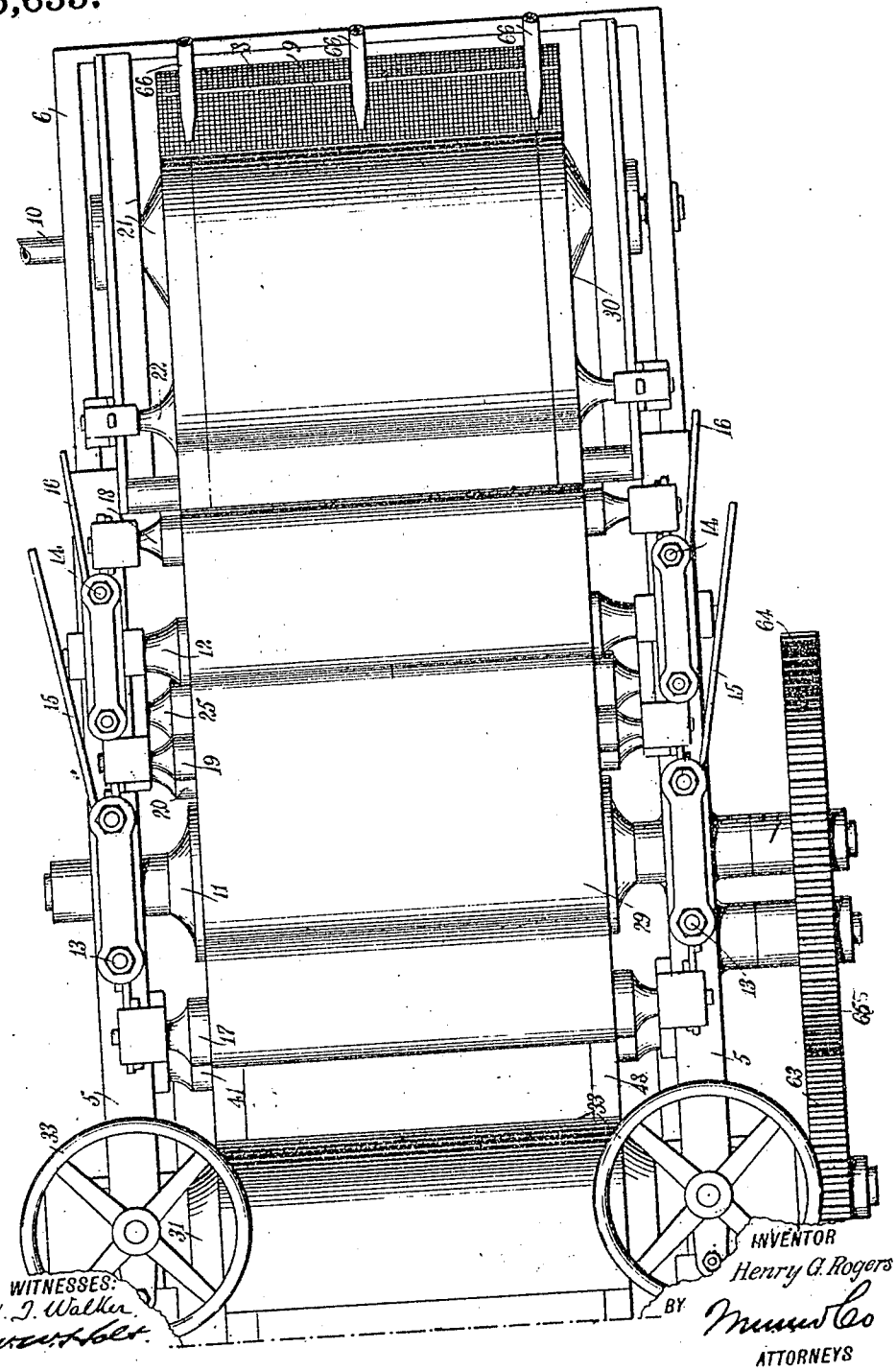
6 SHEETS—SHEET 3.

Fig. 3.



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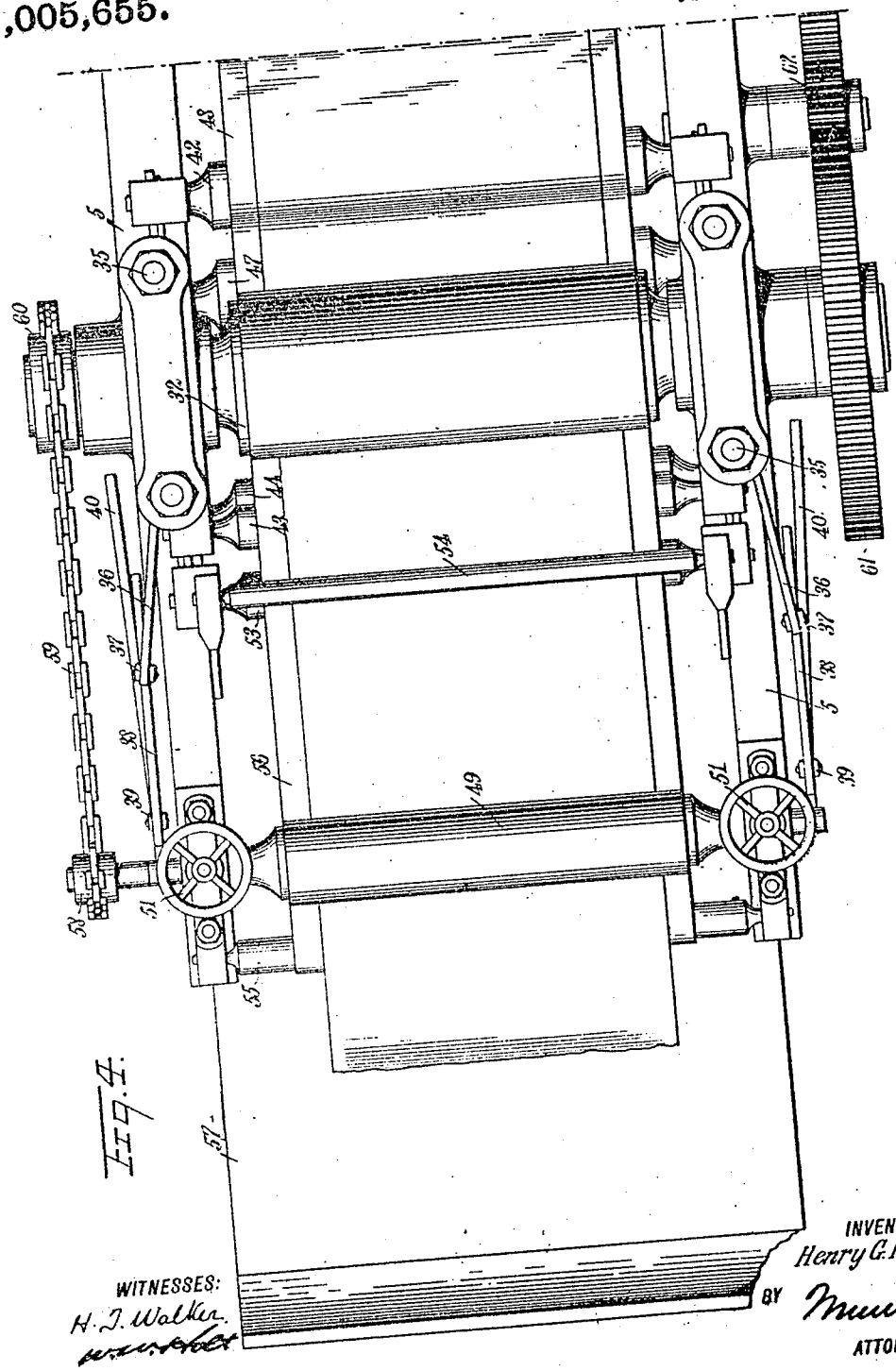

Fig. 4.

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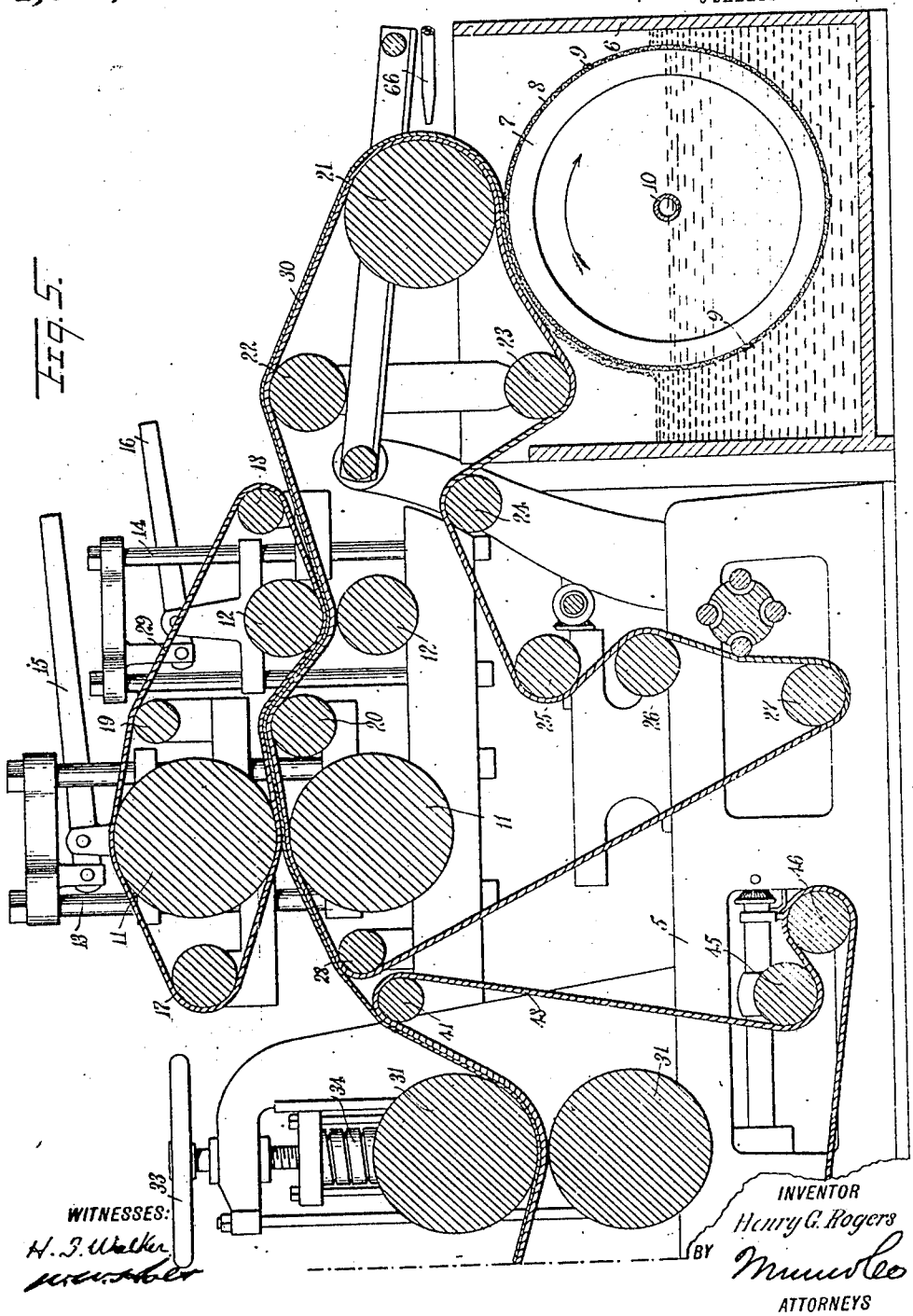
6 SHEETS—SHEET 5.

Fig. 5.



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6 SHEETS—SHEET 6.

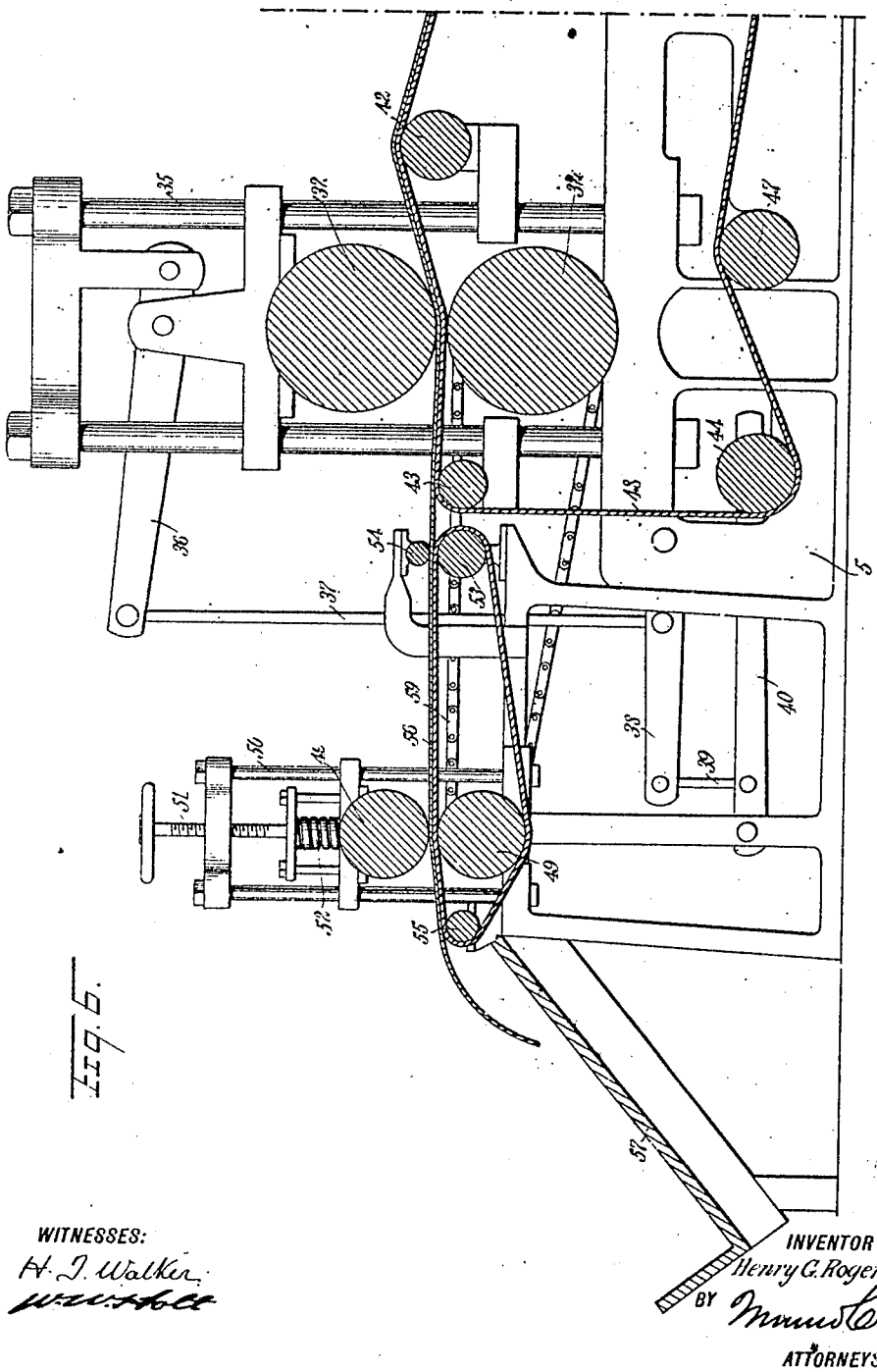

Fig. 6.

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HENRY GUR ROGERS, OF AU SABLE FORKS, NEW YORK.

MACHINE FOR CONVERTING PULP INTO SHEETS.

1,005,655. Specification of Letters Patent. Patented Oct. 10, 1911.

Application filed June 24, 1910. Serial No. 568,681.

To all whom it may concern:

Be it known that I, HENRY G. ROGERS, a citizen of the United States, and a resident of Au Sable Forks, in the county of Essex and State of New York, have invented a new and Improved Machine for Converting Pulp into Sheets, of which the following is a full, clear, and exact description.

The invention is an improved wet machine for forming paper or other pulp into sheets, and delivering the same in a partially dry state.

The invention has in view a machine of this character of increased capacity over machines of the same general type, and in which the sheets are delivered with a relatively small amount of moisture and in uniform lengths and widths and without the use of knives, pins or shears, and without substantial waste of the pulp.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figures 1 and 2 are a side elevation of the machine; Figs. 3 and 4 are a plan of the machine; and Figs. 5 and 6 are a central longitudinal section of the machine.

The machine embodies in its construction suitable supporting frames comprising the side frames 5, 5, rigidly connected together. At the rear end of the machine frame is arranged a pulp vat 6, in which is journaled so as to dip into the pulp a substantial depth, a pulp-gathering cylinder 7, this cylinder being of hollow construction, with the periphery formed by a screen 8, which is shown in Figs. 3 and 5 to be provided with a number of imporous pulp weakeners 9, the said weakeners, two of which are illustrated at diametrically opposite points of the cylinder, being arranged longitudinally thereof and transversely to the web of pulp which the cylinder gathers in its rotation within the vat. The pulp weakeners are shown to project slightly outwardly from the screen and are made of solder or any other material which will not permit the water of the pulp to pass therethrough into the cylinder; accordingly, the pulp collected by the cylinder along these lines will be relatively thinner and consequently weaker than at other points of the cylinder. One of the journals 10 of the pulp-gathering cylinder is made hollow and is connected to the sewer or other suitable point of discharge for carrying off the waste water which is strained by the screen from the pulp.

Some distance in advance of and elevated above the pulp vat 6 are journaled one above the other in suitable bearings carried by the side frames 5, 5, squeezing rollers 11, 11; also likewise mounted between the vat and the rollers 11, is a relatively smaller pair of squeezing rollers 12, 12, the bearings of the upper rollers 11 and 12 of each pair of squeezing rollers being vertically adjustable on vertical guides 13 and 14 respectively, and normally pressed to the rollers below by suitable means, such as the levers 15 and 16, fulcrumed at their inner ends to a part of the frame structure and at an intermediate point to their respective adjustable bearings. The squeezing rollers 12 are shown in Fig. 5 to be arranged at a slightly lower level than the squeezing rollers 11; and at the outer side of the upper squeezing rollers and at substantially the same respective levels are guide rollers 17 and 18. Intermediate the two sets of squeezing rollers and respectively arranged above and below the upper squeezing rollers are guide rollers 19 and 20.

Suitably journaled immediately above the pulp-gathering cylinder is a pressing roller 21, and directly forward thereof at respective higher and lower levels are guide rollers 22 and 23. A guide roller 24 is arranged in advance of and slightly above the guide roller 23; and guide rollers 25, 26 and 27 are arranged substantially one below the other; with the upper guide roller 25 slightly depressed below the guide roller 24. A guide roller 28 is also arranged slightly in advance of the lower squeezing roller 11 and at substantially the same axial level.

A belt or apron 29 passes around the upper squeezing rollers 11 and 12 and around the guide rollers 17, 18 and 19. A belt or apron 30 passes around the lower squeezing rollers 11 and 12 and around the pressing roller 21 and guide rollers 22, 23, 26, 27 and 28, and also bears on the guide rollers 24 and 25, the latter being adjustable to control the tension on the belt.

In advance of the squeezing rollers 11, and at a much lower level are similarly-arranged squeezing rollers 31, 31, and for-

wardly of these rollers a fourth pair of squeezing rollers 32, 32, the bearings of the upper squeezing roller 31 being vertically adjustable by hand-screws 33, and yieldingly pressed toward the lower roller 31 by springs 34. The bearings of the squeezing rollers 32 are shown to be mounted on vertical guides 35 and pressed downwardly by levers 36, similarly to the squeezing rollers 11 and 12, the lever 36 being shown to be operatively connected by a link 37 to a lever 38, which in turn is connected by a link 39 to an operating lever 40, thus affording a compound lever mechanism for forcing the upper squeezing roller 32 to the squeezing roller below. Immediately at the front of and slightly below the guide roller 28 is a guide roller 41, and between the squeezing rollers 31 and 32, and located substantially above a line connecting their points of contact, is a guide roller 42. A guide roller 43 is positioned in advance of and at the same upper peripheral level of the lower squeezing roller 32, and below this roller are guide rollers 44. Belt-tightening and guide rollers 45 and 46, and a guide roller 47 complete a system of rollers for directing an apron or belt 48, the belt extending around the lower squeezing rollers 31 and 32, and the guide rollers 41, 43, 44 and 46, with the outer side of the apron passing about the rollers 45 and 47, the roller 45 being adjustable to control the apron tension.

In advance of the forward squeezing rollers 32, and with their peripheral portions at substantially the same level, are tension breaking rollers 49, 49, the upper roller being journaled in bearings vertically adjustable on vertical guides 50, and yieldingly pressed toward the lower rollers by screws 51 and intermediate springs 52. Immediately at the front of the guide roller 43 is a guide roller 53, over which is located a pressing roller 54. A guide roller 55 located in advance of and slightly depressed below the upper peripheral portion of the lower squeezing roller 49 completes a system of rollers which direct a fourth belt or apron 56, the latter passing around the guide rollers 53 and 55 and about the squeezing roller 49. A table 57 for receiving the sheets is shown to be downwardly and outwardly inclined from the machine frame just below the forward guide roller 55.

Certain of the rollers are suitably positively driven, such, for example, as shown in Figs. 1 to 4 inclusive, wherein it will be seen that the journal of the lower tension breaking roller is extended and provided with a sprocket wheel 58, which is connected by a chain 59 with an alining sprocket wheel 60, secured to the journal of the lower squeezing roller 32. The sprocket wheels 58 and 60 are so proportioned as to cause the tension breaking rollers to revolve at a relatively greater peripheral speed than the peripheral speed of the rollers 32. The other journal of the lower squeezing roller 32 is extended to the outside of the frame and has an attached gear 61 meshing with a pinion 62, which in turn meshes with a gear 63 attached to the extended journal of the lower squeezing roller 31. The lower squeezing roller 11 is similarly operatively connected to the lower squeezing roller 31, as by a gear 64, in mesh with a pinion 65, which also meshes with the gear 63, the gearing for the three sets of squeezing rollers 11, 31 and 32 being such as to cause all of these rollers to travel at the same circumferential velocity. The initial squeezing rollers 12, as shown, are driven only by the action of the apron 30.

Over the pulp-gathering cylinder and directed toward that portion of the pressing roller 21 around which the apron 30 passes, are a number of nozzles 66, for trimming and cutting the pulp, the nozzles being connected with a suitable source of water pressure supply, the outer nozzles serving to trim the outer edges of the pulp, and the intermediate nozzle or nozzles operating to split the pulp longitudinally.

In the operation of the machine, power is applied to one of the positively-driven rollers, which, by reason of the gearing illustrated and described, causes the upper lengths of the several aprons to travel forwardly, and also by reason of the frictional contact of the roller 21, the pulp-gathering cylinder to revolve in a direction indicated by the arrow in Fig. 5. In the revolution of this cylinder, the adhering pulp passing from the vat is initially engaged and pressed by that length of the apron 30 running between the guide roller 23 and the pressing roller 21, the pulp having the weakened transverse lines at intervals caused by the imporous pulp weakeners 9. The pulp in the form of a sheet leaves the cylinder and travels with the apron 30. At the roller 21 the edges of the sheet are trimmed, and, if desired, the sheet split at one or more points longitudinally by the nozzles 66, the removed pulp falling back into the pulp vat. As the pulp sheet leaves the roller 21, the moisture has a tendency to run back to the vat until the roller 22 is passed. From this point the pulp and apron 30 take a slight dip until the squeezing rollers 12 are reached, where a large portion of the water in the pulp sheet is removed. The pulp then successively travels under the squeezing rollers 11, 31 and 32, from which last-mentioned rollers the sheet emerges with a relatively small amount of moisture. When the sheet passes under the squeezing rollers 11, it is prevented from following the upper squeezing

roller by the apron 29. The sheet after leaving the last set of squeezing rollers 32 passes between the pressing roller 54 and guide roller 53, the pressing roller preventing the sheet from following the upper squeezing roller 32. As the sheet passes from the pressing roller 54 between the tension breaking rollers 49 it is given a substantial pull, due to the relatively higher peripheral speed of the roller 49 over the rollers 32, which breaks the sheet along the weakened lines formed by the weakeners 9 of the pulp-gathering cylinder, the break occurring somewhere between the roller 49 and the roller 54. The sheets as they emerge from the rollers 49 are discharged onto the table 57, where a number of sheets may collect without requiring the attention of the operator.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination of pulp squeezing rollers driven at a predetermined rate, and tension breaking rollers driven at a relatively higher rate, through which the pulp passes from the squeezing rollers.

2. The combination in a pulp machine, of a vat, a pulp cylinder revoluble within the vat, squeezing rollers through which the pulp passes from the cylinder, means carried by the cylinder to form weakened lines across the pulp at intervals, a downwardly and outwardly-inclined receiving table, and tension means to break the pulp along the said lines and pile it in lengths onto the said table.

3. The combination in a pulp machine, of a number of sets of squeezing rollers, tension breaking rollers arranged in advance of the squeezing rollers, and independent aprons for conveying the pulp, passing respectively between the several sets of squeezing rollers and between the tension breaking rollers.

4. The combination in a pulp machine, of squeezing rollers, tension breaking rollers arranged in advance of and driven at a relatively higher peripheral speed than the squeezing rollers, and a presser roller to engage the pulp, and prevented from slipping under the action of the tension breaking rollers arranged intermediate the squeezing and tension breaking rollers.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY GUR ROGERS.

Witnesses:
JAMES ROGERS,
ROBT. I. CHAHOON.