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COUCH ROLL MECHANISM FOR PAPER MACHINES.

APPLICATION FILED AUG. 6, 1909.

983,326.

Patented Feb. 7, 1911.

3 SHEETS—SHEET 1.

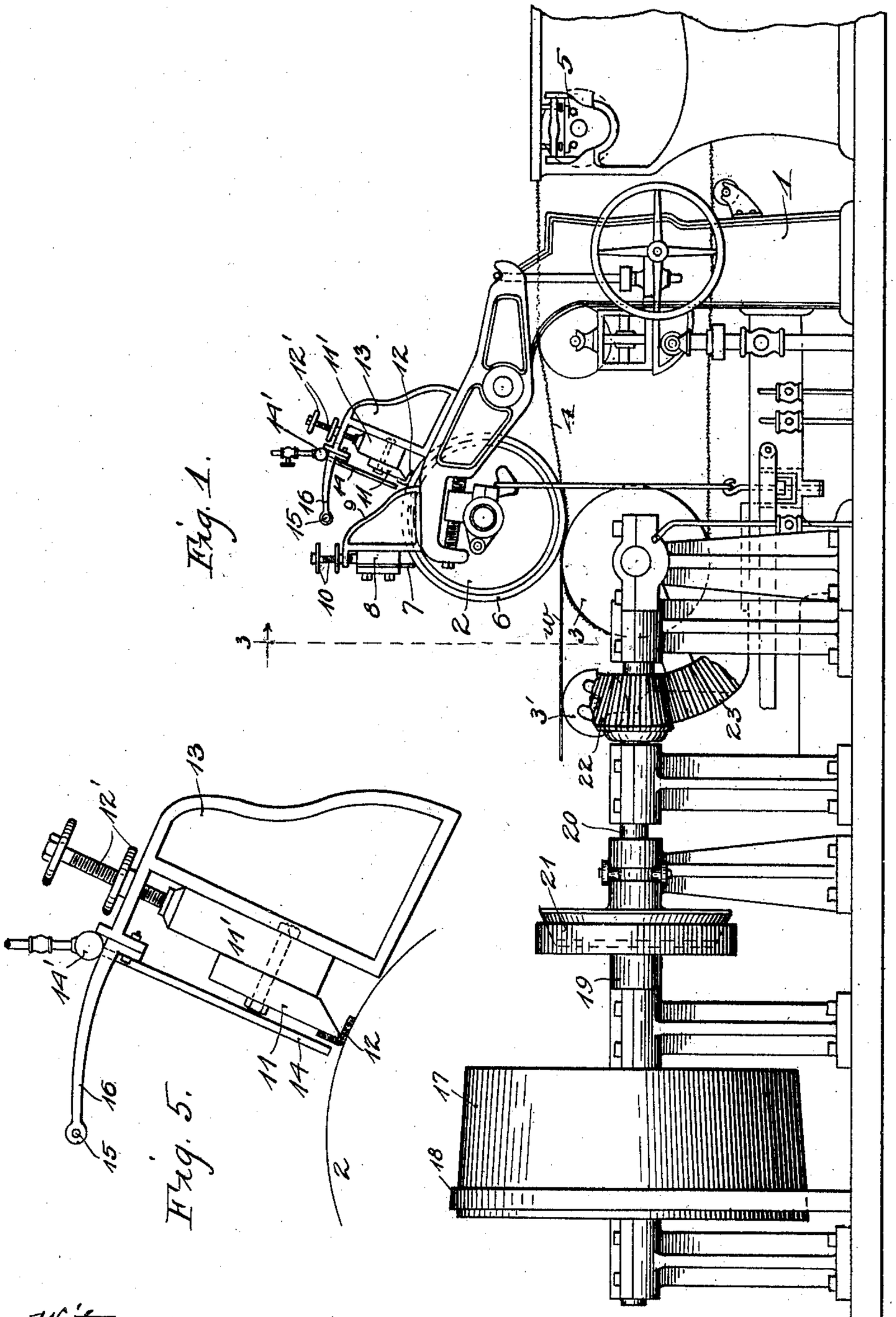

Fig. 1.

Fig. 5.

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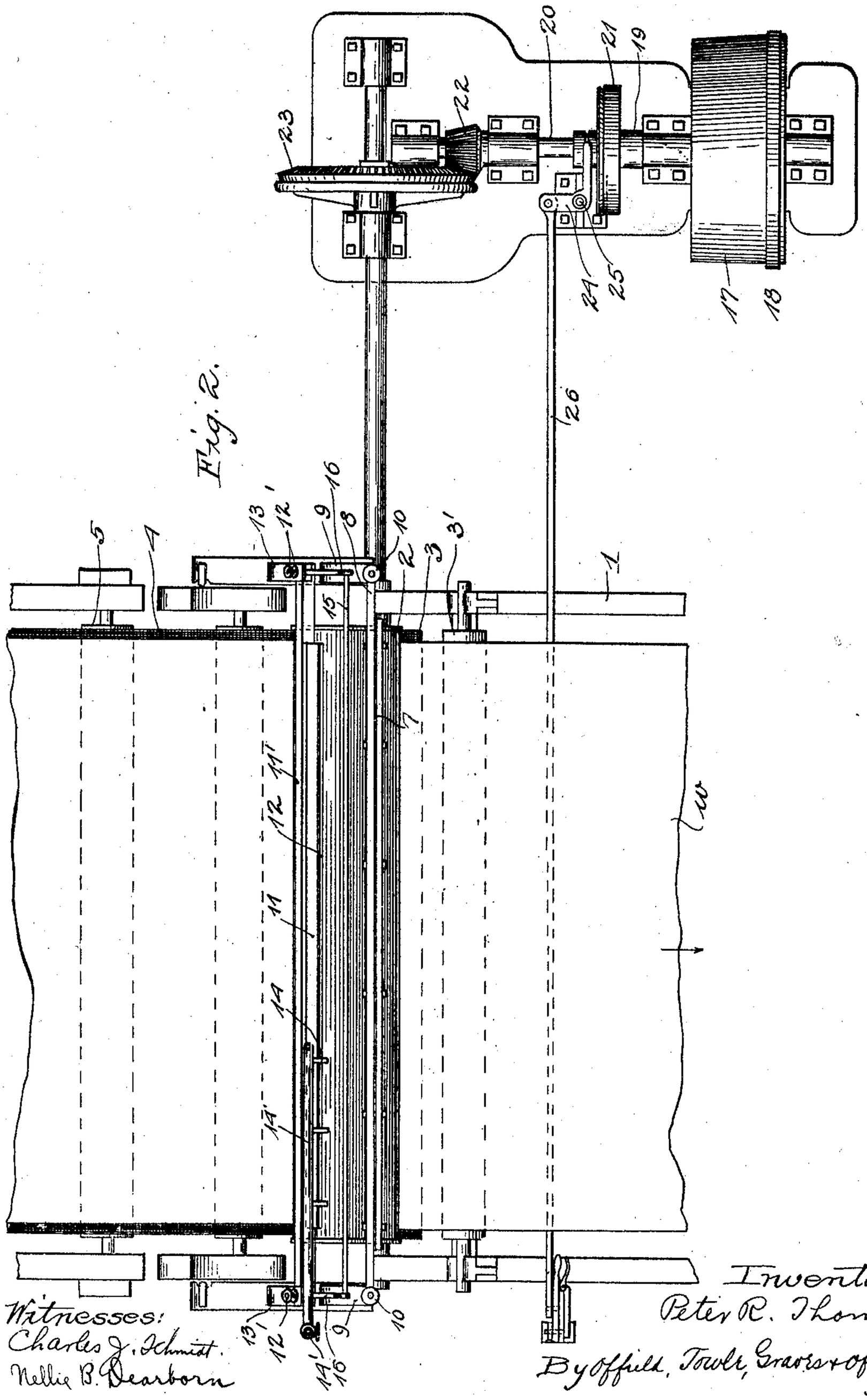
3 SHEETS—SHEET 2.

Fig. 2.



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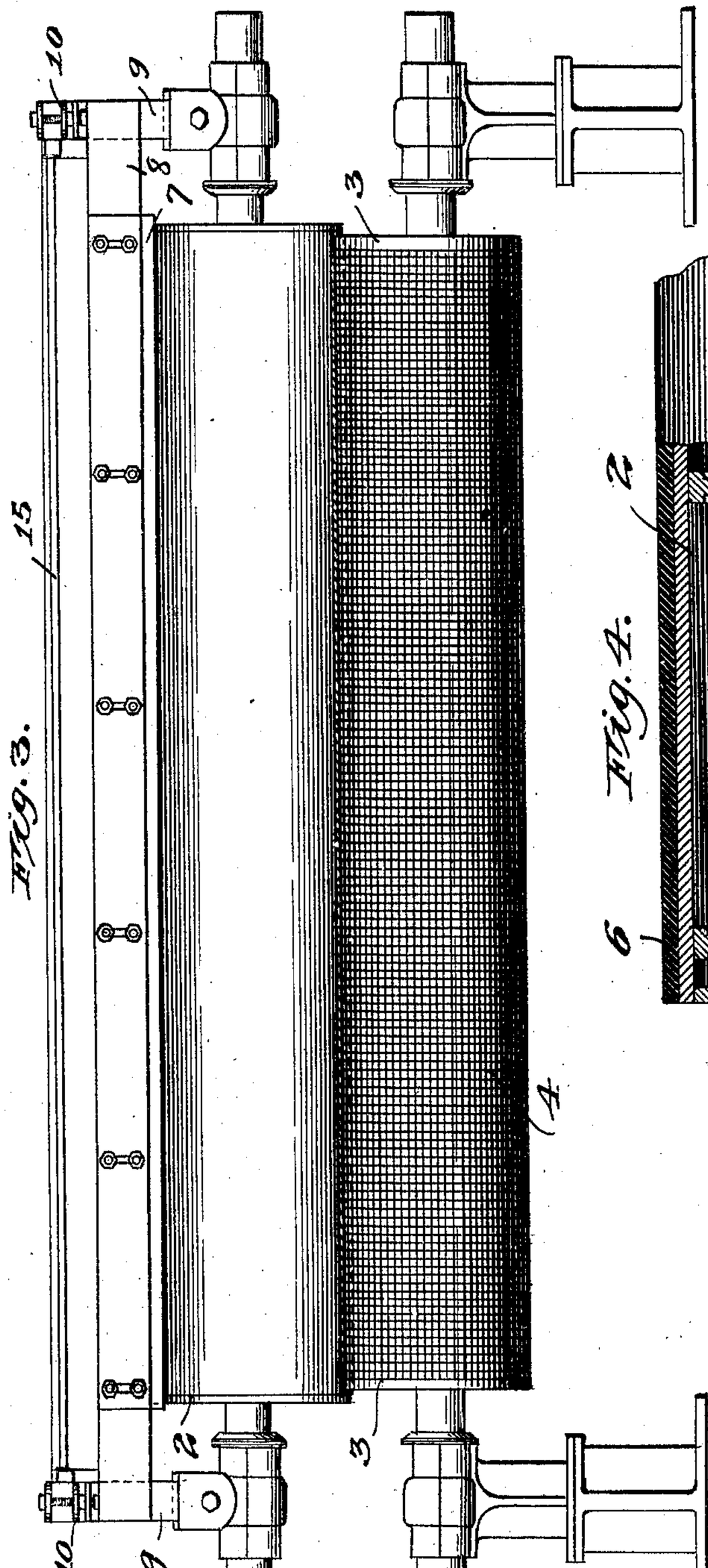

Fig. 3.

Fig. 4.

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COUCH-ROLL MECHANISM FOR PAPER-MACHINES.

983,326. Specification of Letters Patent. **Patented Feb. 7, 1911.**

Application filed August 6, 1909. Serial No. 511,491.

To all whom it may concern:

Be it known that I, PETER R. THOM, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Couch-Roll Mechanisms for Paper-Machines, of which the following is a specification.

This invention relates to improvements in couch roll mechanisms for paper mills and refers more specifically to a couch roll mechanism characterized by the provision of a rubber covering and certain coöperating accessories in lieu of the usual felt jacket or covering.

Among the salient objects of the present invention are to provide a construction which will operate successfully and reliably in performing the usual functions of couch rolls and will at the same time eliminate many of the objections inherent to couch rolls as now commonly used with felt coverings; to provide a couch roll which will wear evenly and preserve its uniformity throughout its entire length for practically an indefinite period, notwithstanding the machine of which it forms a part may be frequently used for making webs much narrower than the length of couch roll; to provide a mechanism which will entirely obviate the carrying over of fragments of the paper web so that they pass a second time between the rolls; to provide a couch roll which by reason of its dense, non-absorbent surface and acting in conjunction with a wiper which coöperates therewith, will obviate the carrying over of water with the roll and thus prevent the objectionable effects resultant therefrom; to provide a couch roll covering, which while extremely moderate in cost, will last many times the life of an ordinary felt covering; to provide a mechanism in the use of which the starting of the web through the couch rolls and on to the succeeding rolls may be accomplished much more conveniently and reliably than with the couch rolls of the prior art; to provide a couch roll which is devoid of fibrous surface and is therefore not attacked and worn down by the Fourdrinier wire web, as to those portions which are not protected by the web of paper or pulp passing between the upper and lower couch rolls, and in general to provide an improved and efficient mechanism of the character referred to.

To the above ends the invention consists in the matters hereinafter described and more particularly pointed out in the appended claims.

The invention will be readily understood from the following description, reference being had to the accompanying drawings in which:

Figure 1 is a view in side elevation of that portion of a paper machine in which the couch rolls are mounted, the front and rear end portions of the mill being broken away to reduce the size of the drawing. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a view taken approximately on the line 3—3 of Fig. 1 and looking rearwardly or in the direction of the arrows. Fig. 4 is an axial sectional view of an end portion of the upper couch roll showing particularly the rubber covering of the roll; and Fig. 5 is an enlarged end elevation view of the wiper mechanism including its supporting and adjusting mechanism.

Referring to the drawings, it will be understood that in so far as the several parts of the paper mill are shown they are of the usual construction excepting only in so far as the upper couch roll and the parts which directly coöperate with the latter are concerned.

In the drawing, 1 designates as a whole the main side frames of the machine in which are suitably journaled the upper and lower couch rolls designated 2 and 3 respectively.

4 designates the Fourdrinier wire web which, as usual, is trained around the lower couch roll, the upper lap passing over the usual tube rolls (not shown), and suction boxes 5 on its way to pass between the couch rolls.

In the preferred embodiment of my invention, the upper couch roll 2 is provided with a vulcanized rubber outer jacket 6 (see particularly detailed Fig. 4) which jacket is externally smooth and of sufficient thickness and such consistency as to afford a slightly yielding or elastic surface. The jacket may be secured upon the roll proper in any suitable manner, and is desirably of the full length of the roll and of uniform diameter throughout.

Above the top couch roll is adjustably mounted a blade-like guard 7 preferably located in front of the vertical axis of said roll, and the lower edge of which is parallel and approaches closely to the periphery of the roll; said guard being adjusted so that its lower edge approaches the roll to within a distance less than the thickness of the web of semi-formed paper which is being formed between the upper and lower couch rolls. To facilitate such adjustment of the guard, the latter is mounted upon a bar 8 which is in turn adjustably mounted upon brackets 9 and vertically movable by adjusting screws 10.

The upper couch roll is additionally provided with the usual wiper mechanism located slightly in rear of the vertical axis of the roll; said mechanism comprising, in the present instance, a guard board 11 (see detailed Fig. 5) mounted to extend along the upper side of the roll, and shod at its engaging edge with a strip of felt 12. The wiper blade 11 is adjustably mounted upon suitable brackets 13, and is carried by a block 11′ adjustably mounted upon said brackets through adjusting screws 12′. A spray pipe 14′ is also mounted upon said brackets to extend across and above the roll; said spray pipe being provided with discharge nozzles 14 as usual.

It is necessary for the attendant to mount upon a suitable platform or frame arranged in front of the couch rolls (said platform not being shown) for the purpose of inspecting, adjusting, or attending the operation of said parts; and for convenience, a hand rail 15 is provided, having its ends supported in the brackets 13 and extending along and above the roll.

The driving train which actuates the part of the machine concerned in the present invention comprises a relatively wide, slightly coned drive pulley 17 (see Fig. 2) over which runs a belt 18 controlled by a belt-shifter, not shown, for varying the speed by the shifting of said belt. A main drive shaft of two-part construction, as indicated at 19 and 20, transmits power from a clutch mechanism 21 to a beveled pinion 22 which meshes with a gear 23 mounted directly upon the axis shaft of the lower couch roll. Clutch 21 is operated through a bell crank 24 pivoted at 25 and actuating rod 26 connected thereto and extending to the opposite side of the machine.

The general operation of the machine is as usual, and therefore requires no particular description. Describing, however, the function and operation of the claimed combinations, the substitution of the smooth non-absorbent-surfaced upper couch roll, for a felt-jacketed roll brings about a different couching action as follows. With the felt-covered roll, the web tends to follow the lower couch roll and accordingly deflects downwardly in passing from the couch roll pass to the felt beyond the latter; but with the smooth non-absorbent-surfaced upper couch roll, the web tends more strongly to follow the latter, and accordingly is deflected upwardly from the roll pass. It follows that whenever the web breaks (and this is an occurrence which happens more or less frequently under all operating conditions and in spite of the greatest care), it is obvious that the web will follow up the face of the upper couch roll and, except for the provision of the advance guard, would accumulate in front of the wiper mechanism on top of the roll. It is of course well understood by those skilled in this art that once the machine is running properly, it involves the loss of much time and trouble to stop the machine; and accordingly it is the practice to let the machine run and get the broken web replaced and running properly on to the felt which carries it to the press rolls, as promptly as possible. In a very few moments the accumulation of partly formed paper at the top of the upper couch roll would be enormous were it not for the guard mechanism provided. It may be noted here that this is a new condition incident to the use of the non-absorbent-surfaced upper couch roll, since the breaking of the web when using a felt-covered upper couch roll, has ordinarily simply resulted in the broken web passing downwardly around the lower couch roll to the save-all.

In the operation of the present invention, the broken end of the web which follows up the face of the roll encounters the guard 7 and keeps accumulating against the guard and falling down until the operator has attended to it. To get the web running properly again, the operators proceed as follows: One operator proceeds to cut the web in rear of the couch rolls by the use of a jet of water which is passed slowly across the web from side to side. Inasmuch as the web is constantly traveling, this produces an oblique cut. The operator at the front of the roll, as the advance corner of the gap or cut comes through, with one hand wipes away the accumulation at the front of the guard 7, and with the other peels off the advance end of the intact web and directs it on to the receiving felt. This operation of peeling off the web and transferring it, as well also as the wiping off of the accumulation in front of the guard (so as to avoid the dropping down of clots upon the web) is of course a progressive one from one side of the machine to the other.

During the normal operation of my improved mechanism, *i. e.* while the web is running through unbroken, there is nevertheless a more or less constant carrying up

of flecks of pulp and fiber by the face of the upper couch roll; and were the guard 7 arranged to have actual bearing contact with the couch roll, these flecks would very soon accumulate and form clots which would drop down upon the web and either break the same or at least form defects in the web. By setting the guard slightly away from the surface of the roll, however, these flecks pass underneath the guard and are washed away by the usual flushing and wiping mechanism in rear of the advance guard. It is of course obvious that the guard 7 must be adjusted very nicely and accurately to work properly in this regard.

By reason of the non-absorbent surface of the upper couch roll it leaves the wiping mechanism at the descending side practically dry, whereas the felt jacketed roll cannot be, even when wiped under great pressure, brought into a similar condition. Inasmuch as the rate of speed is largely determined by the interval of time required for squeezing the water from the web between the couch rolls, it follows that with my improved arrangement a higher speed is easily maintained. Inasmuch as the upper couch roll has no fibers to be caught by the Fourdrinier wires, it is in no wise damaged or impaired by changing the width of web formation from time to time; it being well understood that the felt jacketed couch rolls are rapidly impaired when this is done. Moreover, the durability of the rubber-covered roll is such that its life is many times that of a felt jacketed roll, while the first cost of the rubber roll is not greatly in excess of the corresponding felt-jacketed roll. Another important feature of constant saving is due to the fact that with the smooth non-absorbent surface of the rubber couch roll, the wiper mechanism may be adjusted so as to bear very slightly against the roll, with a consequent saving of many horse-power.

A serious objection inherent to the use of felt-jacketed rolls is avoided, namely, as these felt jacketed rolls become worn, the outer surface of the felt having lost its coating of fiber to a greater or less extent, the surface becomes pebbled or uneven by the exposure of the threads of the weave, and these exposed thread projections leave their imprint in the web so that the latter is permanently marked with the pattern of the weave of the couch roll. This is of course so objectionable that as soon as the roll exhibits this defect to any considerable extent, it must be re-jacketed. With the smooth surfaced rubber rolls this is of course entirely avoided.

There are other features of advantage which need not be recited.

While I have herein described a preferred, and so far as I know the most practicable, embodiment of my invention, nevertheless I do not wish to be limited to specific details of construction, except so far as they may be the substance of the appended claims.

I claim as my invention:

1. In a paper machine, the combination of a smooth, non-absorbent-surfaced couch roll and a guard extending parallel with the roll and in advance of a vertical plane through its axis, the lower edge of said guard being spaced away from the roll periphery a distance less than the thickness of an ordinary paper web being formed, but out of direct contact with the roll.

2. In a paper machine of the Fourdrinier type, the combination with the upper and lower couch rolls, the former having a smooth rubber surface, and the Fourdrinier belt traveling between the rolls, of a guard supported adjacent the upper couch roll in advance of its vertical axial plane, the lower edge of said guard being parallel with the couch roll and separated therefrom by a uniform gap of less width than the thickness of the paper web being formed between said rolls.

3. In a paper machine of the Fourdrinier type, the combination of an upper smooth-surfaced resilient and non-absorbent couch roll and a thin edged blade-like guard supported adjacent the roll in advance of its vertical axial plane, the lower edge of said guard being parallel with the roll surface and spaced therefrom by a uniform gap of less width than the thickness of the web formed between the rolls.

4. In a paper machine of the Fourdrinier type, the combination of an upper couch roll provided with a yielding rubber jacket presenting a smooth peripheral surface, a guard supported adjacent said roll and in proximity thereto, the acting edge of said guard being parallel with the surface of the roll and adjustably spaced therefrom by a uniform gap of less width than the thickness of the paper web being formed below said couch roll.

5. In a paper machine of the Fourdrinier type, the combination of an upper smooth-surfaced couch roll, wiping mechanism acting on the rear descending part of the roll, and guard mechanism located in advance of said wiping mechanism and arranged and adapted to catch and arrest the paper web whenever it carries up the face of the roll and to avoid accumulating clots formed of flecks of fiber carried up by the roll during normal operation while the web runs unbroken.

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