P. R. THOM.

PAPER MACHINE.

APPLICATION FILED SEPT. 23, 1909.

971,645.

Patented Oct. 4, 1910.

4 SHEETS—SHEET 1.

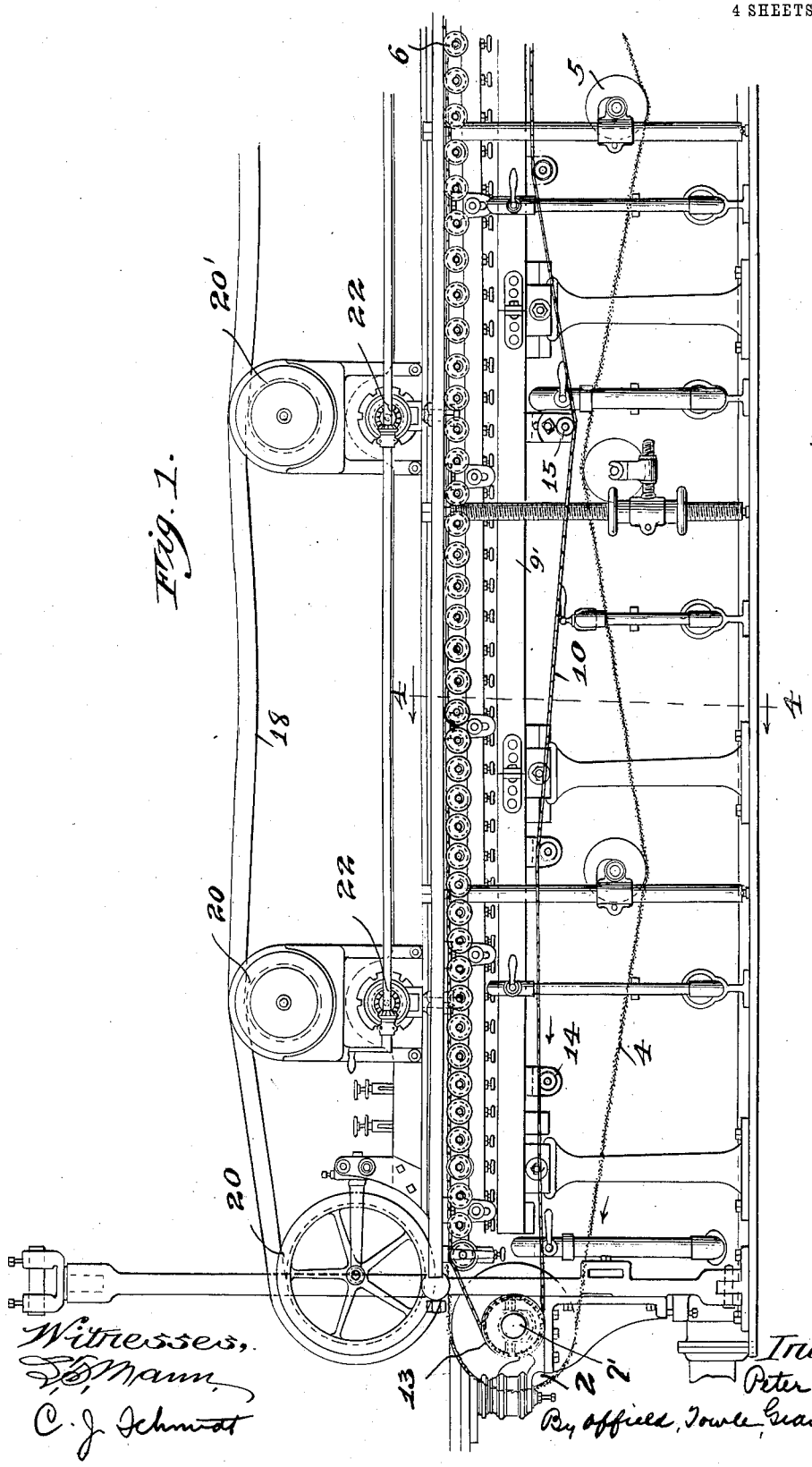

Fig. 1.

Witnesses,
C. J. Schmidt

Inventor,
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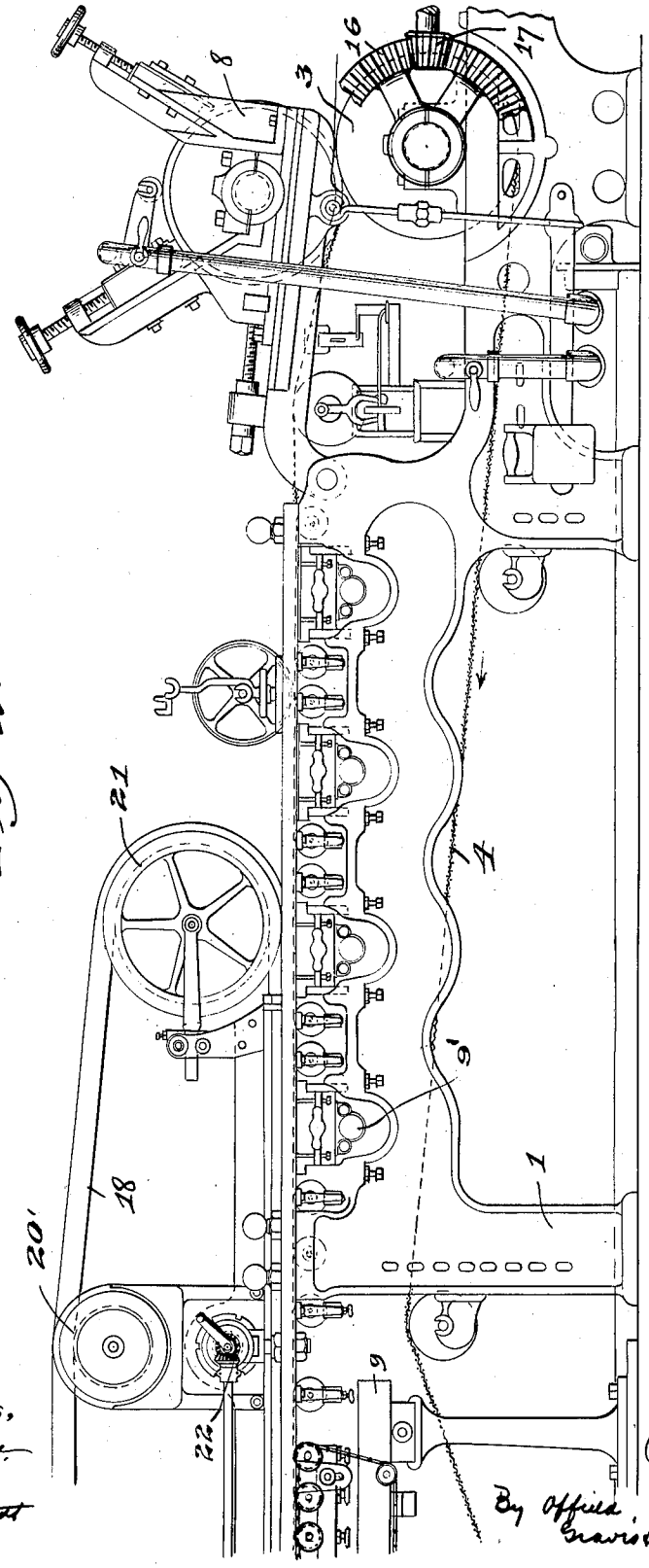

Fig. 2.

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4 SHEETS—SHEET 3.

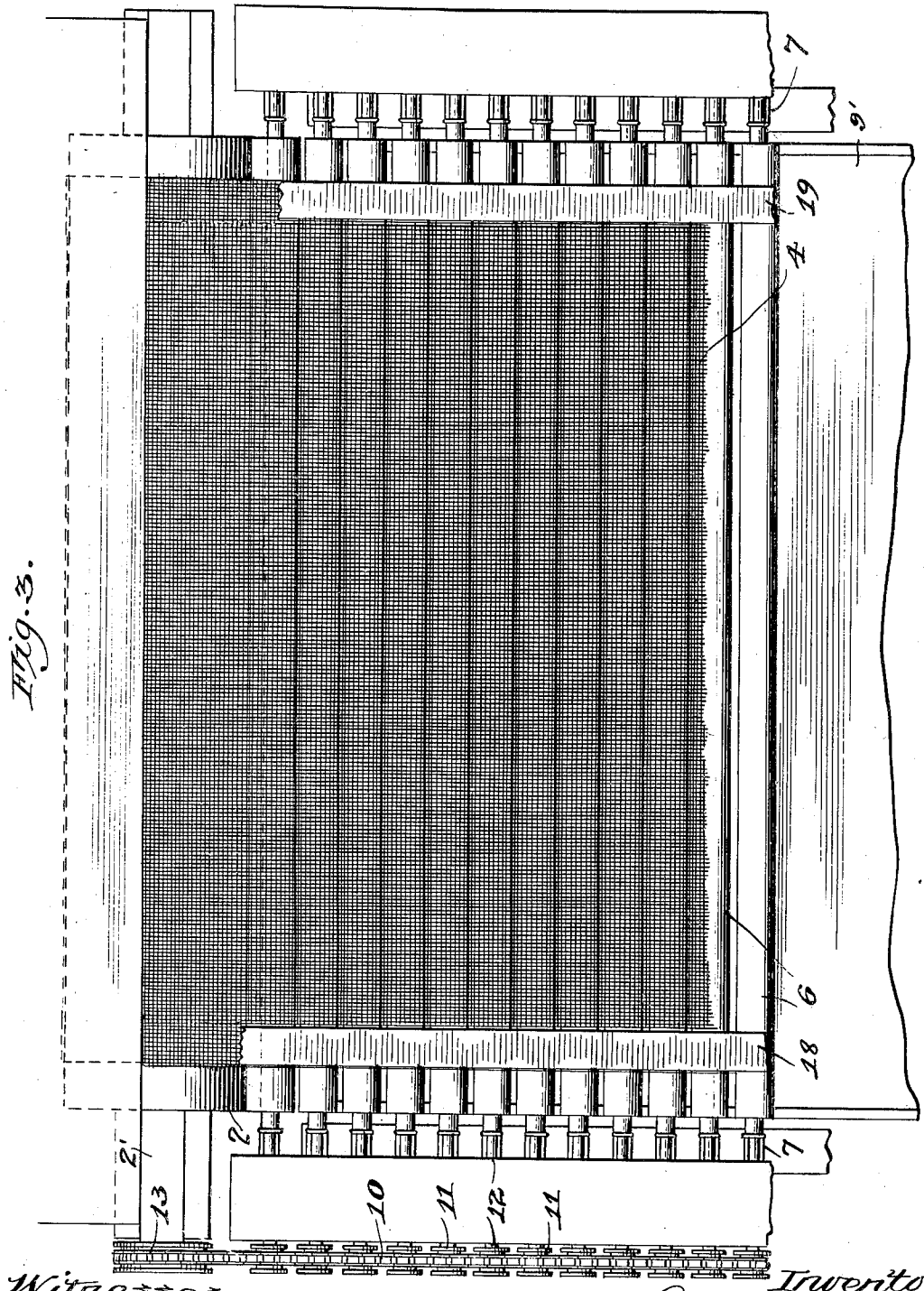

Fig. 3.

Witnesses,
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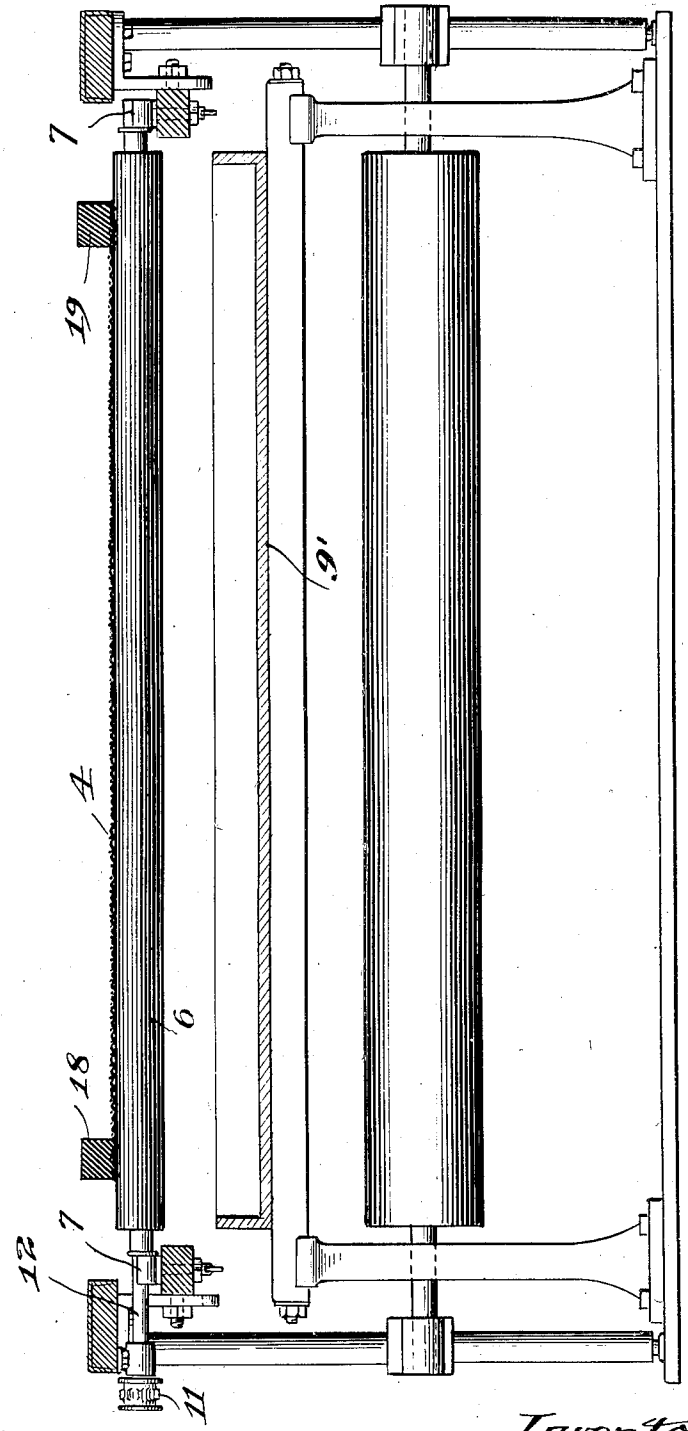

Fig. 4.

Witnesses,
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UNITED STATES PATENT OFFICE.

PETER R. THOM, OF APPLETON, WISCONSIN, ASSIGNOR OF ONE-HALF TO KIMBERLY-CLARK COMPANY, OF NEENAH, WISCONSIN, A CORPORATION OF WISCONSIN.

PAPER-MACHINE.

971,645. Specification of Letters Patent. Patented Oct. 4, 1910.

Application filed September 23, 1909. Serial No. 519,142.

To all whom it may concern:

Be it known that I, PETER R. THOM, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Paper-Machines, of which the following is a complete, clear, full, and precise specification.

My invention relates to paper machines and particularly to improved means for positively driving the tube or bed rolls independently of the frictional engagement therewith of the Fourdrinier belt traveling thereover.

In paper machines a great number of tube rolls are usually employed for supporting the pulp carrying belt, but these rolls do not always rotate with uniform freedom, the result being that the belt traveling thereon is subjected here and there to strains and drag, and unequally distributed friction soon causes unequal wearing of the belt, and furthermore, its uniform travel over the rolls is greatly disturbed. The Fourdrinier belt possesses sufficient strength and will last a very long time if the friction and wear thereon are uniformly distributed.

One of the salient objects of my invention is, therefore, to provide an arrangement which will produce uniform strain on the belt so that its travel and its wear will be uniform.

Another salient object is to eliminate the necessity of additional driving sources and connections for rotating the tube rolls independently of the frictional engagement of the belt therewith, and to this end a single driving means is adapted to furnish power for rotating the belt and also the tube rolls, and the adjustment is such that the tube roll peripheral speed is the same as the speed of travel of the belt thereover, and by having a single driving means this harmonious travel of the belt and tube rolls is maintained upon any variation in speed of the driving means.

In the accompanying drawings this method of driving the rolls is clearly illustrated, and Figure 1 is a side elevation of the left end of a paper machine; Fig. 2 is a side elevation of the right end of the machine; Fig. 3 is an enlarged plan view of a section of the left end of the machine, and Fig. 4 is an enlarged sectional view taken on plan 4—4, Fig. 1.

The supporting frame of the machine comprises a plurality of supporting parts and is designated as a whole by 1. At the left end of the frame is the breast roll 2 and at the right end of the machine is suitably journaled the lower couch roll 3 about which roll passes the Fourdrinier belt 4, the belt being kept suitably taut by adjustable tightener rolls 5. Arranged in a horizontal row at the top of the machine are the tube rolls 6 journaled in bearings 7, 7, as best shown in Fig. 4, the Fourdrinier belt passing over and resting on these rolls. Over the lower couch roll the upper couch roll 8 is suitably mounted, the belt passing between the couch rolls. The pulp in diluted state is delivered to the belt over the breast roll 2 and is eventually carried between the upper and lower couch rolls at the other end of the machine. During travel across the machine liquid in the pulp escapes through the belt and falls to the tray 9 supported in any suitable manner below the belt as best shown in Fig. 4, and more moisture is squeezed from the pulp as it is carried between the couch rolls.

At the right of the machine a plurality of suction boxes 9′ are arranged below the belt and whose purpose is to extract moisture from the pulp, the construction and arrangement of these suction devices being well known.

Where the tube rolls depend upon their rotation upon the frictional engagement therewith of the Fourdrinier belt drag and friction on the belt will occur here and there and will not at all be uniform, this greatly shortening the life of the belt besides disturbing the uniformity of its travel and of the pulp layer formed thereon. To accomplish the rotation of the tube rolls independently of the belt friction I provide a sprocket chain 10 which passes over sprocket wheels 11 provided at the ends of the shafts 12 supporting the tube rolls. This sprocket chain passes over and is driven from a sprocket wheel 13 mounted on shaft 2′ supporting the breast roll, as best shown in Figs. 1 and 3, the lower part of the chain passing over idlers 14 and tightening pulley mechanism 15.

In Fig. 2 the driving means is shown and comprises a bevel gear 16 connected with the lower couch roll 3 and engaged by a pinion 17 which is adapted for connection with some driving source (not shown). The Fourdrinier belt passes about the lower

couch roll and is driven thereby upon rotation of the driving mechanism, and the belt rotates the breast roll about which it is passed and this breast roll in turn controls the rotation of the sprocket wheel 13 and the sprocket chain 10 which rotates the tube rolls. The Fourdrinier belt has sufficient strength for assuming the positive driving of the tube rolls, and its life will not be shortened thereby for the reason that the positive drive of the tube rolls eliminates the frictional engagement between the belt and rolls and causes uniform distribution of strain in the belt and allows it to travel uniformly over the rolls. This method of driving the rolls from the breast roll eliminates the necessity of additional driving mechanism. The adjustment is preferably such that the peripheral speed of the tube rolls will equal the speed of travel of the belt thereover, and by having a single driving mechanism this harmonious speed between the tube rolls and belt will be maintained independently of any variation in speed of the driving mechanism.

I have shown deckel straps 18 and 19 carried about pulleys 20 and 21 mounted on the machine frame, the lower sections of the straps resting on and traveling with the Fourdrinier belt to confine the pulp thereon, the upper sections of the straps being supported on idler pulleys 20′, the adjustable mechanism 22 serving to gage the distance between the deckel straps to determine the width of the stock turned out by the machine. The deckel straps are comparatively heavy, and in prior machines where the tube rolls are driven by the frictional engagement therewith of the Fourdrinier belt the friction is greatly increased and localized where the straps engage the belt. In my arrangement, where the rolls are driven independently of the belt friction, localization is prevented and the strain and wear will be evenly distributed in the belt. In my arrangement, therefore, unequal strain and distortions in the belt are eliminated on account of the freedom of friction or drag as the belt passes over the tube rolls. The life of the belt will, therefore, be greatly prolonged and the texture of the pulp will be much more uniform.

Having thus described my invention I desire to secure the following claims by Letters Patent.

1. In a paper machine, the combination of a pulp carrying belt, tube rolls over which said belt travels, driving mechanism for said belt, and means controlled by the travel of said belt for causing rotation of the tube rolls independently of the frictional engagement therewith of said belt.

2. In a paper machine, the combination of a pulp carrying belt, a row of tube rolls over which said belt travels, driving mechanism for said belt, a driving belt having driving engagement with said tube rolls, and connection between said driving belt and pulp carrying belt whereby the rotation of said pulp carrying belt will cause travel of the driving belt to rotate the tube rolls independently of the frictional engagement therewith of said pulp carrying belt.

3. In a paper machine, the combination of a pulp carrying belt, a roll about which said belt travels, driving mechanism for said belt, a row of tube rolls over which said belt travels, a driving belt for rotating said tube rolls, and a driving member for said driving belt connected with said roll whereby travel of said belt will cause rotation of said roll and rotation of the driving member to drive said driving belt to cause rotation of the tube rolls independently of the frictional engagement thereof with said pulp carrying belt.

4. In a paper machine, the combination of a breast roll, a pulp carrying belt for traveling about said roll, driving mechanism for said belt, a row of tube rolls for supporting said belt, a sprocket wheel connected to rotate with said breast roll, a sprocket pinion connected with each tube roll, and a chain passing about said sprocket wheel and engaging with the sprocket pinions of the tube rolls whereby rotation of the breast roll by said pulp carrying belt will cause positive rotation of the tube rolls independently of the frictional engagement therewith of said pulp carrying belt.

PETER R. THOM.

Witnesses:
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E. J. NUSSBICKER.