

May 3, 1938.

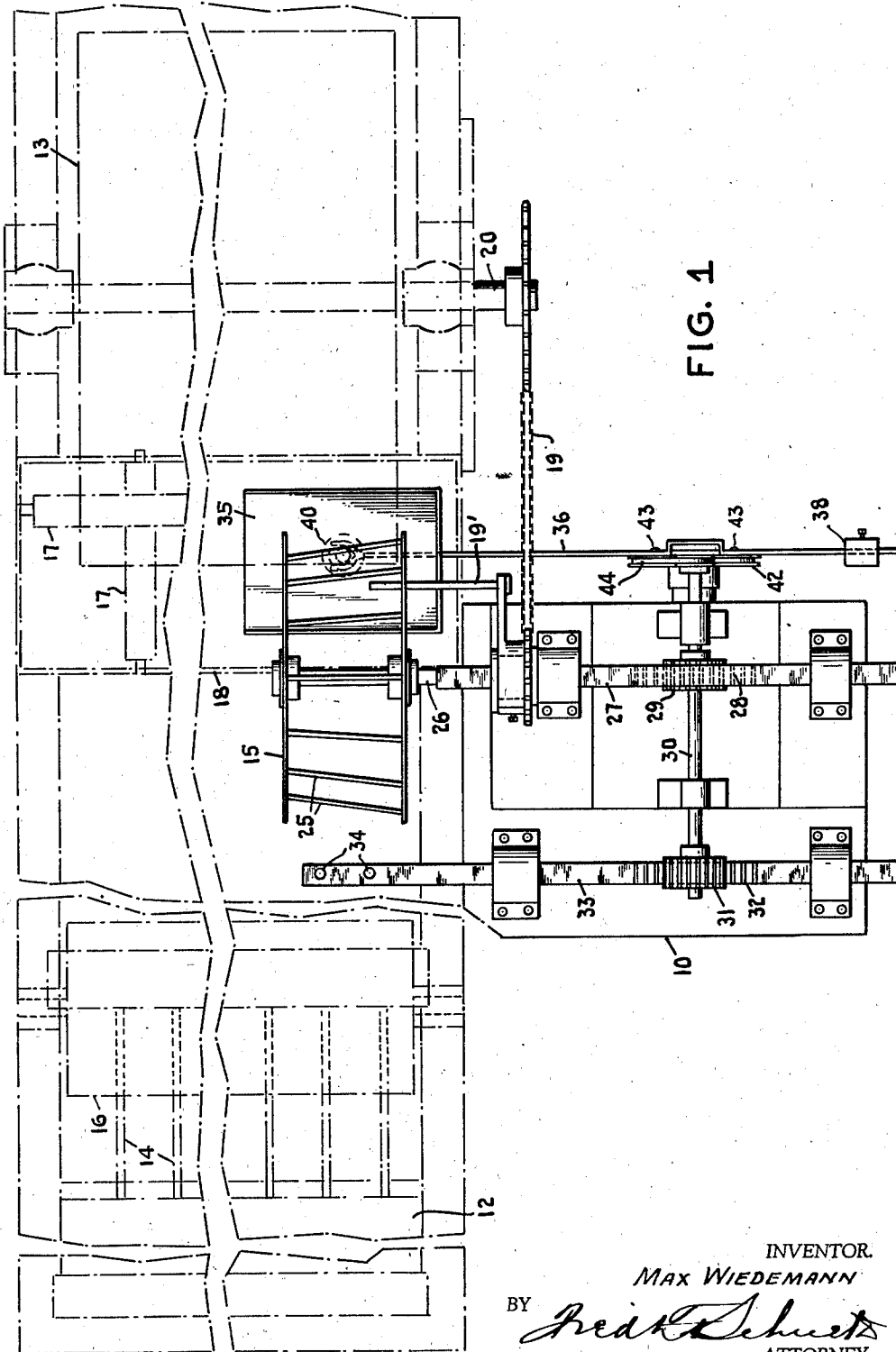
M. WIEDEMANN

2,116,494

AUTOMATIC CLOTH FEED CONTROL

Filed Sept. 22, 1937

3 Sheets-Sheet 1



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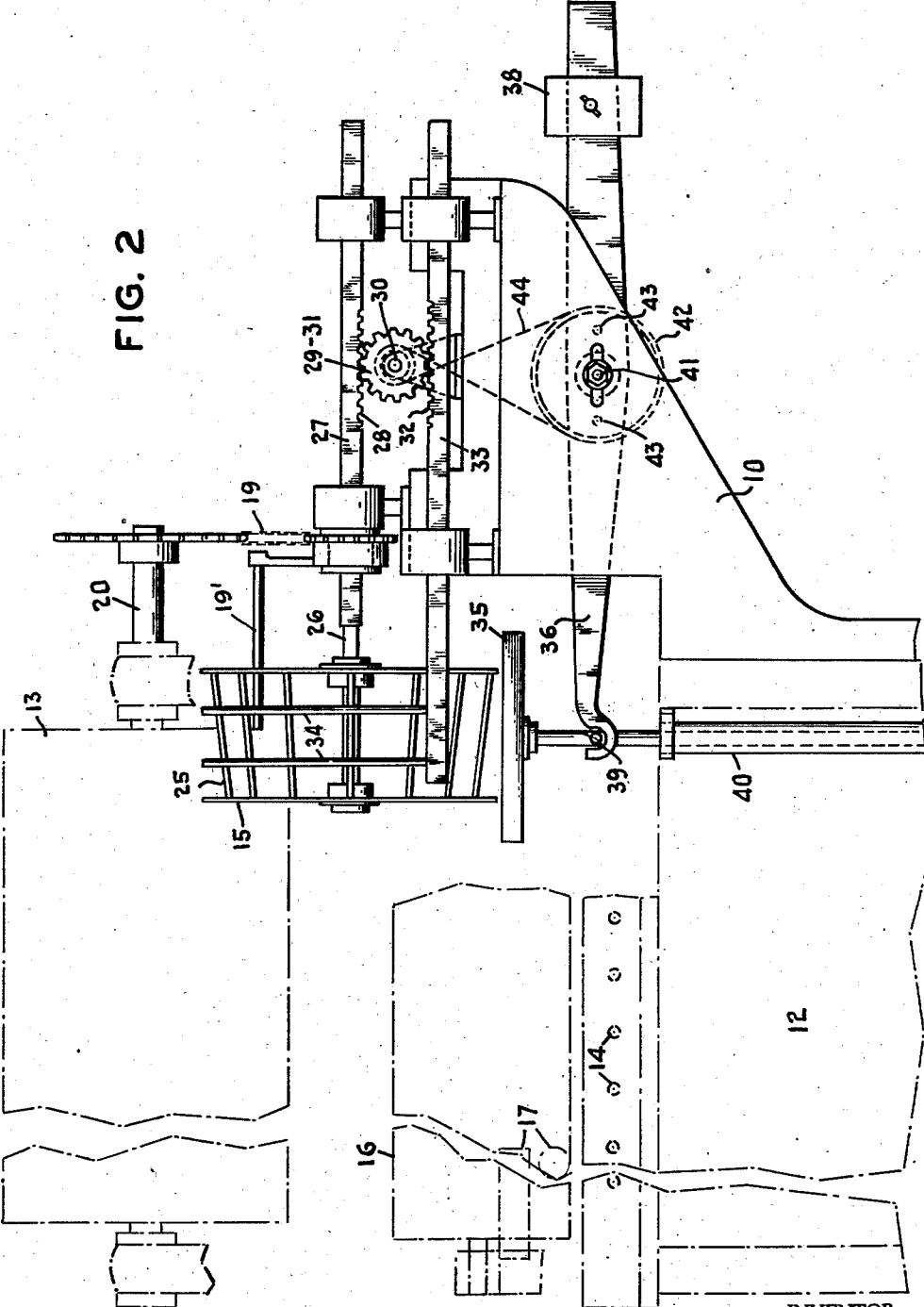
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FIG. 2



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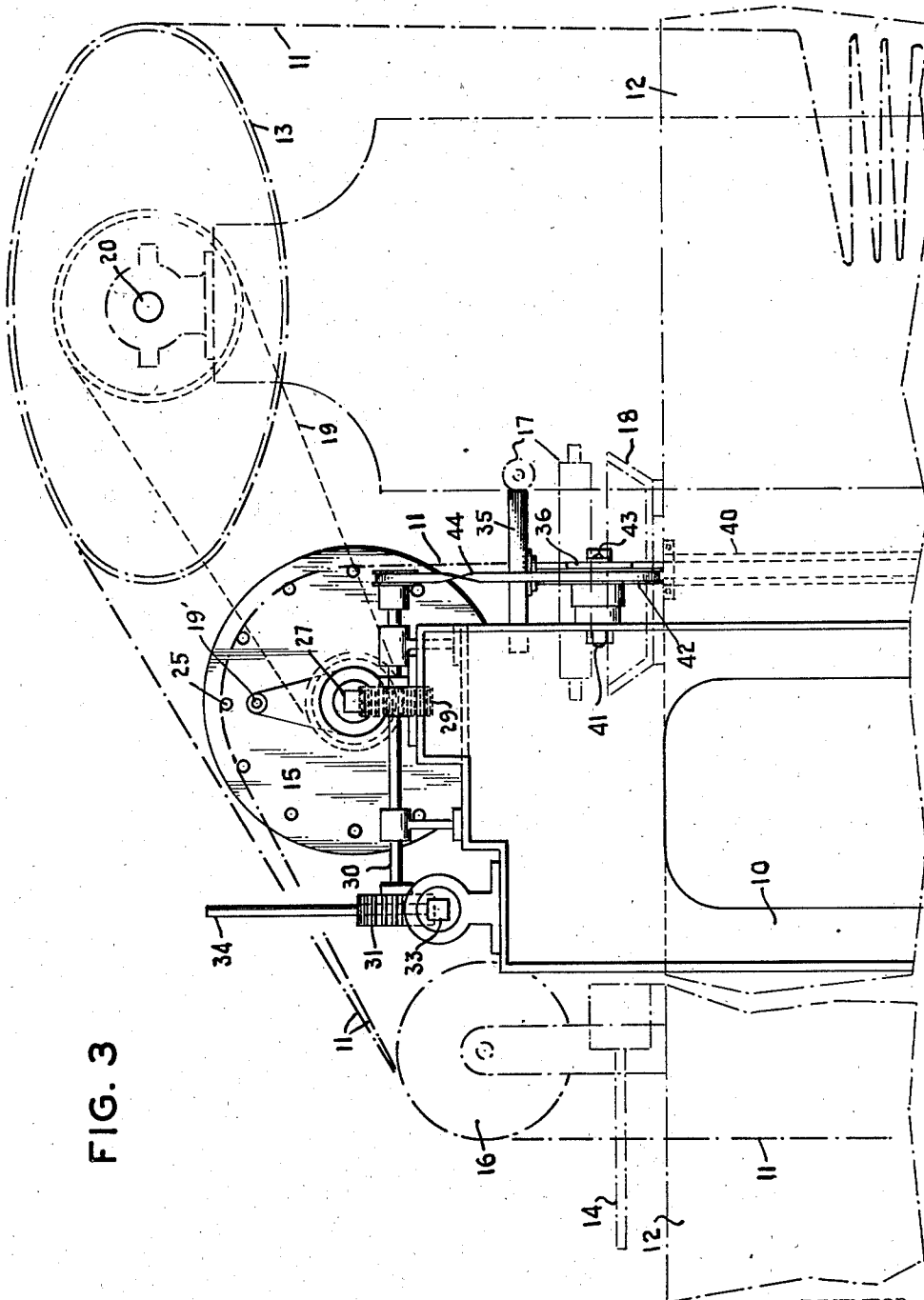
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AUTOMATIC CLOTH FEED CONTROL

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FIG. 3



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AUTOMATIC CLOTH FEED CONTROL

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12 Claims. (Cl. 68—177)

The invention relates to feeding mechanism for cloth or like material in endless bands, and more especially to apparatus for feeding the cloth through a suitable vat containing liquid, as in the dyeing of cloth. Apparatus of this nature has been devised with a reel located between the vat and the pleating reel and driven by the latter so that a continuous band of cloth may be passed through in a number of turns. Difficulty has been experienced with this form of the apparatus in connection with the feed due to resulting tension on the goods and piling up of the goods in the apparatus trough.

The invention has for an object the provision of means, in apparatus of the aforesaid type, for maintaining at all times the desired tension on the goods during its return passage, as well as to maintain a uniform feed thereof.

Another object of the invention resides in the provision of apparatus which will accommodate various weights of goods.

In carrying out the invention, the driving intermediate reel is designed to act also as a compensating reel in providing the same with a conical periphery with respect to which the cloth is displaceable as by causing the said reel to be axially adjustable, by bodily displacing the goods, or by effecting both operations. The displacement is to be effected, moreover, in accordance with the amount of material delivered by the said compensating reel, as by allowing the material in its passage from said compensating reel to the pleating reel through the usual trough to first pass upon a balance pan located in advance of said trough, the amount accumulating on the pan determining the degree of reciprocation of the reel and/or the material.

To enhance the effect of the conical drive surface of the compensating reel on the band of material passing thereover through the bodily displacement of said band, a bifurcated element is located in advance of the said reel and is likewise reciprocated under the action of the weight of the material accumulating in the balance pan, but this reciprocation, which is arranged to be parallel to the rotational axis of the compensating reel, is in a direction opposite to that of the said reel.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a dyeing vat and associated apparatus for passing material there- through shown in phantom lines, the portion em-

bodying the novel features of the invention being indicated in full lines.

Fig. 2 is a similar end view; and Fig. 3 a front view thereof, with counterweight removed.

Referring to the drawings, 10 designates a suitable frame for supporting the feed and drive mechanisms for the material which is in the nature of an endless band 11, said material being delivered into a suitable dyeing vat or tank 12 designed to contain, for example, a dyeing solution. This feed is effected from a pleating reel 13 of the usual type, the endless band passing successively between adjacently and horizontally disposed separated pins 14 located over the one end of the vat and is withdrawn from the latter by a drive reel 15. Suitable guide rolls 16 and 17 are provided to direct the band in its course through the vat; and a transverse trough or the like 18 returns the material withdrawn from the vat by the drive reel 15 to the far end of the pleating reel 13.

The said drive reel is rotated from the pleating reel 13 by means of a sprocket chain 19 and driving pin 19', said pleating reel being driven from suitable prime mover (not shown) and connected with the shaft 20 of the former. The apparatus hereinbefore described is similar to that in general use, and no claim is made to the same. However, difficulty has been experienced in connection with the passage of goods over the drive reel due to difference in the feed rate and the withdrawal rate of the goods and accumulation of the same in the vat, or to the use of goods of different weights in the same apparatus.

In accordance with the invention, provision is made to compensate automatically for any such tension changes and secure a uniform delivery from the reel 15, avoiding substantially slippage of goods with reference to said reel. This is accomplished by constructing the reel 15 of conical periphery, the slats 25 thereof being accordingly inclined, and by arranging said reel as a whole to be reciprocable axially. In addition, and to enhance the compensating action, provision is made also to move the goods bodily over the periphery of the reel and in a direction parallel to its axis of rotation. Both of these actions are made dependent upon the weight of material delivered from the reel and occur simultaneously in directions opposite to each other.

To this end, the spindle 26 on which the reel 15 rotates is connected with a reciprocable rod or bar 27 having a rack portion 28 designed to be engaged by the pinion 29 on a shaft 30. This shaft carries also a pinion 31 engaging a rack

portion 32 of a further rod or bar 33 reciprocable in a direction parallel to the rod 27 or rotational axis of the reel 15.

The arrangement is such, furthermore, that the respective pinions engage their racks at points 180° apart so that as shaft 30 is turned, reel 15 would be moved in a direction opposite to a bifurcated member constituted by pins 34 extending upwardly from the inner end of rod 33 and located in advance of the reel 15. The goods from the tank are designed to pass between these pins from guide roll 16 to the surface of the reel 15, and are shiftable accordingly along said surface but in a direction opposite to any axial movement imparted to the said reel as a whole.

Motion for securing this opposite and simultaneous reciprocation is controlled by the material being treated as the same is delivered from the reel 15 and falls, not into the trough 18 as is the customary practice, but first onto an intermediate pan 35 of a balance comprising a lever having a pan arm 36, the lever at its far end having an adjustable weight 38 to determine the amount of balancing material upon the pan 35 required to throw the balance. This pan is reciprocable in a direction at right angles to the rotational axis of the reel and a stem 39 attached to its underside engages the free end of lever arm 36 and may be guided, for example in a suitable tubular member 40 secured to the vat, in order to steady the action.

As the pan rises and falls in accordance with the weight of material thereon, the lever arm 36 will be correspondingly angularly moved; and this angular movement is communicated to the axle 41 of a wheel 42 to which said lever is secured by fastening means 43. In turn, the angular movement of the wheel is communicated by the driving means 44 to the shaft 30 of the pinions, effecting thereby the aforesaid reciprocations.

Thus, when material accumulates unduly upon pan 35 or is delivered thereto by the compensating reel 15, the said pan will be depressed together with arm 36, which will cause the rods 27 and 33 to be oppositely reciprocated in directions to carry the material to a slower rotating portion of the reel periphery. Conversely, if the amount of the material on the pan is reduced, the pan will rise and the arm 36 of the lever will be elevated, and the rods will be respectively reciprocated in the reverse directions and the material subjected to a faster rotating portion of the reel periphery. By this expedient, the feed is regulated of the material in its return to the pleating reel and objectionable tension is avoided which may cause chafe marks and color streaks. Accumulation of an excessive amount of goods in the trough, which may cause tangles, is also obviated. Furthermore, with the automatic control of the feed, some labor may be dispensed with inasmuch as a single operator could observe conveniently more than one unit.

I claim:

1. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, and means to effect a displacement of the material relatively to the periphery of the reel in passing thereover.

2. In apparatus for feeding an endless band of material through liquid contained in a suitable

vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, said compensating reel being axially reciprocable with respect to the material passing thereover to vary the force exerted thereon, and means to shift axially said compensating reel.

3. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, said compensating reel being axially reciprocable with respect to the material passing thereover to vary the force exerted thereon, and balance means upon which material from said compensating reel is received, together with intermediate mechanism actuated from the former to reciprocate the latter.

4. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, said compensating reel being axially reciprocable with respect to the material passing thereover to vary the force exerted thereon, means to shift axially said compensating reel and including a reciprocable element connected therewith, and means to shift the material over said compensating reel surface in an axial direction opposite to that in which the reel itself is shifted and including a reciprocable element bearing means engaging the band upon its opposite sides, together with means for moving simultaneously said elements in opposite directions.

5. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, a bifurcated element located in advance of the compensating reel and through which the material passes, and means to shift said element in a direction parallel to the rotational axis of the compensating reel.

6. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, said compensating reel being axially reciprocable with respect to the material passing thereover to vary the force exerted thereon, means to shift axially said compensating reel and including a reciprocable element connected therewith, a bifurcated element located in advance of the compensating reel and through which the material passes, and means to shift said element in a direction parallel to the rotational axis of the compensating reel and opposite to that in which said reel is shifted and including a reciprocable element connected with the bifurcated element, together with means for moving

simultaneously said reciprocable elements in opposite directions.

7. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel in withdrawing the material from the vat, said compensating reel being axially reciprocable with respect to the material passing thereover to vary the force exerted thereon, means to shift axially said compensating reel, a bifurcated element located in advance of the compensating reel and through which the material passes, parallel extending means connected respectively with the compensating reel and the bifurcated element, and means to move the parallel extending means simultaneously in opposite directions.

8. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel to withdraw the material from the vat, a rack connected with said compensating reel to reciprocate the same axially, a bifurcated element located in advance of the compensating reel through which the material passes, a rack connected with the bifurcated element for reciprocating the same in a direction parallel to the rotational axis of the compensating reel, and opposite to that in which the said reel is shifted, pinion means engaging at diametrically opposed points both racks, and means to rotate said pinion means.

9. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel to withdraw the material from the vat, a rack connected with said compensating reel to reciprocate the same axially, a bifurcated element located in advance of the compensating reel through which the material passes, a rack connected with the bifurcated element for reciprocating the same in a direction parallel to the rotational axis of the compensating reel, and opposite to that in which the said reel is shifted, pinion means engaging at diametrically opposed points both racks, and means subject to the weight of the material delivered from said compensating reel to rotate said pinion means.

10. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface

compensating reel for the material and driven from said pleating reel to withdraw the material from the vat, a rack connected with said compensating reel to reciprocate the same axially, a bifurcated element located in advance of the compensating reel through which the material passes, a rack connected with the bifurcated element for reciprocating the same in a direction parallel to the rotational axis of the compensating reel, and opposite to that in which the said reel is shifted, pinion means engaging at diametrically opposed points both racks, a balance pan reciprocable under the weight of material delivered thereto from the compensating reel, and a lever moved thereby and connected with said pinion means for rotating the latter.

11. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel to withdraw the material from the vat, a rack connected with said compensating reel to reciprocate the same axially, a bifurcated element located in advance of the compensating reel through which the material passes, a rack connected with the bifurcated element for reciprocating the same in a direction parallel to the rotational axis of the compensating reel, and opposite to that in which the said reel is shifted, pinion means engaging at diametrically opposed points both racks, a balance pan reciprocable under the weight of material delivered thereto from said compensating reel, a lever connected therewith, and a wheel rotated by said lever, said wheel being connected with said pinion means to rotate the same.

12. In apparatus for feeding an endless band of material through liquid contained in a suitable vat therefor, said apparatus including a rotatable pleating feed reel and guides for moving the material through the vat: a conical surface compensating reel for the material and driven from said pleating reel to withdraw the material from the vat, a rack connected with said compensating reel to reciprocate the same axially, a bifurcated element located in advance of the compensating reel through which the material passes, a rack connected with the bifurcated element for reciprocating the same in a direction parallel to the rotational axis of the compensating reel, and opposite to that in which the said reel is shifted, pinion means engaging at diametrically opposed points both racks, a balance pan reciprocable under the weight of material delivered thereto from said compensating reel, a lever connected therewith, a wheel rotated by said lever, said wheel being connected with said pinion means to rotate the same, and a weight adjustable along said lever.

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