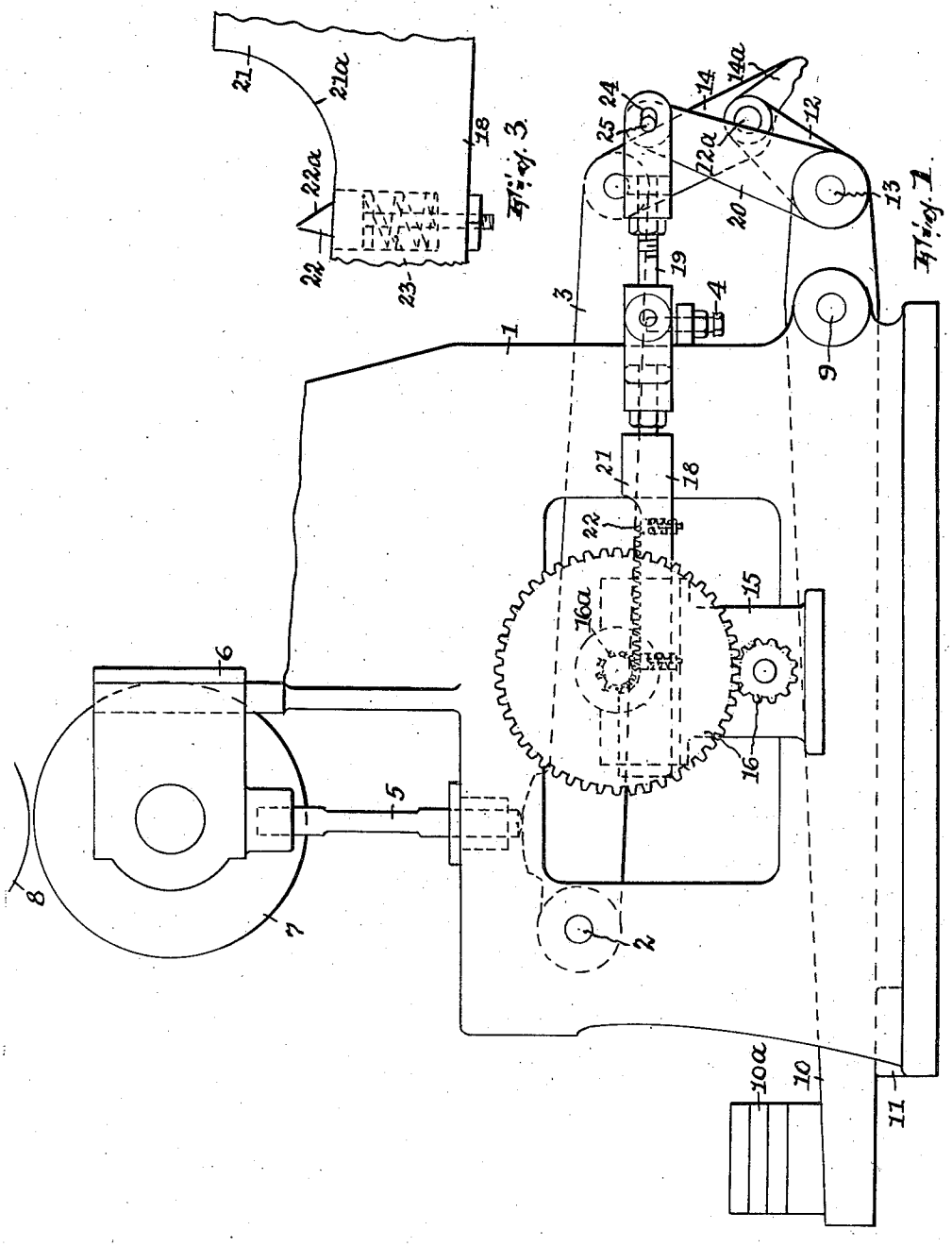
April 3, 1945. M. G. HINNEKENS 2,373,027

CALENDER MACHINE

Filed June 2, 1944 2 Sheets-Sheet 1



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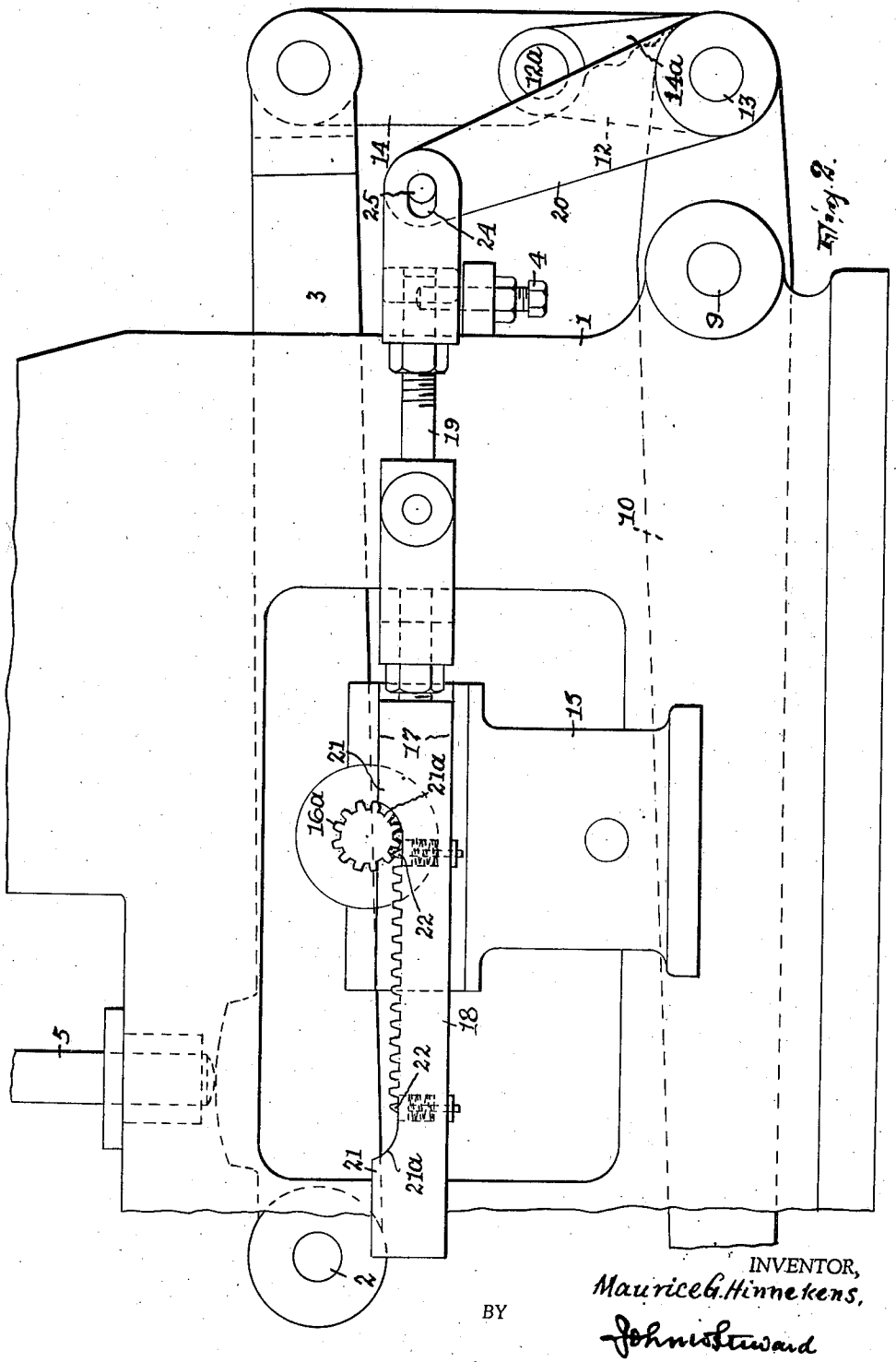


Fig. 2.

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CALENDER MACHINE

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2 Claims. (Cl. 74—422)

This invention consists in a novel combination of parts for moving a load to and from a given position. It is set forth herein in its application to a calender machine, to wit, in which the load to be moved includes the lower calender roll movable into cooperative or calendering relation to an upper calender roll. But the invention is not to be regarded as thus limited.

In the drawings,

Fig. 1 is a side elevation of said machine embodying the invention;

Fig. 2 is a similar elevation of the critical parts involved in the invention; and

Fig. 3 is a fragmentary side elevation of the rack and latch.

In a frame or supporting structure 1 is fulcrumed at 2 a pair of levers such as 3 of the second class adapted to rest on adjusting screws 4 and, through plungers 5, supporting a pair of carriers or slides 6 in which is journaled the lower calender roll 7 adapted, when the levers are raised, to abut the upper calender roll 8 assumed to be suitably journaled in the supporting structure.

In said structure at 9 is fulcrumed a pair of levers 10 of the first class weighted at 10*a* and adapted to seat on rests 11. Connecting the short arms of these levers with the levers 3 is a pair of toggle-joints, the lower members of which are cranks 12 fast to a shaft 13 journaled in said short arms and the upper members are links 14 pivoted on a shaft 12*a* fast to the cranks 12. When the toggle-joints are articulated in the direction to extend them, or from the position of Fig. 1 to that of Fig. 2, their members may thus pass the dead-center relation to each other whereupon the motion is checked by contact of an arm 14*a* of shaft 12*a* with the hubs of the cranks. During such articulation the lower roll abuts the upper roll and is thus checked in its rise, whereupon the toggle-joints act to depress the short arms of the levers so that the weights 10*a* act to cause the lower roll to exert an augmented yielding pressure on the upper roll. So much characterizes a conventional type of calender machine. The moving parts referred to provide in the present case what I term the load. In the use of such a machine the occasion to move the lower roll to and from calendering relation to the upper roll is frequent and the load is of considerable weight. Usually the operation is performed by hand, that is, through the medium of an arm or crank affixed to the shaft 13. According to this invention the motion is effected by power derived from a reversible motor. Thus:

A reversible electric motor 15 is mounted on the near side of the frame and has reversibly driven gearing 16 including a driving gear 16*a*. Arranged to slide lengthwise of itself in the frame, as in suitable guides at 17, is a rack 18 in mesh with the gear. It is equipped with a pivoted link 19 by which it is connected with a crank 20 fast to the shaft 13. The teeth of the driving gear and those of the rack are all of conventional form and equally spaced. The length of the series of teeth of the rack is only such as, when the gear drives the rack in either direction, to move crank 12 from one to the other of its limits defined by contact of levers 3 with the screws or rests 4 on the one hand and contact of arms 14*a* with the hubs of cranks 12. The rack has, projecting in the same direction as and alined with its teeth and spaced from its end teeth, abutments 21, preferably providing concave surfaces 21*a* adjoining said end teeth. The spacing of each abutment from the adjoining end tooth is only sufficient so that when the rack is positioned so that the space between such tooth and the abutment registers with the driving gear the latter may rotate idly, by which I mean in the absence of an expedient now to be referred to. Alined with and positioned between each end tooth and the adjoining abutment and projecting in the same direction as the teeth of the rack is a latch 22 which is yieldingly supported against displacement in the opposite direction, as by a spring 23, and is spaced from said end tooth substantially the same as the teeth of the rack are spaced from each other. This latch has a camming surface 22*a* facing away from the adjoining end tooth and arranged to be wiped by the teeth of the driving gear when the latter is turned in the rotative direction in which those teeth of the gear which immediately adjoin the rack pass first the abutment and then said tooth.

In Fig. 1 the load is in retracted state, levers 3 and 10 being seated on the rests 4 and 11, respectively, and the toggle-joints in collapsed state, the rack being displaced to the right so that the driving gear occupies the space between the left-hand abutment and the adjoining end tooth. If the driving gear continues to rotate in the direction (anticlockwise) in which it caused shifting of the rack to the right it will do so without continuing such shifting, its teeth clicking idly past the left-hand latch. But if the direction of rotation of the driving gear be now reversed a tooth thereof will positively engage the latch and thereby shift the rack to the left sufficiently to bring the first near tooth

thereof into position to be engaged by the gear and thus initiate displacement of the rack by the gear to the left in the conventional way. When the rack has been thus shifted until the space between its right-hand abutment and adjoining end tooth registers with the gear the latter will idle as before, the gear clicking past such latch.

Consider the rack as connected with the load and with regard to its function of shifting the load in either direction. If the connection did not afford some lost motion the latch would be subject to strain likely to cause its fracture or other incapacitation. Hence I provide for necessary lost-motion as between the rack and the load, to wit, sufficient to permit the latch to move the rack so as to bring the first adjoining tooth into the path of a tooth of the gear. For this purpose there is shown in the link 19 a slot 24 receiving the pin 25 by which said link is pivotally connected with the crank 20 and of a length approximately equal to the spacing of the rack teeth. In other words, consider the rack as adapted, for instance, to move to the left in Fig. 1 to displace the load: it may be regarded as having, afforded by the right-hand end of the slot, means to abut the load only after the first right-hand tooth has been engaged by the gear on rotation of the latter in the appropriate direction, or here clockwise.

Having thus fully described my invention, what I claim is:

1. The combination of supporting structure, a reversibly rotative driving gear journaled therein, a rack confined to slide lengthwise of its series of teeth in said structure and having an abutment projecting in the same direction as and alined with said teeth and spaced from one end tooth only sufficiently so that when the rack is positioned so that the space between said tooth and abutment registers with the gear the latter may rotate idly, and a latch arranged in the rack and alined with and positioned between said tooth and abutment and projecting in the same direction as said teeth and yieldingly supported against displacement in the opposite direction and spaced from said tooth substantially the same as said teeth are spaced from each other and having a camming surface facing away from said tooth and arranged to be wiped by the teeth of said gear when the latter is turned in the rotative direction in which those teeth thereof which immediately adjoin the rack pass first the abutment and then said tooth, said gear being arranged to mesh with the rack.

2. The combination, with supporting structure, a reversibly rotative driving gear journaled therein, a rack confined to slide lengthwise of its series of teeth in said structure and having an abutment projecting in the same direction as and alined with said teeth and spaced from one end tooth only sufficiently so that when the rack is positioned so that the space between said tooth and abutment registers with the gear the latter may rotate idly, and a latch arranged in the rack and alined with and positioned between said tooth and abutment and projecting in the same direction as said teeth and yieldingly supported against displacement in the opposite direction and spaced from said tooth substantially the same as said teeth are spaced from each other and having a camming surface facing away from said tooth and arranged to be wiped by the teeth of said gear when the latter is turned in the rotative direction in which those teeth thereof which immediately adjoin the rack pass first the abutment and then said tooth, said gear being arranged to mesh with the rack, of a load to be moved by the rack movable in said structure, said rack having means to abut the load and thereby move the same only after a tooth of the gear, on rotation of the latter in the opposite rotative direction, has engaged said tooth of the rack.

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