H. G. ROGERS.

MACHINE FOR CONVERTING PULP INTO SHEETS.

APPLICATION FILED JAN. 13, 1917.

1,223,905.

Patented Apr. 24, 1917.

3 SHEETS—SHEET 1.

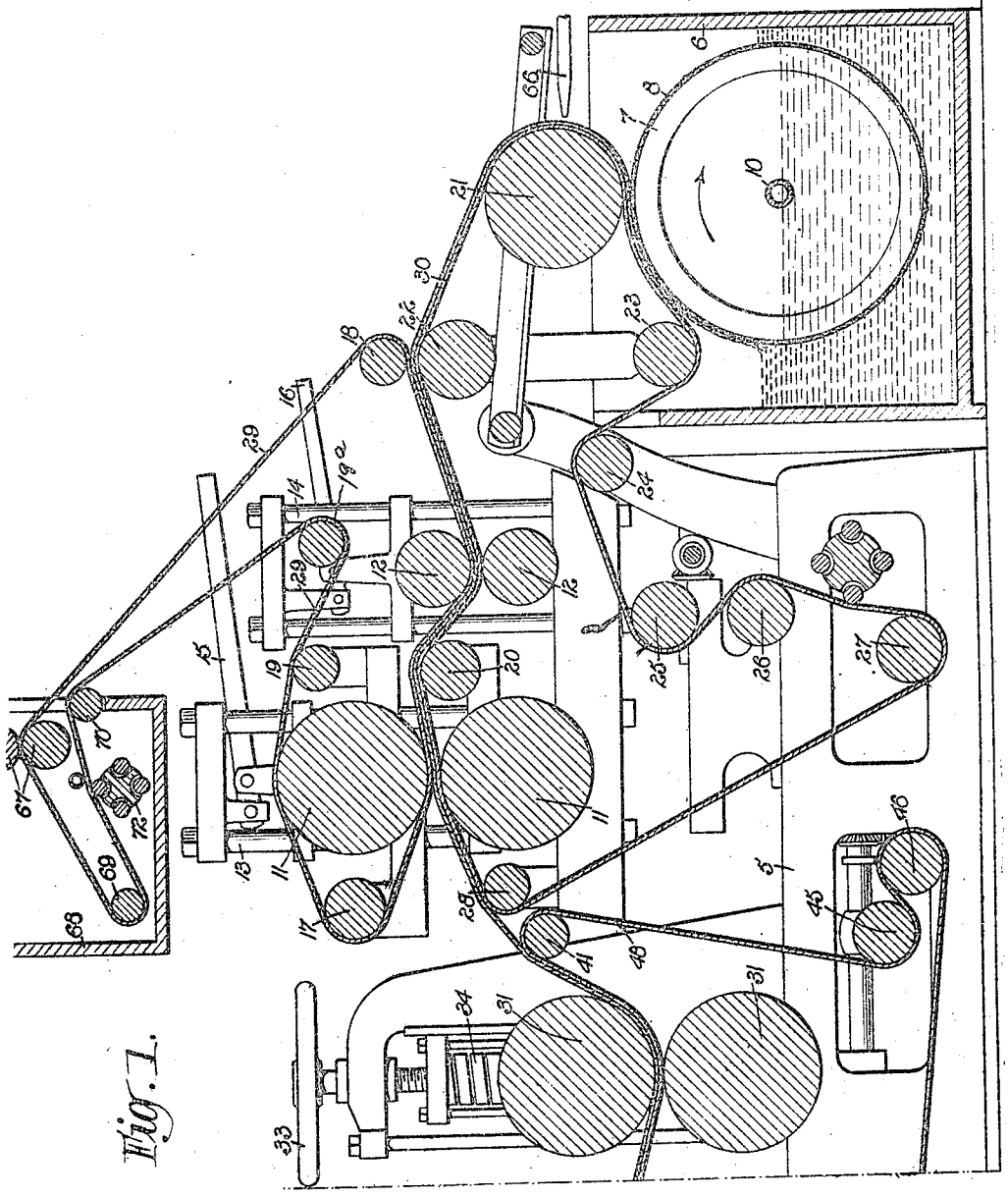


Fig. 1.

WITNESSES

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INVENTOR

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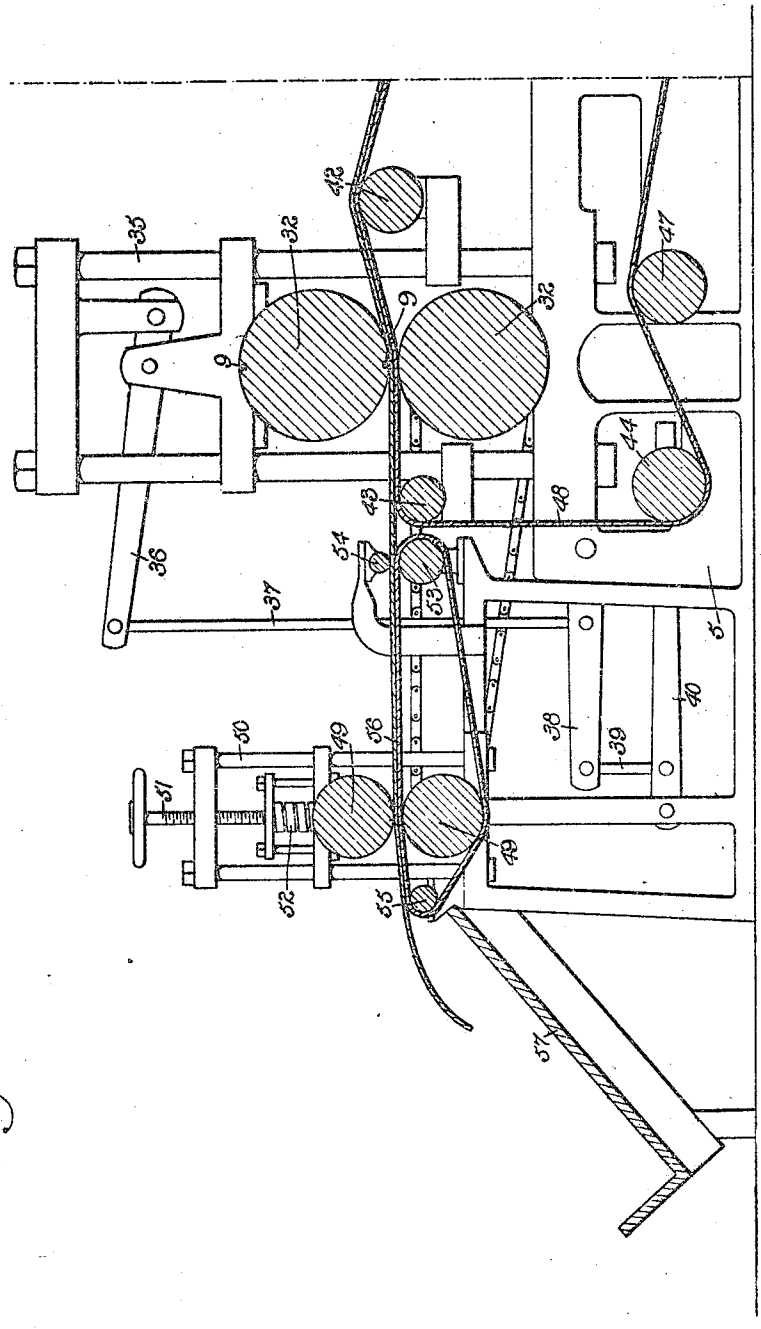


Fig. 2.

WITNESSES

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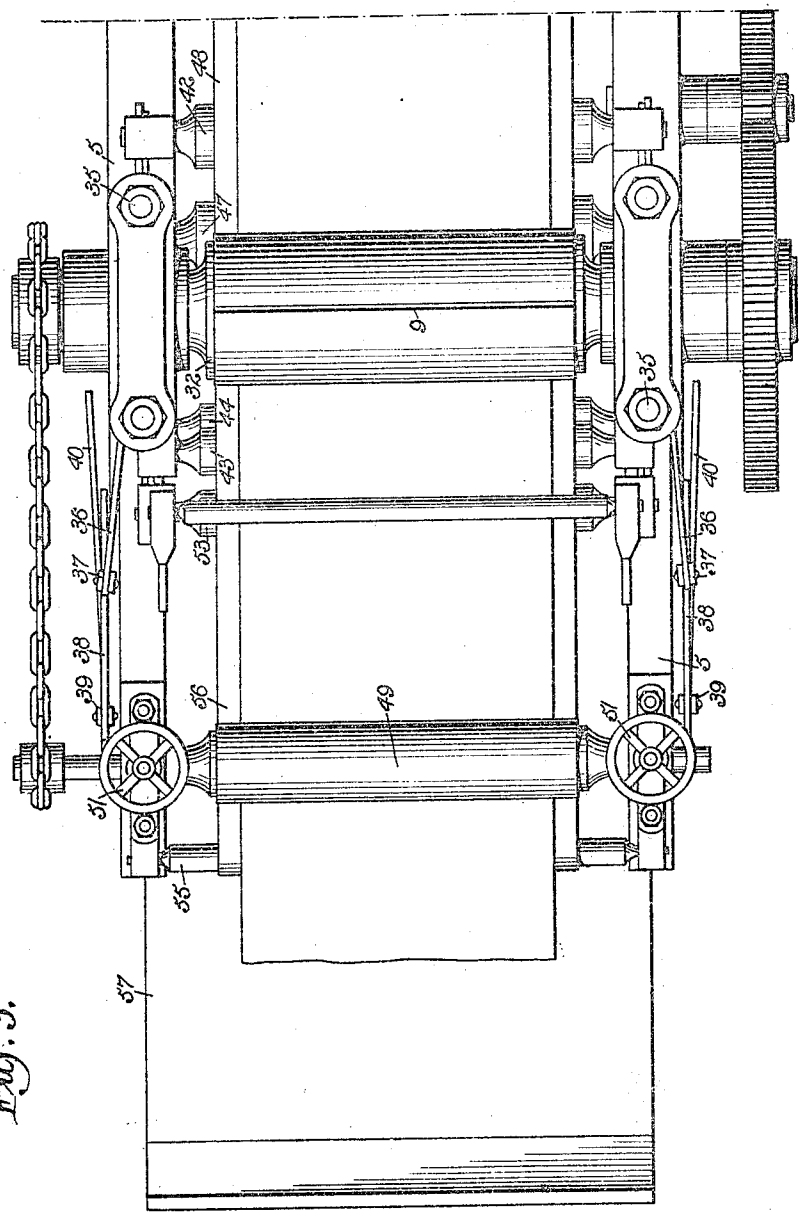


Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

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

MACHINE FOR CONVERTING PULP INTO SHEETS.

1,223,905. Specification of Letters Patent. Patented Apr. 24, 1917.

Application filed January 13, 1917. Serial No. 142,209.

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.

My present invention is intended more particularly as an improvement on the machine for which a patent was granted to me on October 10, 1911, No. 1,005,655, said machine being for the purpose of forming paper or other pulp into sheets, and delivering the same in a partially dry state.

The patented machine referred to is distinguished by squeezing rollers driven at a predetermined rate and tension-breaking rollers driven at a relatively higher rate, together with means so acting on the pulp as to weaken the same on transverse lines whereby a sheet will be severed by the relatively higher speed of the breaking rollers. In the patented construction the pulp-gathering cylinder has longitudinally disposed members thereon, which produce thinner and consequently weaker lines across the sheets of pulp as the same is gathered by the cylinder.

In my present invention I produce the weakened lines by means of a groove in one of the final pair of squeezing rollers, whereby the grooved portion of the roller will leave the sheet wet along the line of the groove, thereby causing the sheet to readily part at this line in response to the higher speed of the breaking rollers. The present invention comprises also a washing means for one of the aprons forming part of the machine.

The invention will be particularly explained in the specific description following.

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

Figures 1 and 2 represent together a central longitudinal section of a machine for carrying out my invention;

Fig. 3 is a plan view of that portion of the machine corresponding with Fig. 2.

The machine illustrated corresponds in the main with that illustrated in my patent above mentioned, and 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. In the patented construction the said cylinder is provided with a number of imporous pulp weakeners generally arranged diametrically opposite each other on the cylinder longitudinally thereof so as to be transverse to the web of pulp which the cylinder gathers in its rotation within the vat. In accordance with my present invention I produce weakened lines in the pulp by reason of a longitudinal groove or grooves 9 in one of the rollers of the final pair of squeezing rollers hereinafter referred to. One or several grooves 9 will be produced according to the desired length of sheets.

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 roll-

ers 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 forwardly 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 is a guide roller 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.

Suitable driving means is provided for the several rollers as described in my patent above referred to, and the arrangement is such that the tension breaking rollers 49 revolve at a relatively greater peripheral speed than that of the final squeezing rollers 32. The longitudinal groove 9 in one of the said squeezing rollers 32 leaves the pulp at the groove or grooves wetter than the remaining portion and therefore weaker to withstand the pull due to the higher speed of the rollers 49 so that a sheet of pulp will be severed at the said weakened line. The result is accomplished without in any way varying the formation of the sheet of pulp in the gathering of the same on the cylinder so that a uniformly smooth sheet results. A marked advantage also is that it is found practical to weaken even very thin sheets of pulp.

The numeral 66 indicates nozzles for trimming and cutting the pulp in a manner described in my patent referred to.

In my patented construction, the belt 29 runs between the pairs of rollers 11, 12, about rollers 17, 18 and over a roller 19. In my present construction a second roller 19^a is provided adjacent to the roller 19, and the roller 18 is preferably shifted to a point above the roller 22 from the more forward position in the first construction. My present construction provides for washing the belt 29 and the same runs from the roller 19^a upwardly over a guide roller 70 at the front of a washing vat 68 and downwardly into said vat about a roller 69 therein, the belt returning between rollers 67 at the front of the vat, downwardly and about the roller 18, then between the pairs of rollers 12, 11, in succession to co-act with the belt 30 in carrying the pulp, about a roller 17 and returning over the upper roller 11 and the roller 19 to the roller 19^a. In the vat 68 is a revolving whipper 72 to whip the belt, said whipper being in driving engagement with the belt. In practice the vat 68 is supported in any suitable manner.

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

1. In a machine for forming pulp into sheets, squeezing means including a roller having a longitudinal groove presenting a non-squeezing line to produce a relatively weakened line with excess moisture trans-

versely of the sheet, and tension-breaking rollers beyond the said first roller to exert breaking action on the web at the weakened line.

2. In a machine for forming pulp into sheets, squeezing means including a roller having a longitudinal groove presenting a non squeezing line to produce a relatively weakened line with excess moisture transversely of the sheet, in combination with tension breaking rollers driven at a relatively higher speed than the said grooved roller.

HENRY GEER ROGERS.