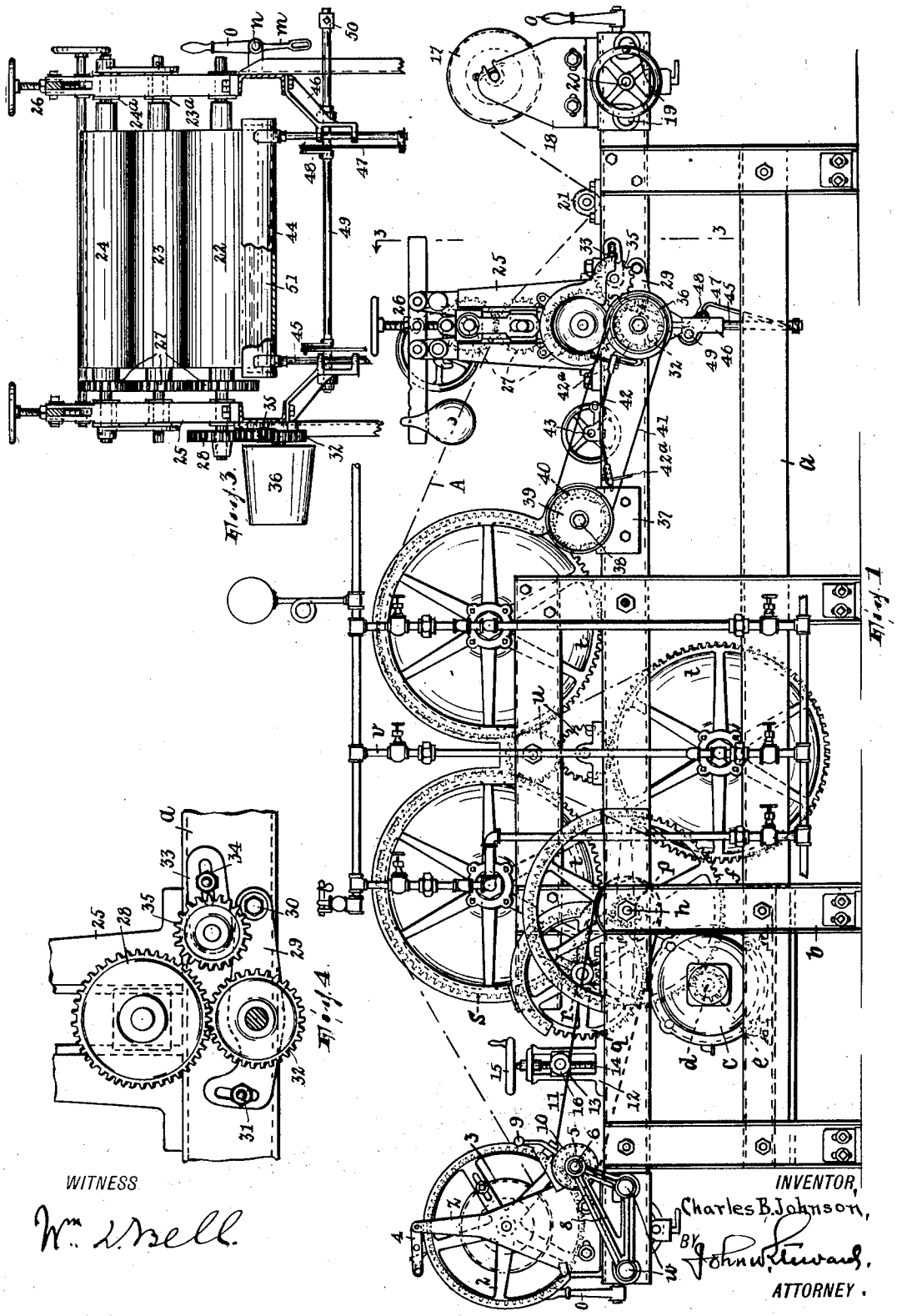
June 2, 1925. 1,540,265

C. B. JOHNSON

MACHINE FOR SIZING WARPS

Filed March 7, 1924 2 Sheets-Sheet 1



WITNESS

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INVENTOR,

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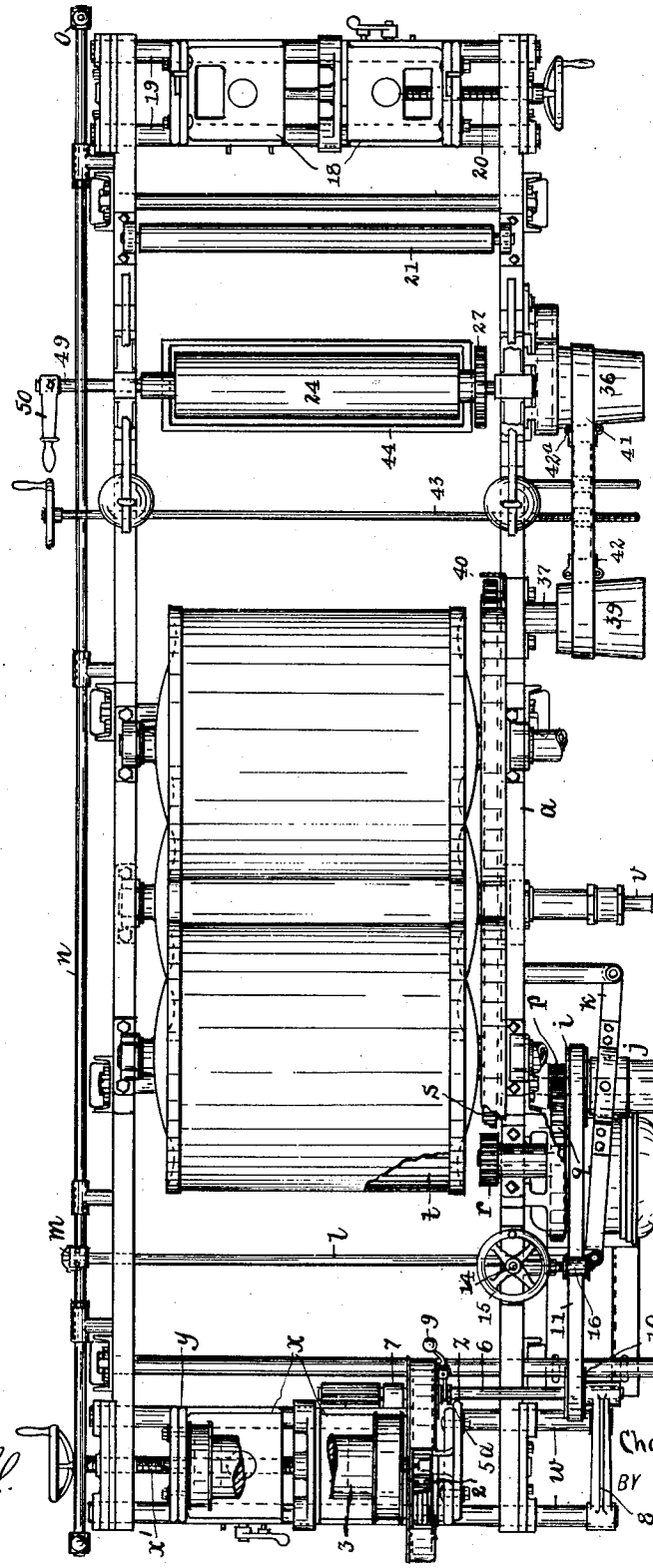


Fig. 2.

WITNESS

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Patented June 2, 1925. 1,540,265

UNITED STATES PATENT OFFICE.

CHARLES B. JOHNSON, OF PATERSON, NEW JERSEY.

MACHINE FOR SIZING WARPS.

Application filed March 7, 1924. Serial No. 697,453.

To all whom it may concern:

Be it known that I, CHARLES B. JOHNSON, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Machines for Sizing Warps, of which the following is a specification.

This invention relates to machines for sizing warps or other textile sheets, as fabrics, wherein the sheet is treated with liquid size, then passed over a heated revoluble drum, and finally wound up on a beam. Heretofore on account of the diameter of the wound mass of the sheet which accumulates on the beam increasing as the treatment proceeds, the sizing was not uniformly or in other respects properly accomplished. That is, if the speed of the beam was made the proper speed for obtaining at the leading end portion of the sheet proper application of the size and the proper degree of drying thereof, then at the other or following end portion the desired application and sufficient degree of drying of the size would not be attained because of the acceleration in speed of the sheet which had meantime ensued, and, on the other hand, if the speed of the beam was made the proper speed for obtaining at said following end of the sheet the desired application and proper degree of drying of the sizing liquid, then, the speed of the sheet being now at first its slowest speed, there would be a surplus application of sizing liquid to and an undue drying thereof on the leading end of the sheet; in the first instance the following end would be unduly wet and in the second instance the leading end would be over-dried, or "baked". This disadvantage was due to the drive being applied to the beam, which resulted in the sheet being drawn past the size applying means and heated drum at gradually increasing speed on account of the increasing diameter of the wound mass. According to this invention, given means to apply the liquid size to the sheet and rotating means to advance the sheet at constant speed and simultaneously dry the size thereon, together with a rotary beam on which to wind the sheet, I drive the beam onto which the sheet thus is wound through slip-friction rotation-transmitting means operatively connecting the beam with said rotating means, whereby while the sheet will be wound up, it will be at all times advanced at constant speed, giving uniform and otherwise proper results in the application thereto and drying of the sizing liquid. Since augmentation of the diameter of the wound mass tends to cause a gradual reduction in the degree of tension of the sheet I preferably construct the rotation-transmitting means so that the degree of slip-friction it affords may be varied.

In addition to the foregoing, my invention contemplates certain improvements relating to the means used in these machines for applying the liquid size.

In the drawings,

Fig. 1 is a side elevation of the improved machine;

Fig. 2 is a plan;

Fig. 3 is a section on line 3—3, Fig. 1; and

Fig. 4 shows a detail.

a is a suitable frame and at *b* near the left hand end thereof in Fig. 1 is a lateral extension of the frame in which is arranged an electric motor *c* whose shaft *d* carries a pinion *e* which drives a gear *f* whose sleeve *g* revolving on the shaft *h* is adapted to drive a pulley *i* through any suitable clutch *j* (unnecessary of detailed description) one member of which is slidable into engagement or disengagement with the other by shifting a lever *k* adapted to be manually operated through a pitman *l* from a depending arm *m* on a rock-shaft *n* extending lengthwise of and journaled in the frame and having handles *o*. Fixed to revolve with pulley *i* is a pinion *p* in mesh with the gear *q* having fixed thereto a pinion *r* which in turn meshes with a gear *s* on a drum *t*; following the usual construction there are three of these drums or "cans" *t* journaled in the frame *a*, two in one horizontal plane and the third in a plane below the first two, their gears *s* being connected to rotate together by transmission gearing *u* seen in Fig. 1 so that the two upper drums rotate counterclockwise and the lower drum clockwise. These drums are all internally heated by steam admitted thereto from a system of piping *v* which supplies the steam through suitable axial stuffing boxes for the drums, all as usual. (The drums and substantially all the gearing described are shown housed).

The means *i*, *p*, *q*, *r*, *s*, *t* (when the machine is operating, that is, when the clutch *j* is established) rotates and so advances the sheet of warp A at constant speed, the

warp extending over the two upper drums and under the third drum, in tractive engagement with all three.

On two tie rods *w* at the left hand end of the machine is arranged a carriage *x* which it is unnecessary to describe in detail further than to say that it includes a tail-stock *y* and a head-stock *z*; it may be manually shifted lengthwise of the tie rods or transversely of the machine by turning a screw *x'*, which is journaled in the frame and threaded into a portion of the carriage. In the head-stock is journaled a gear 2 which receives the gudgeon at one end of the beam 3 and is adapted to have the beam made fast thereto (so as to rotate therewith) in any way, the gudgeon at the other end of the beam being journaled in the tail-stock *y*; 4 is a pawl on the head-stock engaging the teeth of the gear to prevent its backward rotation. In mesh with the gear 2 is a pinion 5 which is splined on the shaft 6 journaled in a bearing 7 of the carrier *x* and also in a bracket 8 upstanding from the tie rods *w*. 9 is simply a pivoted device engaged with a grooved collar 5^a of the pinion and which may be used to slide the pinion on the shaft 6 clear of the gear 2 whenever it is desired to disconnect the gear from the shaft 6. The carriage and the details I have heretofore described in connection therewith are well known in machines wherein a warp, fabric or other sheet is wound on a beam.

The shaft 6 carries a pulley 10 and around this pulley and the pulley *i* extends a belt 11. Thus is afforded between the rotary drum-including means and the beam 3 a rotation-transmitting means which affords slip-friction as between its parts *i*—11—10; when the machine is operating the mass which accumulates on the beam and formed by the convolutions of the sheet A will increase in diameter (especially as it is the custom to wind in a sheet of paper or the like to keep the convolutions of the sheet A separated), in consequence of which the beam would tend to advance the sheet A at a constantly increasing rate, whereas the sheet is actually kept advancing at a constant rate by the drum which, as described, is rotated at constant speed; therefore the means 10—11—*i* affords the required slippage. Means is provided whereby the tension of the part of the sheet A between the beam and the nearest drum *t* may be kept substantially constant (since otherwise this tension would obviously decrease as the mass of windings increased in diameter). Thus I provide a stand 12 in which is movable vertically a follower 13 which forms a nut on a screw 14 that is journaled vertically in the stand and has a hand-wheel 15 for turning it, the follower being equipped with a roller 16 which bears on the upper stretch of the belt 11 and according as its pressure thereon is increased as the mass accumulates on the beam increases the degree of tractive effort existing between the belt and the two pulleys *i* and 10.

Assuming means (to be described) exists to apply the sizing liquid to the sheet it will be seen in view of the foregoing that the sheet is advanced and receives the sizing liquid and undergoes drying always at a constant rate, so that the sizing liquid is applied uniformly and the drying uniformly effected throughout the whole length of the sheet.

The sheet is delivered to the machine wound on a beam 17 which is journaled in a carriage 18 that may be shifted transversely of the machine on two tie rods 19 by turning a hand screw 20 swiveled in the frame *a* and having a threaded engagement with the carriage. The sheet then passes under a roller 21 and between this roller and the nearest drum *t* it is treated with the sizing liquid by means known as a quetch, as follows: 22, 23, and 24 are three superposed rolls, the lowest one of which dips in the sizing liquid contained in a receptacle as will appear. The roll 22 is journaled in two stands 25 upstanding from the machine *a*, whereas the other two rolls (23 resting on 22 and 24 on 23) are journaled in bearings 23^a and 24^a, respectively, slidable vertically in the stands 25. If the weight of the two upper rolls is not sufficient to maintain the desired pressure between each two of the set any auxiliary means (such as that shown at 26, which is old and unnecessary to describe) may be used. The three rolls are connected by gears 27. The power to rotate these rolls in synchrony is applied to the shaft of the lowest roll, which shaft carries a gear 28. There is nothing novel in this quetch, per se. In a bracket 29 (Fig. 4) pivoted at 30 and adjustable vertically on its pivot by virtue of a bolt-and-slot connection 31 with the frame *a* is journaled a driving gear 32. In another bracket 33 which has a slot-and-bolt connection 34 with the frame *a* and which may be adjusted tangentially of the coengaging portions of the two gears 28 and 32 is journaled a pinion 35. With the parts in the positions of Fig. 4 gear 32 drives gear 28 directly and consequently the rolls 22—23—24 each in one direction; but if bracket 29 is depressed so that gear 32 clears gear 28 and the transmission pinion 35 is meshed with these two gears by shifting the bracket 33 to the left the rotation of each of the stated parts will be in the opposite direction. The sheet may be passed between either rolls 22 and 23, or 23 and 24. When the sheet A is passed between the rolls 22 and 23 it will of course receive more liquid than when it is passed between rolls 23 and 24, as actually shown in Fig. 1. The directions of rotation

of the two rolls which happen to be active on the sheet should agree with the direction of the advance of the sheet; hence the occasion for the mechanism shown in Fig. 4 whereby from gear 32 the rolls may be rotated in one direction or the other.

Heretofore the rotating of the rolls was effected by the pull of the sheet which was in many cases prohibitive, considering that the fibres have been wetted and that frequently their nature is such that they have very little tensile strength. Hence I provide for rotating the rolls by making them a part of the rotary system of the machine, the connection between them and the means (as the drums) by which the sheet is pulled from them being a variable-speed rotation-transmitting means. Fixed to rotate with the gear 32 is a cone 36 and journaled in a stand 37 is a shaft 38 parallel with the axis of said cone and carrying a cone 39 reverse to cone 36 and a gear 40 in mesh with the gear *s* of the nearest drum *t*. Around these two cones extends a belt 41, 42 being a belt shifter having forms 42ª engaging the two stretches of the belt and having tapped into it a manually revoluble screw 43 which is suitably journaled in the frame *a*. When the belt is shifted the speed of rotation of the gear 32 and consequently of the rolls will be changed. Thus the rolls are driven by the rotary means including the drums or cans, instead of by the pull of the sheet A which is thus saved undue strain, and any desired tension of said sheet may be attained by adjustment effected at 43.

The sizing liquid is contained in a trough or receptacle 44 carried by two vertical rods 45 which are guided in hangers 46 of the frame *a*. These rods have connected to them curved links 47 which are pivoted to the ends of arms 48 on a horizontal shaft 49 journaled in the hangers 46 and having a handle 50. When the shaft is by the handle turned from the position in Figure 1 to the horizontal position in Figure 2 the trough will be elevated to a position where the lower roll will dip into the sizing liquid 51 contained in the trough, the pivoting points between the links 47 and arms 48 passing over the shaft 49 until the links impinge against the shaft and the parts come to rest with the trough elevated. The trough can by a reverse movement of the shaft be quickly lowered for replenishing its supply of liquid, and withdrawing the liquid from the lower roll.

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

1. Apparatus of the class described including, with a supporting structure and means to apply the liquid size to the sheet to be treated, rotating means to advance the sheet at constant speed and simultaneously dry the size thereon, a rotary beam onto which to wind the advanced sheet, and slip-friction rotation-transmitting means operatively connecting the beam with said rotary means.

2. Apparatus of the class described including, with a supporting structure and means to apply the liquid size to the sheet to be treated, rotating means to advance the sheet at constant speed and simultaneously dry the size thereon, a rotary beam onto which to wind the advanced sheet, and a variable-slip-friction rotation-transmitting means operatively connecting the beam with said rotary means.

3. Apparatus of the class described including, with a supporting structure and means to apply the liquid size to the sheet to be treated, rotary means to advance the sheet at constant speed and simultaneously dry the size thereon, a rotary beam onto which to wind the advanced sheet, rotary means with which the beam is connected to be rotated thereby, each of said rotary means including a pulley, a power transmitting belt extending around the pulleys, and means to exert variable pressure on one stretch of the belt.

4. Apparatus of the class described comprising, in combination, a frame and a rotary system therein including a pair of quetch rolls held pressing against each other and coactive to exert pressure on the sheet to be treated when interposed between them and one of which is adapted to peripherally conduct the liquid size to said sheet, rotary means to pull the sheet in the direction in which it is fed by the quetch rolls, and variable-speed rotation-transmitting means operatively connecting one of the quetch rolls and said rotary means.

5. Apparatus of the class described comprising, in combination, a frame and a rotary system therein including a pair of quetch rolls held pressing against each other and coactive to exert pressure on the sheet to be treated when interposed between them and one of which is adapted to peripherally conduct the liquid size to said sheet, rotary means to pull the sheet in the direction in which it is fed by the quetch rolls, and variable-speed rotation transmitting means operatively connecting one of the quetch rolls and said rotary means including a pair of reverse cone pulleys, a belt extending around the pulleys, and means to shift the belt lengthwise of the axes of the pulleys.

In testimony whereof I affix my signature.

CHARLES B. JOHNSON.