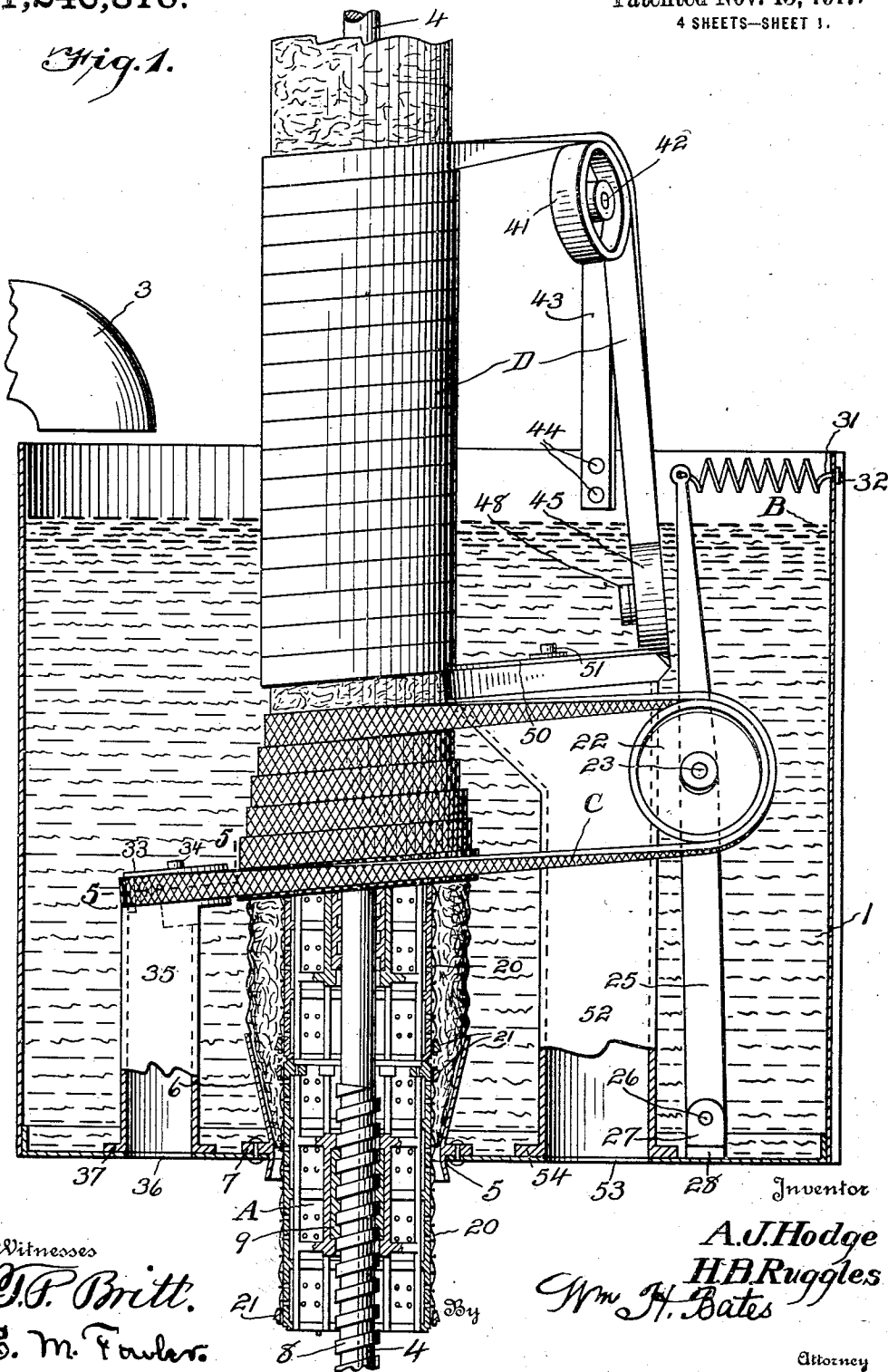


PULP GATHERING, TRANSFERRING, SQUEEZING, COMPRESSING, FORMING, AND DRYING DEVICE
FOR REGULAR AND IRREGULAR SHAPED DRUMS OR CYLINDERS.

Patented Nov. 13, 1917.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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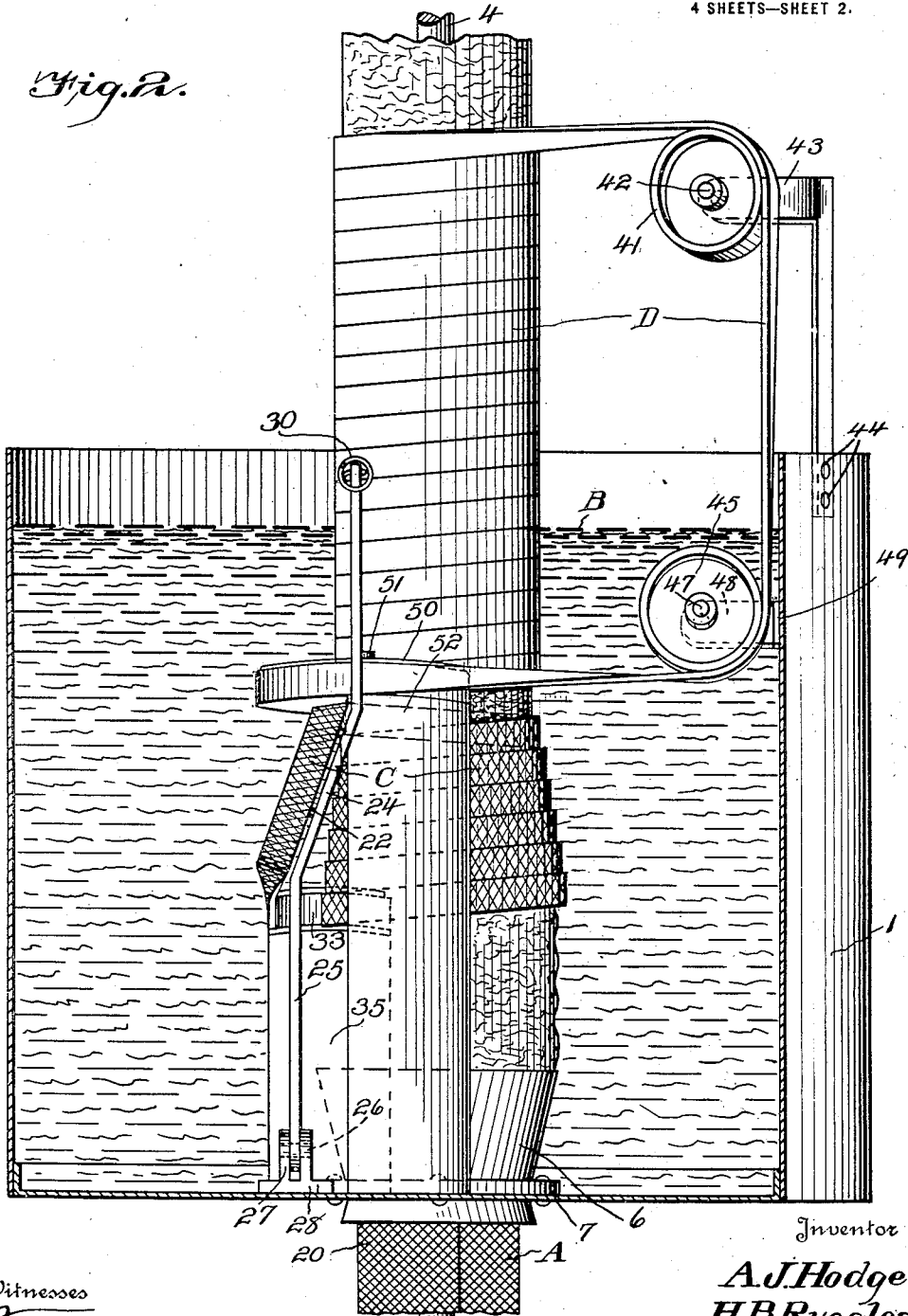
APPLICATION FILED JAN. 13, 1915.

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4 SHEETS—SHEET 2.

1,246,816.

Fig. 2.



Witnesses

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4 SHEETS—SHEET 3.

Fig. 3.

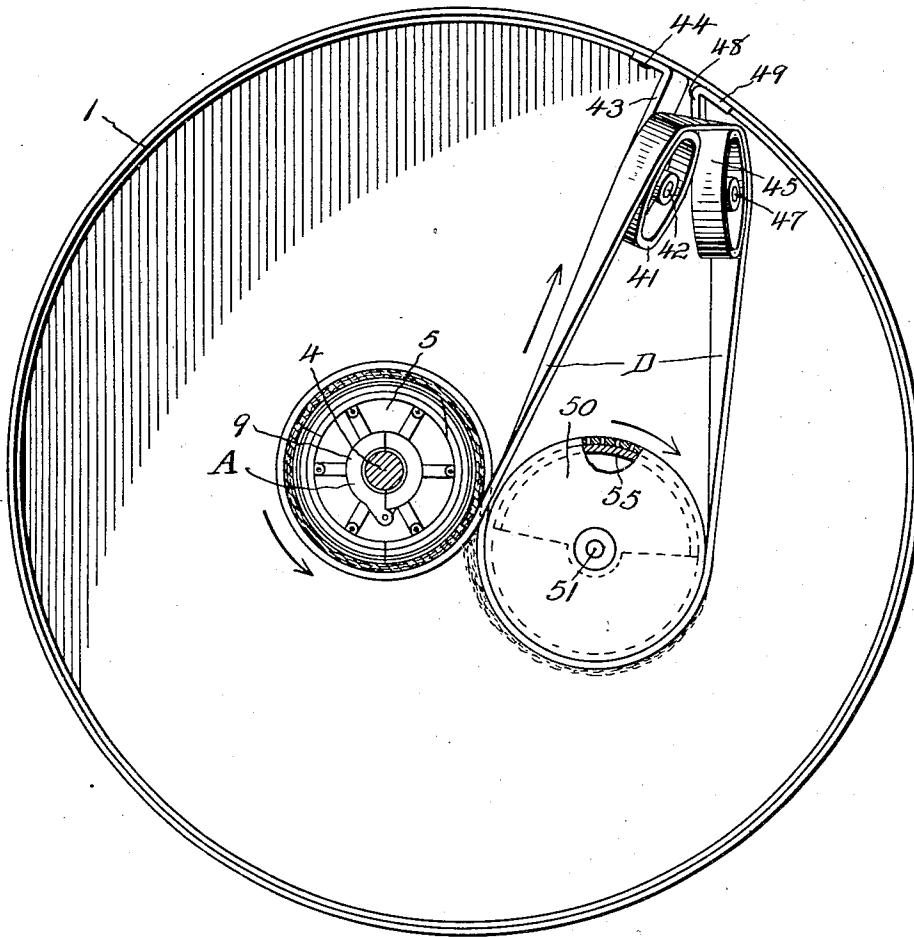
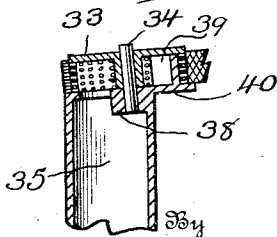


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 4.

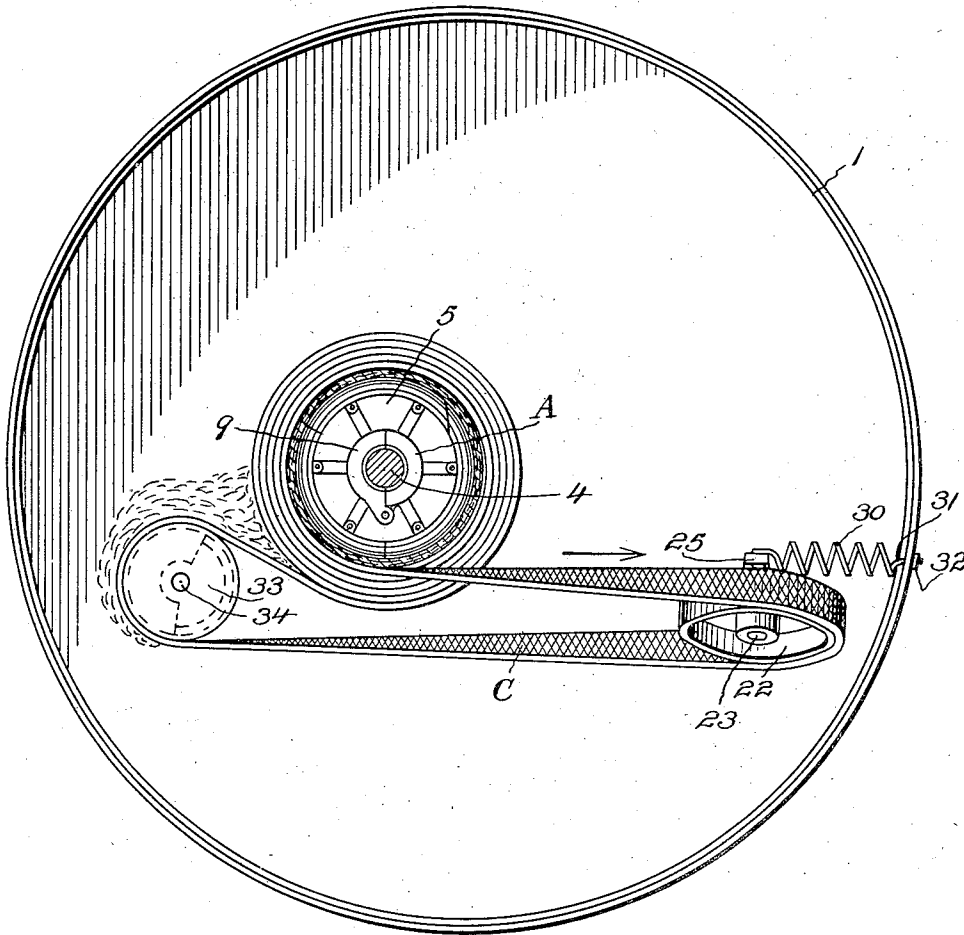
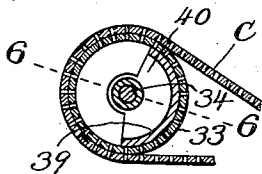


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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PULP GATHERING, TRANSFERRING, SQUEEZING, COMPRESSING, FORMING, AND DRY-
ING DEVICE FOR REGULAR AND IRREGULAR SHAPED DRUMS OR CYLINDERS.

1,246,816.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed January 13, 1915. Serial No. 2,051.

To all whom it may concern:

Be it known that we, ARTHUR J. HODGE and HENRY B. RUGGLES, citizens of the United States of America, residing at Pasadena, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in pulp gathering, transferring, squeezing, compressing, forming, and drying devices for regular and irregular shaped drums or cylinders, of which the following is a specification.

This invention has relation to certain new and useful improvements in pulp gathering, transferring, squeezing, compressing, forming and drying devices for regular and irregular shaped drums or cylinders and has for its primary object, the provision of mechanism of improved construction and operation which may be readily substituted for the primary pulp compressing and squeezing mechanism and also the secondary pulp compressing and shaping mechanism of the machine disclosed in our first or original application, Serial Number 741, filed Jan. 6, 1915.

The invention has for another object, to provide a device of this character which may be employed for pulp gathering and transferring alone or for pulp gathering, transferring, squeezing, compressing and forming or for pulp gathering, transferring, squeezing, compressing, forming and drying, as desired, and employed in connection with any other part or parts of the machine disclosed in our above referred to first or original application or of any other analogous machine.

Another object of the invention resides in the provision of a device of the above stated character which will be of such construction and operation that when it is desired to employ the same for gathering and transferring only, it may be substituted for the primary compressor and squeezer bars of our original machine and the operating mechanism for said bars, without disturbing the secondary compressor and shaping bars of said machine, or the operating mechanism for the last mentioned bars.

A further object of the invention resides in the provision of a device of the char-

acter set forth which will be especially adapted for use in connection with forms or former-sections movable spirally through a pulp containing tank, the device being constructed and mounted in such manner as to be operated by the spiral movement of the forms or former-sections to gather pulp from the tank and transfer the same to said forms or former-sections and compress and dry the pulp upon the outer face of said forms or former-sections and at the same time squeeze all surplus liquid from the pulp while the latter is being compressed and shaped upon said forms or former sections to produce the article or articles of the desired configuration and size.

A still further object of the invention resides in the provision of a device of this character in which one or more tension belts may be employed, as the occasion may require, to gather and transfer the pulp to the moving forms or former-sections and compress and dry the pulp around said forms or former sections, as the latter move longitudinally through the pulp containing tank.

Still another object of the invention lies in the provision of a plurality of tension belts engaged spirally around the connected forms or former-sections to gather, transfer, squeeze, compress, shape and dry the pulp around the forms or former-sections as desired, the belts being arranged one above the other with their adjacent edges close together to limit the amount of pulp reaching the forms or former-sections after the first or primary compressing and squeezing operation, each belt being arranged or coiled around the forms or former-sections in such manner as to make it practically impossible for the pulp to pass between the coils of said belts.

With these and other objects in view, our invention consists in the novel construction, combination and arrangement of parts as will be hereinafter more in detail described and the asserted novelty specifically pointed out in the claims.

In the accompanying drawings which clearly and fully illustrate our invention:—
Figure 1 represents a side elevation with parts in section;

Fig. 2 is a side elevation at substantially right angles to Fig. 1, with the pulp containing tank in section;

Fig. 3 is a top plan view;

Fig. 4 is a view similar to Fig. 3, with the upper or secondary tension belt removed to show more clearly the lower or primary tension belt;

Fig. 5 is a detail section on the plane of line 5-5 of Fig. 1; and

Fig. 6 is a detail section on the plane of line 6-6 of Fig. 5.

Referring more particularly to the drawings in which similar reference characters designate corresponding parts throughout the several views, 1 designates the pulp containing tank which may be supported in elevated position by any suitable means, not shown, and receives a continuous supply of pulp from a feed pipe 3 having its discharge end directed toward the open upper end of said pulp containing tank 1.

Extending longitudinally through the pulp containing tank 1 is the stationary shaft 4 of the machine, the bottom of the tank being provided with an opening 5, through which the stationary shaft 4 extends.

Around and spaced from the stationary shaft 4 and secured in the opening 5 is the upwardly flared pulp receiving and directing receptacle 6, which is preferably of the form shown in our original application and has its depending downwardly flared lower end projecting through said opening 5, while its outwardly directed annular flange 7 extends from the narrow portion of said pulp receiving and directing receptacle 6 and is secured in any suitable manner upon the upper face of said bottom of the pulp containing tank 1.

Formed upon a portion of the stationary shaft 4 below the pulp containing tank 1, is a spirally extended feed and guide thread 8 for feeding and guiding upwardly in a spiral direction the forms of former-sections A, it being understood that the forms or former-sections A are each provided with suitable interior central guide nuts 9 for engagement with and movement over the feed and guide thread 8, and that said forms or former-sections A may be of the construction shown in the drawings and also shown and specifically described in our co-pending application Serial Number 741, filed Jan. 6, 1915, or of any other preferred or well known construction. The outer cylindrical or body portion of each form or former-section A should, however, be perforated and have a screen 20 mounted upon its outer face and secured in position by the hoop sections 21, which serve to form chimes and head channels of barrels and the like, or by any other suitable means.

The forms or former-sections A may be

placed in position around the stationary shaft 4, below the feed and guide thread 8, in consecutive order and raised and rotated upon said stationary shaft 4 until they automatically lock together and the guide nut 9 of the uppermost form or former-section A catches upon the feed and guide thread 8. Then, as each additional form or former-section A is placed in position upon the stationary shaft 4, it is simply necessary to raise or elevate the same until it engages and locks with the form or former-section A immediately above the same, when it will be carried by the last mentioned form or former-section A and all above and locked with the latter, in an upward spiral direction around said stationary shaft 4 and through the pulp containing tank 1, after passing through the receptacle 6, to collect pulp from the receptacle 6, and tank 1.

Any suitable means, not shown, may be employed for rotating the connected and locked together forms of former-sections A over the feed and guide thread 8, and thereby causing said forms or former-sections A to travel in an upward and spiral direction through the pulp containing tank 1. Therefore, the rotating means will not be specifically described or shown and further detailed description of the construction and operation of the forms or former-sections A in this application, is believed to be unnecessary, as these parts do not constitute the most important parts of the present invention.

The present invention, however, resides principally in the provision of the primary and secondary tension belts C and D, respectively, preferably formed of a porous elastic material and mounted to operate in such manner as to gather pulp from the tank and transfer the same to the form or former-sections A and compress, squeeze, shape and dry the pulp upon said form or former-sections A during an upward spiral movement of the latter through the pulp containing tank 1.

The primary or lower tension belt C is passed downwardly around the idler 22 mounted upon the inclined stub shaft 23 which is carried by the inclined portion 24 of the pivoted arm 25 which has its lower extremity mounted upon the pivot pin 26 extended transversely through the bearing ears 27 of the plate 28 which is mounted upon the upper face of the bottom of the tank 1, it being understood that the lower extremity of the pivoted arm 25 is engaged between said ears 27. From the inclined portion 24, the pivoted arm 25 is extended upwardly and tapered to the point at which it connects with the perforated head of said arm 25, within which is secured one end of the tension spring 30, which has its opposite end 31 threaded and engaged through the

wall of the tank 1 adjacent the top thereof, with a regulating nut 32 mounted upon said threaded end 31 outwardly of the tank 1, whereby the tension of the spring 30 may be readily regulated to vary and control the tension of the primary or lower tension belt C, the arm 25 swinging upon its lower extremity to the proper incline or angle with respect to the bottom and side walls of the tank 1.

After being passed in this direction around the idler 22, the primary or lower tension belt C is extended inwardly and given a quarter turn and passed around the perforated periphery of the guide wheel 33 mounted upon the slightly outwardly inclined stub shaft 34. The primary or lower tension belt C is then coiled spirally around the forms or former-sections A and the pulp gathered upon the same from the receptacle 6 and the space immediately above the same. The entire primary or lower tension belt C is positioned a short distance above the top of the receptacle 6 and after being coiled around the forms or former-sections A and the pulp upon the same, said primary or lower tension belt C is returned to the idler 22, being given a quarter turn in the reverse direction, the idler 22 being a sufficient distance from the forms or former-sections A and the guide wheel 33 to permit of a quarter turning of the primary or lower tension belt C without danger of the same riding off of the idler 22.

The primary or lower tension belt C is porous and also elastic and as said primary or lower tension belt C passes around the guide wheel 33, pulp is gathered upon the outer face of said belt and transferred to the outer faces of the screens 20 of the forms or former-sections A and this pulp together with the pulp gathered upon the screens 20 before the latter reach the coiled portion of the primary or lower tension belt C, is compressed upon said screens 20 as the forms of former-sections A move upwardly and spirally within the coiled portion of the primary or lower tension belt C, by the latter. It will be readily seen that, owing to the elasticity of the primary lower tension belt C, this belt will automatically adjust itself to the thickness of the pulp wall around the forms or former-sections A and the movement of the latter will cause operation of the primary or lower tension belt C in the proper direction and at the proper rate of speed, the surplus liquid from the pulp being compressed and shaped upon the screens 20, passing either to the interior of the forms or former-sections A or outwardly through the coiled portion of said primary or lower tension belt C.

Owing to the difference in diameter of the forms or former-sections A and the small guide wheel 33, it will be readily seen,

especially by referring to Fig. 4 of the drawings, that as the guide wheel 33 is positioned only a short distance from the moving forms or former-sections A, a pocket is formed at the point at which the primary or lower tension belt C leaves the guide wheel 33 and passes to the pulp wall around said moving forms or former-sections A, so that the pulp gathered by said primary or lower tension belt C as it passes around the small guide wheel 33, may be readily transferred to the screens 20 to be tightly compressed around the same.

Liquid from the pulp gathered upon the portion of the primary or lower tension belt C passing around said small guide wheel 33, may pass freely through said belt C and through the perforated periphery of said small guide wheel 33 to the interior of the latter, from whence it may escape by way of the liquid discharge pipe 35 positioned over an opening 36 in the bottom of the tank 1 and having a flanged lower end 37 secured upon the upper face of said bottom around said opening 36. It will be understood that the stub shaft 34 of the small guide wheel 33 is secured in a suitable bearing 38 formed at the upper end of said water discharge pipe 35 and that said wheel 33 rotates freely upon said stub shaft 34 and the upper end of said water discharge pipe 35 and also upon the shoe 39 which is of substantially semi-circular form and projects upwardly from the extension plate 40 carried by the upper end of said liquid discharge pipe 35. The shoe 39 is inwardly of the perforated periphery of said wheel 33 and said shoe 39 and extension plate 40 are positioned so as to permit the shoe 39 to cover the openings in the periphery of the wheel 33 between the points at which the primary or lower tension belt C engages and leaves said guide wheel 33, thereby making it impossible for pulp to gather upon this portion of the wheel or liquid to pass through the same. The liquid passing through the remainder of the wheel 33 and the primary or lower tension belt C engaged around the same as the pulp gathers upon said belt C, will cause a suction and thereby attract the pulp to the belt C at this point, as will be readily understood by referring to Fig. 4 of the drawings.

The secondary or upper tension belt D is engaged around the upper guide wheel 41 mounted upon the stub axle 42 projecting laterally from the inwardly bent upper end or angle of the angle arm 43 which has its depending end or angle secured to the inner face of the pulp containing tank 1 adjacent the upper end thereof in any suitable manner, as shown at 44. The belt D is then brought downwardly and engaged around the lower guide wheel 45, which is mounted upon the stub axle 47 projecting laterally

from the inner end of the arm 48 which has its outer end bent at an angle and secured to the inner face of the pulp containing tank 1, preferably below the gathering or pulp level line B, whereby the guide wheel 45 will be supported below the gathering or pulp level line B. The secured and bent end of the arm 48 is clearly shown in Fig. 3 of the drawings and indicated by the reference character 49.

After being passed around the lower guide wheel 45, the tension belt D is given a quarter turn and engaged around the large guide wheel 50 which is positioned in a substantially horizontal plane and mounted upon the upstanding stub shaft 51 which is positioned in a practically vertical plane so that the large guide wheel 50 has its edge toward the stationary shaft 4 tilted downwardly slightly, the purpose of which will presently appear.

After being extended around the large guide wheel 50, the tension belt D is coiled around the pulp wall upon the outer face of the screens 20, for some distance above the gathering or pulp line B and above the upper edge of the pulp containing tank 1 and then extended outwardly from the pulp wall and given a quarter turn before it again returns to the upper guide wheel 41, previously mentioned. This tension belt B serves as a secondary compressing and shaping belt to give the final compression to the pulp wall and shape the same around the screens 20. It will be readily seen that as the large guide wheel 50 is only a short distance from the moving forms or former-sections A, the belt D, as it travels from the large guide wheel 50 to the partially compressed and shaped pulp wall, will gather additional pulp and transfer the same to the pulp wall just above the last or uppermost coil of the primary tension belt C and the upward spiral movement of the connected forms or former-sections A will cause the tension belt D to move with the same. It will also be evident that as the tension belts C and D are resilient, they will automatically adjust themselves to the cylindrical pulp wall as the same decreases in diameter under the pressure of said belts C and D. The belts C and D may be formed of any suitable material and applied in any manner desired and if preferred, the number of belts may be increased and additional belts positioned above the gathering or pulp line B to serve simply as tension or drying belts.

The large guide wheel 50 rotates above the flared upper or enlarged end of the liquid drain pipe 52 which has its lower end positioned over the drain opening 53 in the bottom of the pulp containing tank 1 and preferably in a portion of said bottom opposite the portion in which the opening 36 is lo-

cated. The drain pipe 52 has its lower end 54 turned outwardly to form a suitable supporting flange which is secured in any suitable manner upon the upper face of said bottom of the pulp containing tank 1 around said opening 53.

Mounted upon the upper end of the drain pipe 52 within the large guide wheel 50 and serving to support the stub shaft 51 is the shoe 55 which has an upstanding flange of substantially semi-circular form. The periphery of the large guide wheel 50 is perforated, as clearly shown in Fig. 3 of the drawings and the shoe 55 is so positioned that all liquid from the pulp gathered by the upper tension belt D as the same passes around the large guide wheel 50, may readily pass through the openings in the periphery of said wheel 50 covered by the belt after said liquid has passed through said belt, after which the liquid may readily pass downwardly in said liquid drain pipe 52 and escape from the same by way of the drain opening 53. The shoe 55, however, will prevent liquid from passing through the openings in the remaining portion of the periphery of said large guide wheel 50, thereby preventing the pulp in the pulp containing tank 1 from gathering directly upon the periphery of the large guide wheel 50 and working under the belt D and thereby probably causing the same to ride off of the wheel 50.

By referring to Figs. 1 and 2, it will be readily seen that the coils of the primary tension belt C decrease in size from the lowermost to the uppermost coil, thereby causing each coil of the belt C to do its share of the work of compressing the pulp around the moving screens 20 and while we have shown a space between the uppermost coil of the primary tension belt C and the lowermost coil of the secondary or upper tension belt D, these belts may be brought closer together, if desired.

As we have placed arrows on Figs. 3 and 4 of the drawings to indicate the direction in which the tension belts C and D travel during operation of the device and have carefully and thoroughly described the construction and operation of the complete device, it is believed that this description together with the drawings will serve to make the invention clear and a further description of the device is unnecessary.

While the preferred embodiment of the invention has been shown and illustrated, it will be understood that minor changes in the details of construction and arrangement of parts may be made within the scope of the appended claims without departing from the spirit of the invention or sacrificing any of the advantages of the same.

What is claimed is:—

1. In a device of the class described, the

combination of a pulp receiving form, a primary pulp compressing tension belt acting upon said form, and a secondary pulp compressing and shaping tension belt acting successively upon said form.

2. In a device of the class described, the combination of the pulp receiving forms, a primary pulp gathering and transferring belt acting upon said forms, and a secondary compressing and shaping belt for further acting upon the pulp, the said belts acting in succession upon the same forms.

3. In a device of the class described, the combination of a porous pulp gathering and transferring belt, movable pulp receiving forms, said belt being adapted to transfer the gathered pulp to the forms, and a belt for compressing and shaping the pulp upon said forms.

4. In a device of the class described, the combination of a pulp containing tank, connected forms movable through said tank, means for gathering and transferring pulp to the outer faces of said forms and partially compressing said pulp around said forms, and a compressing and shaping belt for giving a final compression to said pulp and shaping the same around said forms.

5. In a device of the class described, the combination of a pulp containing tank, connected forms movable in one direction through said tank, a pulp gathering and transferring member, said member having a portion engaged spirally around said forms to transfer pulp to the latter and partially compress said pulp in the form of a cylindrical wall around said forms, means for supporting and guiding said member, said member being operated by movement of the forms, and a second member for further compressing and shaping the pulp around said forms.

6. In a device of the class described, the combination of a pulp containing tank, forms movable spirally through said tank, a resilient primary belt for gathering and transferring pulp to said forms, said belt having a portion engaged spirally around said forms to compress the pulp transferred to the same and squeeze surplus liquid from said pulp, and a secondary belt above the primary belt and having a portion engaged spirally around said forms and the pulp transferred to the same to further compress and shape said pulp.

7. In a device of the class described, the combination of spirally movable forms, a primary tension belt for gathering pulp and transferring the same to said forms during movement of the latter, supporting and guiding means for said primary tension belt, means for adjusting the tension of said primary tension belt, and a secondary tension belt above said primary tension belt to further compress and shape said pulp.

8. In a device of the class described, the combination of spirally movable forms, supporting and guiding means for said forms, a primary tension belt for gathering pulp and transferring the same to said forms, said primary tension belt serving to partially compress the pulp around said forms, a secondary tension belt having a portion coiled around the pulp transferred to said forms to further compress and shape said pulp upon said forms, and supporting and guiding means for said secondary tension belt, said secondary tension belt being adapted to gather and transfer additional pulp to said forms adjacent the primary tension belt.

9. In a device of the class described, the combination with a pulp containing tank, a stationary shaft extended through said tank, a liquid discharge pipe for said tank, and connected forms movable spirally upon said shaft and through said tank; of a lower primary tension belt for gathering pulp from said tank and transferring the same to said forms, guide wheels for said belt, one of said guide wheels having a perforated periphery, said guide wheel being mounted upon the upper end of said liquid discharge pipe, whereby liquid from the pulp gathered by said belt as the latter passes around said guide wheel may pass into said guide wheel and escape by way of said liquid discharge pipe, and a secondary tension belt for further compressing and shaping the pulp around said forms.

10. In a device of the class described, the combination with a pulp containing tank, a stationary vertical shaft extended through said tank, a pulp gathering and directing receptacle within the bottom of said tank and means for supplying pulp to said tank; of connected forms movable upwardly and spirally upon said shaft, said forms moving through said receptacle and said tank, means for gathering pulp from said tank above said receptacle and transferring said pulp to said forms, said means being adapted to partially compress the pulp upon said forms, a secondary means for gathering pulp from said tank and transferring the same to said forms above the first mentioned means, said secondary means being engaged spirally around said forms and the pulp transferred to the same and serving to finally compress and shape the pulp around said forms, the first mentioned and second mentioned means being caused to move by movement of the forms, and means for supporting and guiding the secondary means.

11. In a device of the class described, the combination with a pulp containing tank, a stationary shaft extended through said tank and connected forms movable spirally upon said shaft and through said tank; of a primary pulp gathering and transferring belt for gathering and transferring pulp to said

forms during movement of the latter through said tank, said belt also serving to compress the gathered pulp upon said forms, a secondary tension belt above the
 5 first mentioned belt for further compressing and shaping the pulp upon said forms, guide wheels for said secondary tension belt, supporting means for said guide
 10 wheels, one of said guide wheels being provided with a perforated periphery, a liquid discharge pipe extended upwardly from the bottom of said tank, the last mentioned guide wheel being mounted upon the upper
 15 end of said liquid discharge pipe, and a shoe within said last mentioned guide wheel to prevent liquid from passing through the portion of the periphery of said guide wheel not covered by said secondary tension belt and thereby make it impossible for pulp
 20 from the tank to gather directly upon the periphery of the guide wheel and work between the same and the secondary guide belt.
 12. A pulp forming mechanism having a pulp container and a pulp compressing
 25 means operating in the mass of the pulp to gather and press the same into a given form within said compressing means.

13. A pulp forming mechanism comprising a pulp container, a former traveling through said container and through the
 30 mass of pulp therein and belting in said mass to shape the pulp on said former.

14. A pulp forming mechanism having a pulp container, a former passing through said container, belting adapted to progressively shape pulp upon said former and
 35 express some of the liquids therefrom, and a secondary belt adapted to further compress the pulp formed and maintaining said compression until the belt and former have
 40 passed out of the mass of the pulp.

15. A pulp forming machine having a pulp containing tank and a plurality of belts operating partially in the mass of pulp and partially outside the same to gather,
 45 compress, shape and add to the pulp being shaped.

In testimony whereof we affix our signatures in presence of two witnesses.

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 HENRY B. RUGGLES.

Witnesses:

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 EDITH C. SALQUIST.