

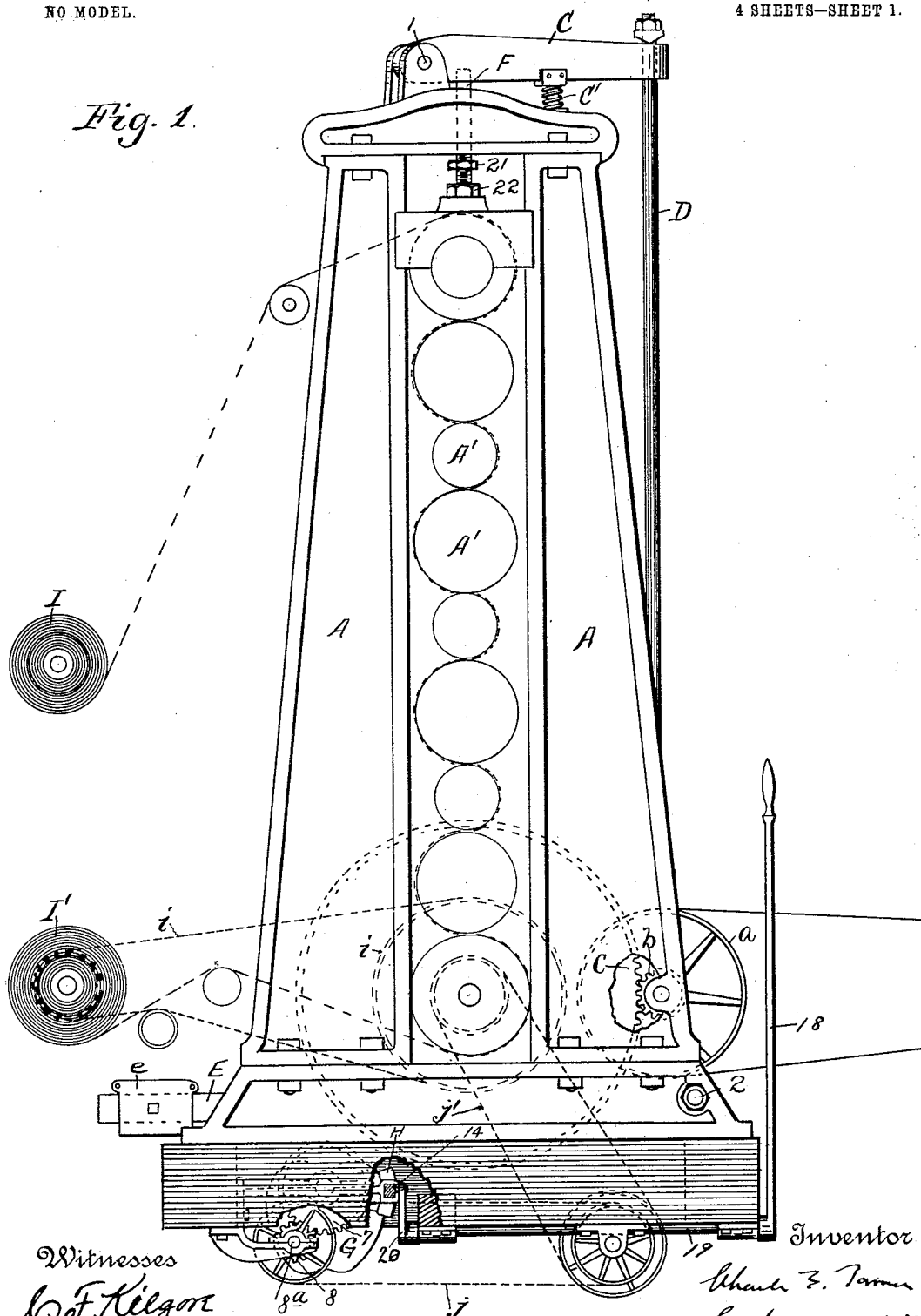
C. E. TORRANCE.
PAPER MAKING MACHINERY.

APPLICATION FILED MAY 6, 1901.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.



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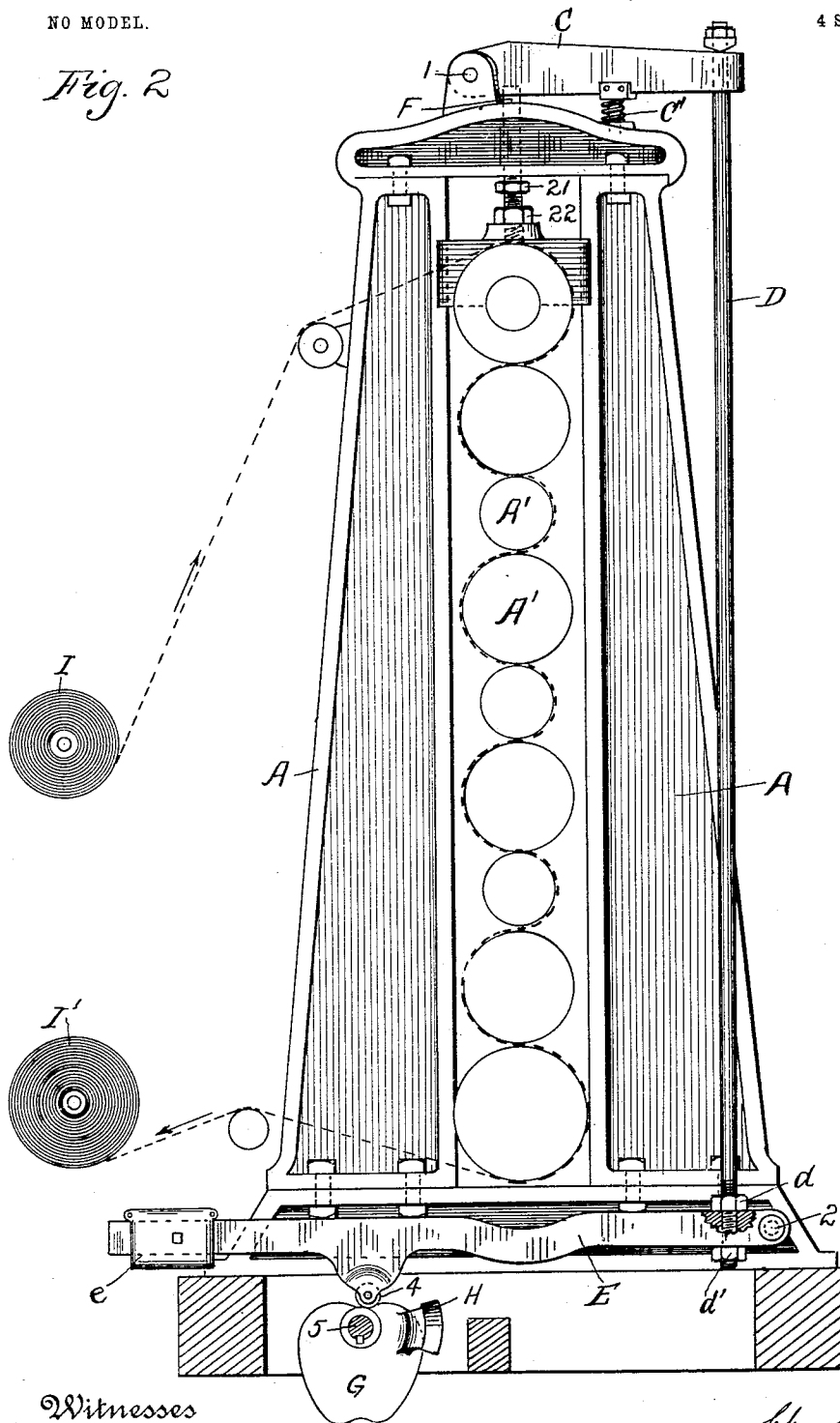
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4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

Fig. 3

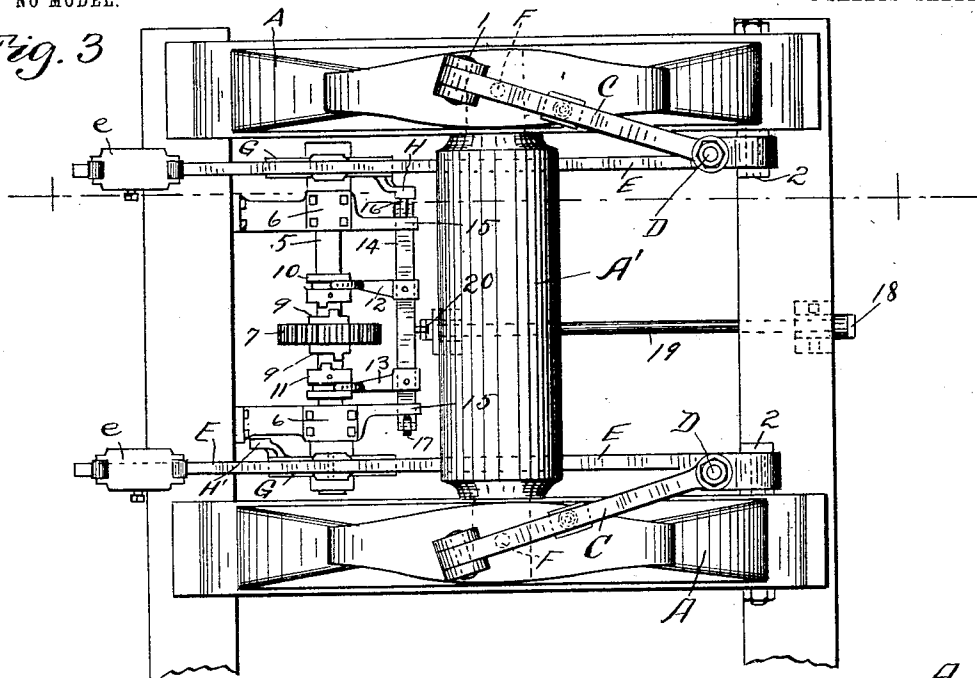
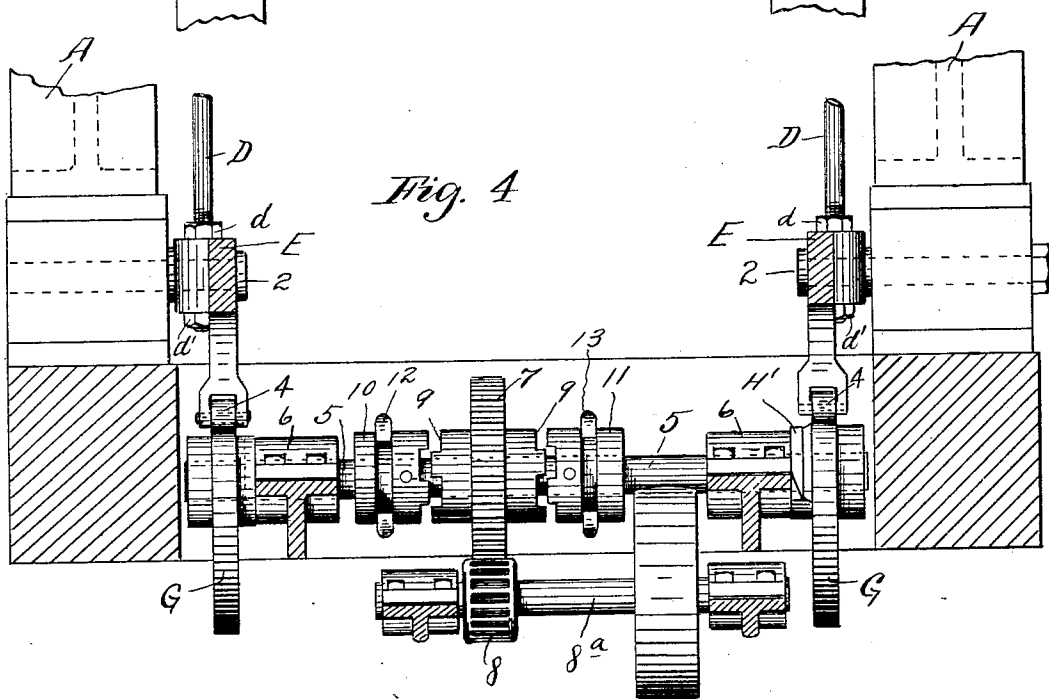


Fig. 4



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4 SHEETS—SHEET 4.

Fig. 5

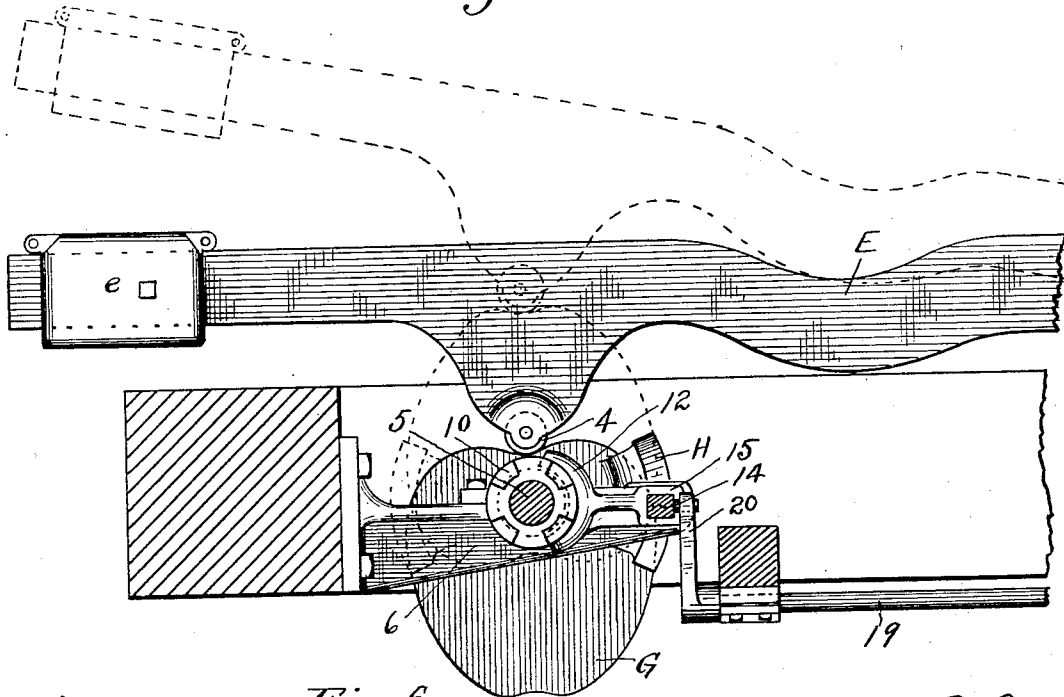
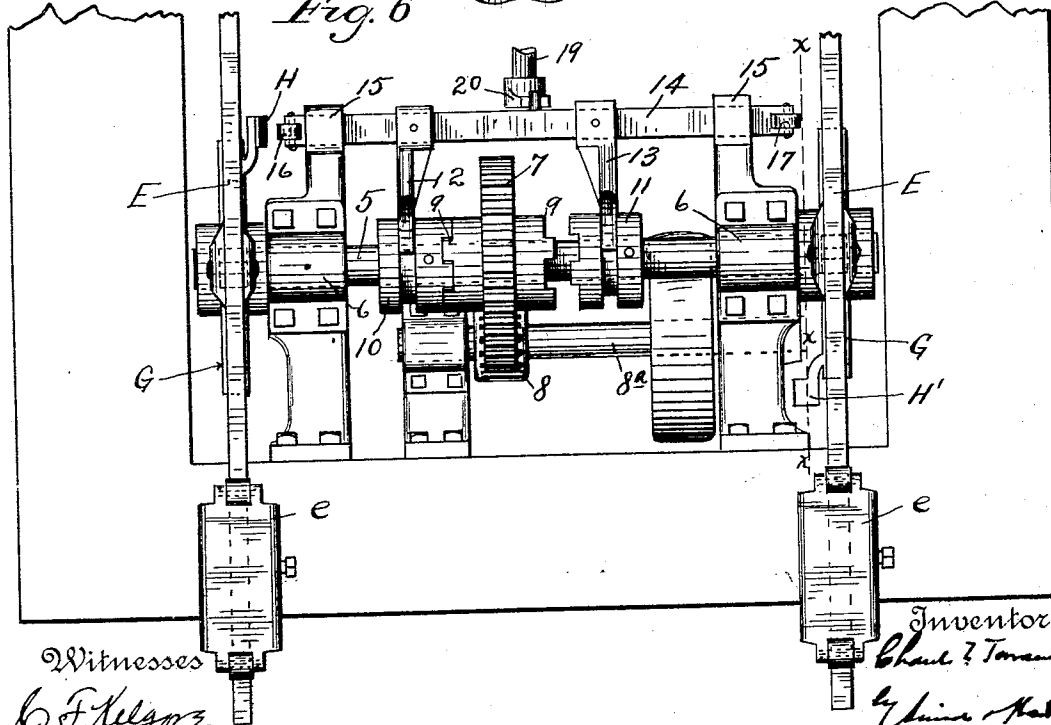


Fig. 6



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UNITED STATES PATENT OFFICE.

CHARLES E. TORRANCE, OF FLORENCE, MASSACHUSETTS.

PAPER-MAKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 735,175, dated August 4, 1903.

Application filed May 6, 1901. Serial No. 58,854. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. TORRANCE, a citizen of the United States, and a resident of Florence, Hampshire county, Massachusetts, have invented certain new and useful Improvements in Calendering Machinery, of which the following is a specification.

My invention relates particularly to the machines and mechanism used for finishing and calendering the surface of paper. It is well known that in calendering-machines the rolls are arranged one above the other and supported at each end in bearings mounted in suitable columns or supports. The bearings of these rolls are arranged to have a limited amount of vertical movement, so that the rolls may be free to move up and down to vary the pressure. This is necessary because of the fact that the finish on the surface of the paper is determined by the pressure to which it is subjected when passing between the rolls. It has been the common practice heretofore to apply this pressure to the bearing-boxes of the rolls at each end thereof separately and directly by hand. The chief objections to this method are that it is very difficult to get the pressure at both ends of the rolls the same and, further, that a considerable amount of time is consumed in obtaining the proper adjustment of the pressure, and the finish on a considerable length of the paper is irregular and causes a great deal of waste and loss.

The object of my invention is primarily to provide means for applying and releasing the pressure on the rolls in the shortest possible time.

The further object is to provide means for taking up the wear which may occur on the rolls.

Figure 1 of the drawings shows a side elevation of a calendering-machine of ordinary construction to which my improvement is applied, showing the power connections for driving the machine. Fig. 2 is a sectional side elevation showing how my invention is applied. Fig. 3 is a plan view showing the shipper-shaft and the cam-shaft. Fig. 4 is a front view of the cam-shaft and its driving connections looking in the direction of the arrow in Fig. 3. Fig. 5 is a view, on enlarged scale, of the cam and the weight-carrying lever op-

erated thereby. Fig. 6 is a detail, on enlarged scale, of the actuating mechanism shown in Fig. 3, but showing one of the clutches in engagement with the driving-gear.

Referring to the drawings, A A denote the columns of a calendering-machine of ordinary construction, having the rolls A' mounted in the customary manner, motion being imparted to the rolls from a source of power by the belt-pulley *a*, pinion *b*, and gear *c*. Levers C are pivoted to the top of the columns, as at 1, and are connected at their free ends by the rod D to levers E, which levers are pivoted to the base of the machine, as at 2. Lever E carries at its free end the weight *e*. It will be noted by reference to Fig. 3 that the lever C is positioned somewhat at an angle to the columns, as shown in Fig. 3. The lever C rests on one end of the pin F, the opposite end of the pin being connected with the bearing-boxes of the rolls, as shown in Fig. 2.

It will be noted that the rod D is connected to the lever E between its pivotal point and the weight *e* and that by this arrangement the weight *e*, through the rod D, lever C, and pin F, exerts a pressure on the rolls. As is clearly shown in Figs. 2 and 5, this lever E carries a roller 4, which rides on a cam G.

The shaft 5 is mounted in suitable bearings, as at 6, preferably under the machine, and has secured to each end the cams G, as shown in Figs. 2, 3, 4, 5, and 6. The rollers 4, mounted in the lever E, ride on the peripheries of these cams. A gear 7, having clutch-faces 9 formed on each side of its hub, is loosely mounted on this shaft 5 and is in engagement with a pinion 8, mounted on the shaft 8^a. The rolls A' receive their motion from a source of power through the pinion *b* and gear *c*, and the shaft 8^a receives its motion through the belts *j'* and *j*, so that when the machine is in operation the pinion 8 and the gear 7, which meshes with it, are in continual motion. Clutch members 10 11 are keyed to the shaft 5—one on each side of the gear—and are adapted to be moved into engagement with the clutch members on the gear 7 by the shippers 12 13, attached to a shipper-shaft 14, which is supported in suitable bearings 15. In each end of the shipper-shaft are mounted rolls 16 17. On the oppos-

ing sides of the cams G are secured to the shaft 5 the cams H H', so positioned that when the cams G are secured to the shaft 5 the cams H H' will be diametrically opposite each other.

5 The shipper-shaft 14 is connected to an operating-lever 18 through the shaft 19 and the crank-arm 20, secured to the end thereof. As shown in the drawings, this lever is arranged to be operated by hand; but it is evident that
10 it could equally be arranged to be moved by the foot of the operator.

The unfinished paper is carried on the roll I and moves from it in the direction indicated by the arrow in Fig. 2 around and between
15 the calendering-rolls, as indicated by the dotted line, and the finished paper is carried off onto the roll I'. This roll I' receives its motion through the belt i from the pulley i' .

The operation of my invention is as follows:
20 Presuming the machine to be in operation with the rolls under pressure, the levers E and the cams G would occupy the positions shown in Fig. 2 of the drawings, and the relative positions of the shipper-shaft and the
25 cam-shaft would be as shown in Figs. 3 and 4 of the drawings, both of the clutches 10 11 being out of engagement with the clutch-faces of the gear 7 and the roller 16 in the end of the shipper-shaft resting against the face of the cam H in the position shown in Fig. 5.
30 To remove the pressure from the rolls, the lever 18 is moved to one side. The crank-arm 20 at the end of the shaft 19 moves the shipper-shaft to the right, throwing the clutch 10 into engagement with the gear 7, as shown in
35 Fig. 6. When the parts are in this position, the roller 17 in the end of the shipper-bar is in the line of movement of the lowest part of the cam H', as shown by the dotted line marked
40 $x x$. Clutch 10, engaging the clutch-face on the continuously-revolving gear 7, causes the cam-shaft to rotate, carrying with it the cams G G', on which are the cams H H'. When cam H' comes in contact with the roll 17, it gradually moves the shipper-shaft until the clutches
45 disengage, thus stopping the rotation of the shaft 5. The cams G G' and the levers E will then occupy the positions as shown by dotted lines in Fig. 5, and the relative positions of
50 the shipper-shaft and the cam-shaft will be as shown in Figs. 3 and 4. When the lever E is raised by this partial revolution of the cam G, it carries with it the rod D, thus removing the pressure at the free end of the lever C, and
55 the spring C', acting upwardly against the under side of the lever C, relieves the pressure on the pin F and the rolls. To put the rolls under pressure again, it is only necessary to throw the lever 18 in the opposite
60 direction until clutch 11 engages the clutch-face on the gear 7. The roller 16 in the end of the shipper-shaft will then be in the line of movement of the lowest part of the cam H, and when this cam comes in engagement with
65 the roller it will move the shipper-shaft until the clutch 11 is disengaged from the gear 7, when the cam-shaft will cease revolving. The

levers E and the cams G G' will then occupy the position as shown in full lines in Fig. 5. From this description it must be evident that
70 the time consumed in applying or releasing the pressure on the rolls is reduced to a minimum and that all the work can be accomplished with perfect ease by one man, who
75 by means of a lever throws one or the other of the clutches 10 11 into engagement with the gear 7. The rest of the operation of applying or releasing the pressure and stopping at the proper time is taken care of effectually
80 by the mechanism described.

The weight e is mounted on rollers on the lever E, so that its distance from the pivotal point of the lever may be altered at will. Any
85 suitable means may be used for securing the weight in place on the lever.

The rod D passes through the lever E and has nuts $d d'$ screwed down on each side of the lever E, thus causing said rod to move
with the lever.

It is customary to make the alternate rolls
90 in these calendering-machines of a composition of some sort which is liable to be worn down by continual use, and it is therefore necessary to have some means of adjustment to take up this wear. In Fig. 2 of the draw-
95 ings the pin F is shown threaded at its lower end into the bearing-box of the roll, and lock-nuts 21 22 are provided to secure the pin in any position desired. In case some of the
100 rolls wear down it is necessary to take this wear up, which is done by screwing the pin F back out of the box a sufficient amount and lock it into position by the lock-nuts.

In Figs. 1 and 5 the crank-arm which operates the shipper-shaft is clearly shown.

I do not intend to limit myself to the exact
105 arrangements of the parts as shown in the drawings, as it is evident that many alterations and changes could be made without materially altering the work of the machine.

I claim as my invention—

1. In a machine of the class specified, the combination with the columns and rolls suitably mounted therein, of lever-operated pressure devices for the rolls, mechanism for con-
115 trolling said pressure devices, means for manually setting said mechanism in motion and automatically-operated means for stopping said mechanism.

2. In a machine of the class specified, the
120 columns and rolls suitably mounted therein, weights arranged to exert pressure at each end of the rolls, cams mounted on a shaft and adapted to control the movement of the weights, means for manually setting said
125 cams in motion and automatic means for stopping said cams.

3. In a machine of the class specified, mechanism independent of the rolls for applying and releasing the pressure thereon, means
130 for manually throwing in the power connections for operating said mechanism, and automatically-operated means for disengaging said power connection.

4. In a machine of the class specified, the columns, the rolls suitably mounted therein, pressure devices for said rolls, and means for operating said pressure devices, comprising a shaft suitably mounted, cams carried on said shaft and adapted to control the movement of said pressure devices, a continuously-rotating gear mounted on said shaft, clutches geared thereto, means for throwing one or the other of said clutches into engagement with the gear, and means for automatically disengaging the clutch and gear, substantially as described.

5. In a machine of the class specified the columns, rolls suitably mounted in said columns, pressure devices for said rolls and means for applying and removing the pressure from the rolls, comprising a shaft mounted in suitable bearings, cams secured to said shaft and adapted to control the movement of said pressure devices, clutch connections between a source of power and said shaft, means for manually throwing in said clutch connections, and means for automatically disengaging them.

6. In a machine of the class specified the columns, rolls suitably mounted therein, weights arranged to exert a pressure at each end of the rolls, a shaft mounted in suitable bearings, cams secured to this shaft and arranged to control the movement of the weights, a gear loosely mounted on said shaft and having clutch-faces on each side of its hub, clutch members keyed to the shaft and adapted to engage the clutch-faces on the gear, manually-operated means for throwing one or the other of these clutches into engagement with the gear, and means for automatically disengaging said clutch connections.

7. In a machine of the class specified the columns, rolls suitably mounted in the columns, weights adjustably mounted on levers and arranged to exert the pressure on the ends of said rolls, a shaft mounted in suitable bear-

ings, cams secured to said shaft and engaging the weight-carrying lever, clutch connections between a source of power and said shaft, means for manually throwing said clutch connections into engagement, and cams built upon the first-named cams and adapted to disengage said clutch connections, substantially as described.

8. In a machine of the class specified the combination with the columns, rolls suitably mounted therein and weights arranged to exert pressure upon the ends of the rolls, of a rotatable shaft mounted in suitable bearings, a driving-gear loosely mounted on said shaft having clutch-faces on each side of its hub, clutches keyed to said shaft and adapted to engage said clutch-faces on the gear, cams secured to each end of said shaft, a shipper-bar connected with the clutches, means for manually moving said shipper-bar to engage one or the other of the clutches with the gear, and means for automatically moving said shipper-bar to disengage the clutches, substantially as described.

9. In a machine of the class specified the combination with the columns, rolls suitably mounted therein, weights carried by levers and adapted to exert a pressure on the ends of the rolls, a shaft mounted in suitable bearings, clutch connections between the shaft and a source of power, cams secured to each end of said shaft, rollers mounted in said levers and adapted to rotate on the periphery of said cams, a shipper-bar for the clutches, means for manually throwing in the clutch connections and the second set of cams secured to the lever-operating cams and adapted to engage the shipper-bar to throw out the clutch connections, substantially as described.

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