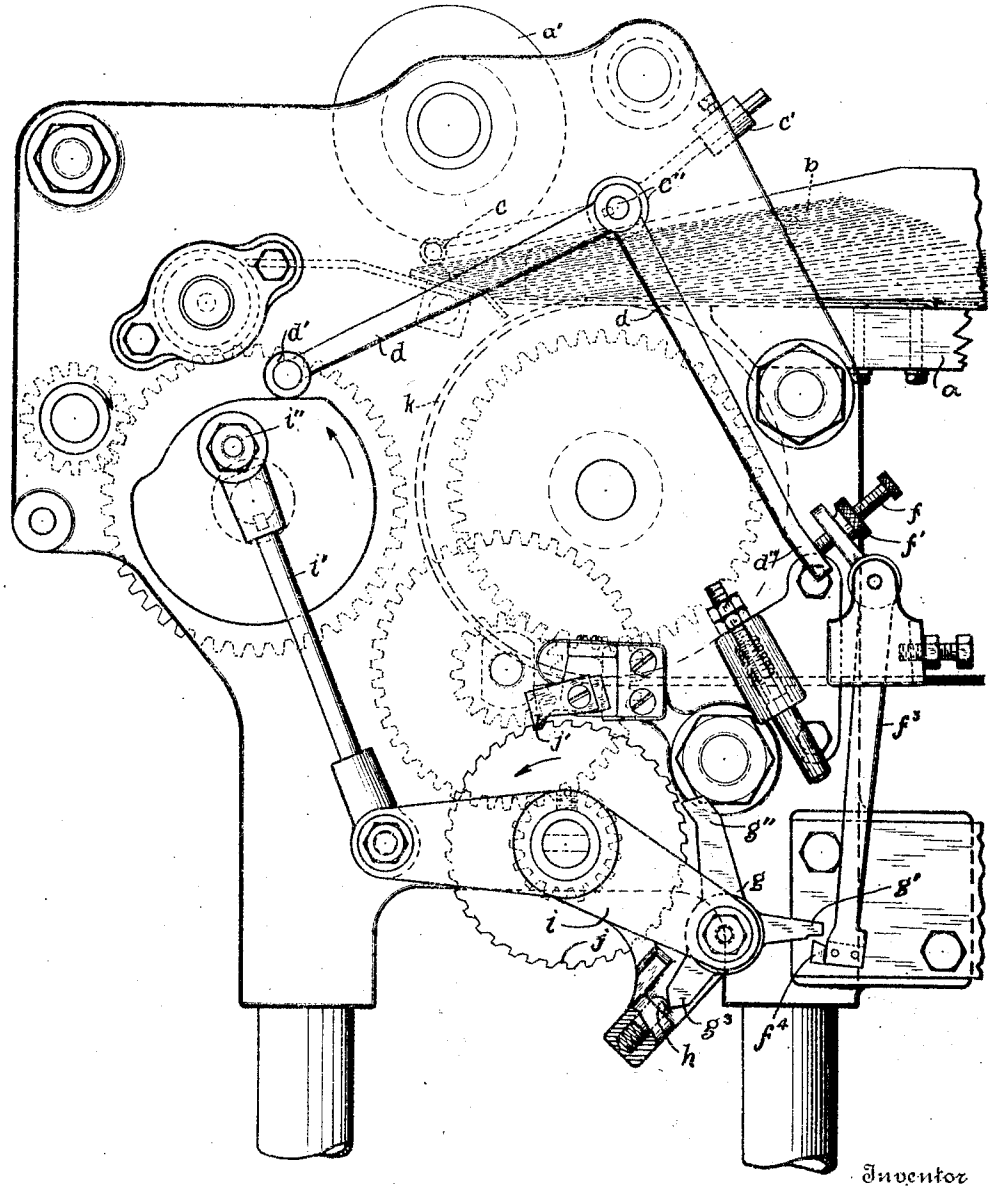
July 6, 1926. 1,591,546

A. OLSON

SHEET FEEDING MECHANISM

Filed March 20, 1925 6 Sheets-Sheet 1

FIG. 1.



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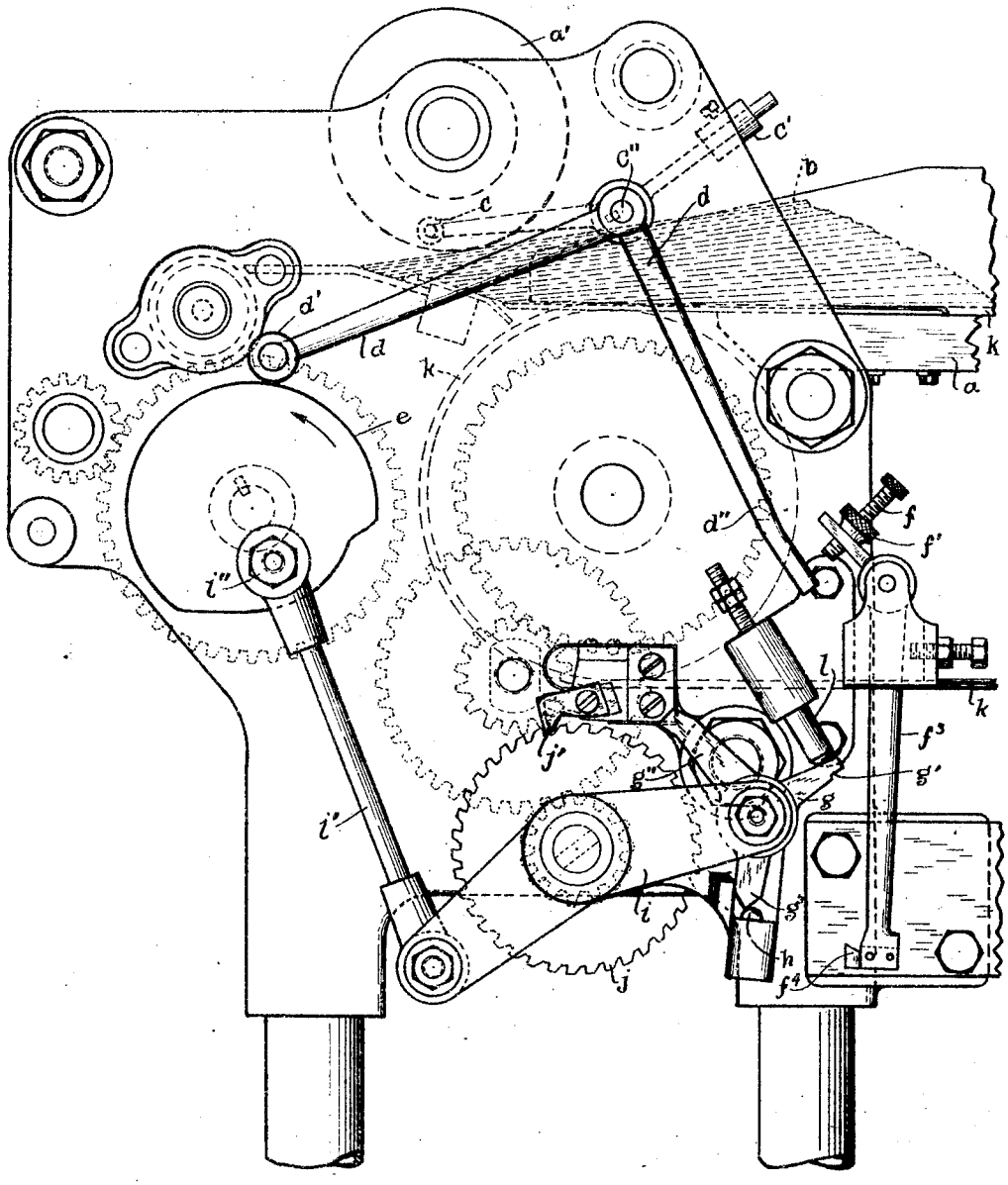
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SHEET FEEDING MECHANISM

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Fig. 2.



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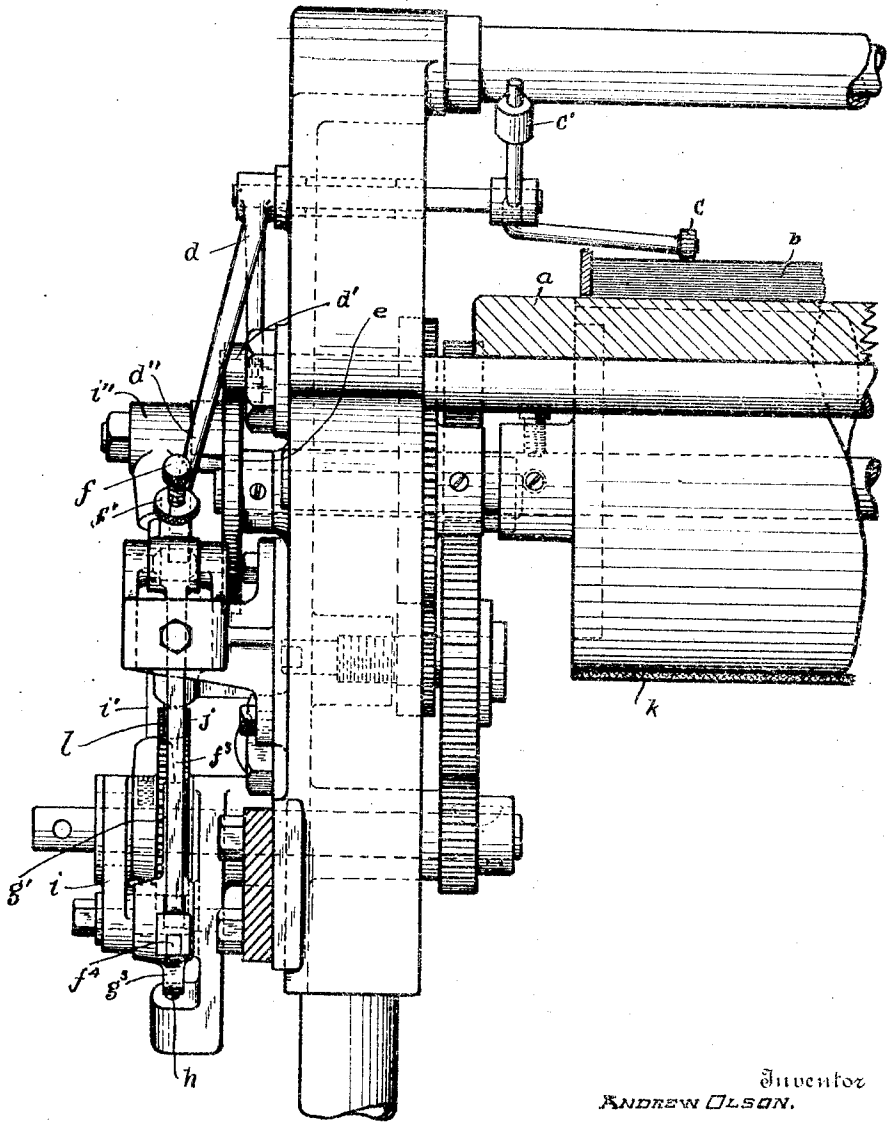
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6 Sheets-Sheet 3

FIG. 3.



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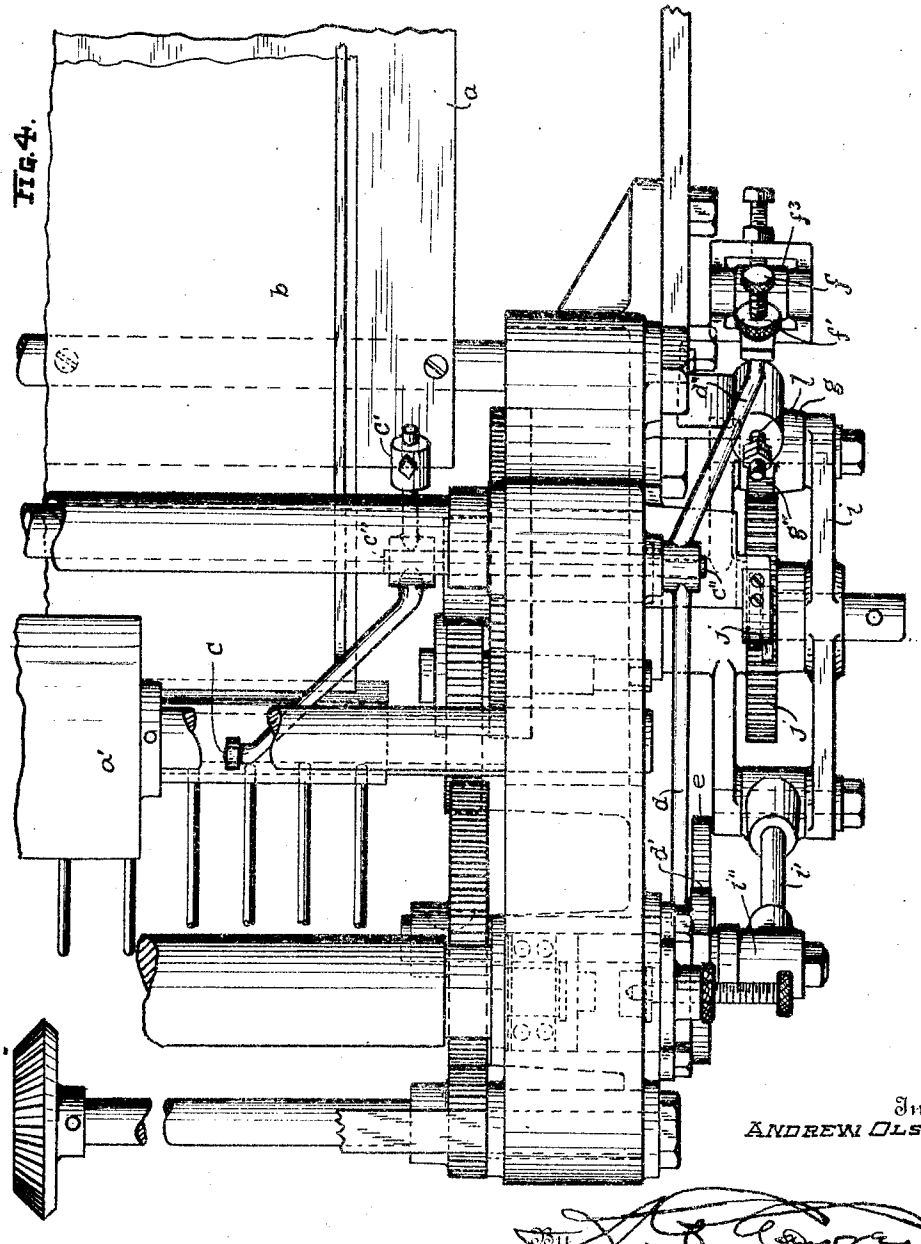
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SHEET FEEDING MECHANISM

Filed March 20, 1925 6 Sheets-Sheet 4

FIG. 4.



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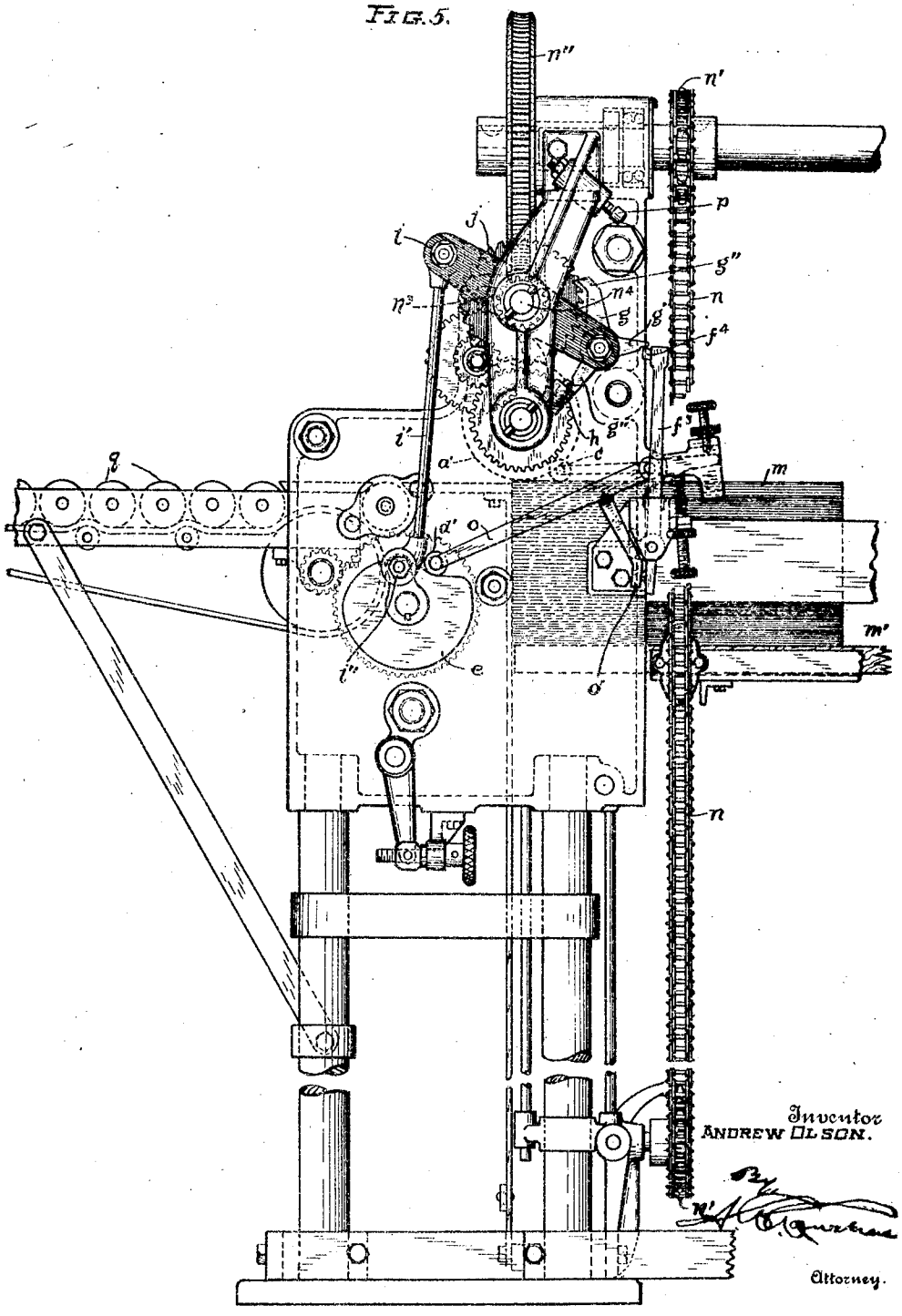
July 6, 1926. 1,591,546

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SHEET FEEDING MECHANISM

Filed March 20, 1925 6 Sheets-Sheet 5

FIG. 5.



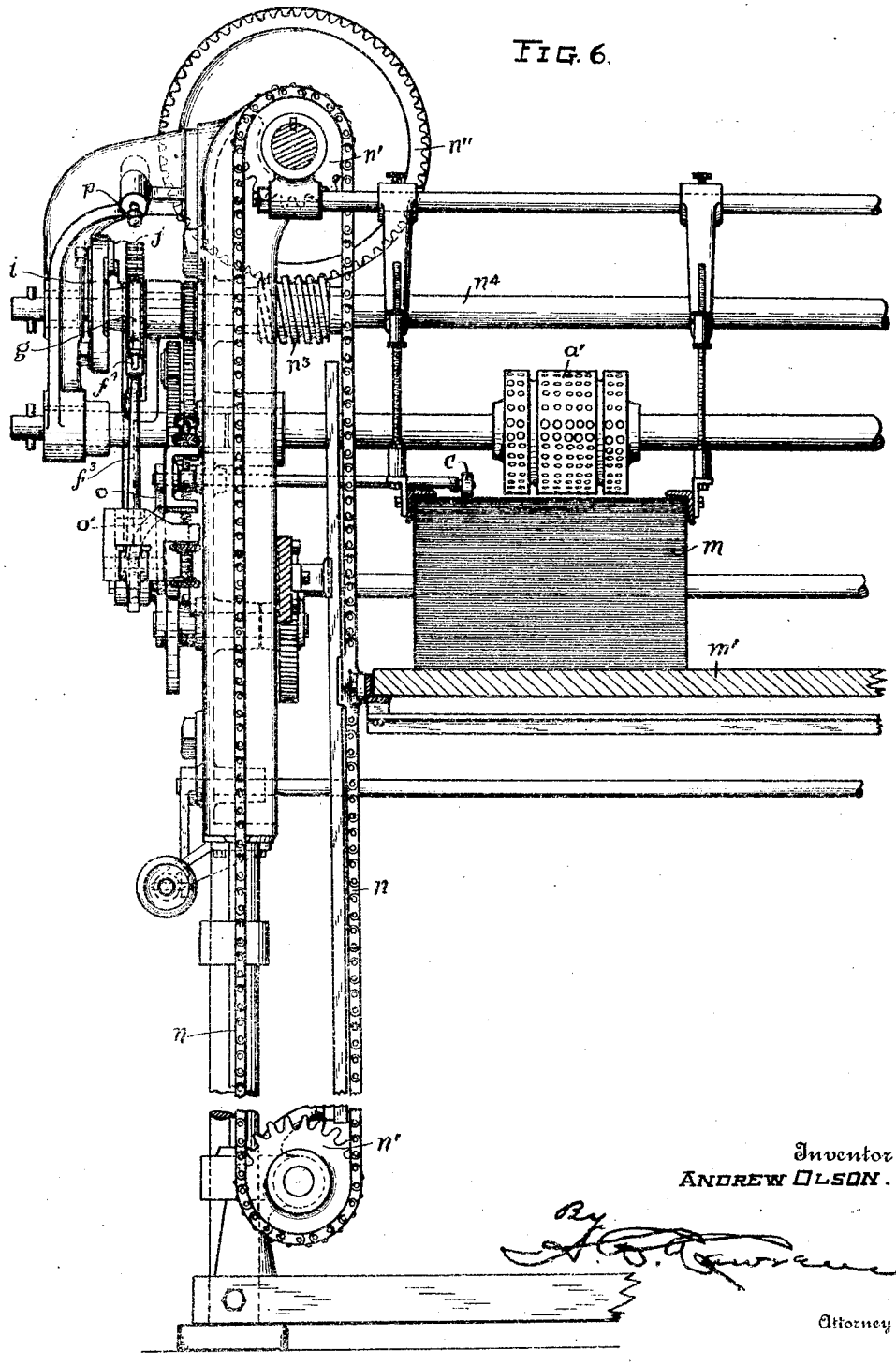
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SHEET FEEDING MECHANISM

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FIG. 6.



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UNITED STATES PATENT OFFICE.

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SHEET-FEEDING MECHANISM.

Application filed March 20, 1925. Serial No. 16,989.

My invention relates to improvements in sheet feeding mechanism and more particularly to the sheet testing and advancing means thereof; the object of my invention being the provision of simple and dependable mechanism affording the closest adjustment for controlling the advance or presentation of the sheets of paper to a sheet feeding appliance.

My improvements are applicable to various types of sheet feeding mechanism and I have herein disclosed them in connection with sufficient apparatus of a continuous feeder and of a pile feeder to explain the general features and advantages thereof.

A common type of a similar appliance generally used in the art comprises a sheet detector or testing mechanism which rests upon the pile of paper and serves to prevent the movement of actuating means for a ratchet wheel adapted otherwise to effect the advance of the paper intermittently to the feeding mechanism. Therein the pawl mechanism for the ratchet wheel is positively detained from movement through the operation of the associated sheet detector, while a terminally slotted connecting rod normally remains inoperative for actuating said ratchet wheel.

My present invention comprises a suitable sheet detector associated with means for accomplishing frequent intermittent testing of the sheets immediately presented to the feeding mechanism. This testing means is directly associated with a member permissively actuating into operative relation the pawl of positively and continuously operated means for advancing the paper, which pawl invariably is disabled at the end of each operative movement. Adjusting means are interposed between the sheet detector and the pawl, whereby extreme accuracy of testing the presented sheets, as well as the movement of the controlling ratchet, is insured.

An embodiment of my invention may be briefly described as comprising suitable testing means rendered operative at frequent intervals by a rotating cam, which testing means are adapted to extend a trip member into the path of a pawl connected for continuous actuation, which pawl engages an adjustable stop and is disabled at the end of a variable stroke before its return to the permissively engaging position with the ratchet. The movements of these members are positive, accurately timed, and the same are capable of the closest adjustment under varying operative conditions.

Sheet feeding mechanism to which my improvements have been applied are shown in some detail with respect to the instant invention and may be explained in connection with the accompanying drawings wherein:—

Figure 1 is a fragmentary view in side elevation of a continuous sheet feeder incorporating my improvements.

Fig. 2 is a similar view thereof, illustrating the actuating mechanism thereof in another position.

Fig. 3 is a fragmentary view of said actuating mechanism in rear elevation.

Fig. 4 is a fragmentary plan view of the sheet feeding and actuating mechanism.

Fig. 5 is a fragmentary view in side elevation illustrating a pile feeder incorporating my improvements.

Fig. 6 is a transverse sectional view thereof on line 6—6, Fig. 5.

Throughout the several figures of the drawings, I have employed the same character of reference to indicate similar parts.

It will be unnecessary for me to explain or illustrate the details of the two well-known types of sheet feeding mechanism partially disclosed in the accompanying drawings for the purpose of explaining my instant invention, which more particularly relates to the mechanism for advancing or presenting the sheets to the forwarding means. Such forwarding means are assumed and shown to be a rotary suction head best indicated in the upper portions of Figs. 1 and 2 and centrally of Fig. 6 for the respective types of continuous feeder and pile feeder with which my improvements have been incorporated.

The continuous feeder, being shown upon a much larger scale in the earlier figures of the drawings, may first be described, wherein the feeding table a is associated with a rotary suction head a' positioned above the fanned-out bank of sheets b. A testing roller c rests forwardly upon the sheets b and is counterbalanced by the adjustable weight c', Fig. 4, whereby the controlling shaft c'' mounting the bell-crank lever d is actuated. The upper arm of the bell-crank lever d mounts a roller d' which normally

rides the contour of cam e, rotated in a contra-clockwise direction. The lower end d'' of said bell-crank lever is adapted to contact with the adjusting screw f, retained by its lock-nut f' in any adjusted position at the upper end of the pivoted control lever f^3, whereon the trip f^4 is carried at its lower end, potentially in the path of arm g' of the three-armed pawl member g. This comprises the pawl proper g'', with a lower extension g^3 having inclined faces adapted to engage upon one side or the other of the spring-actuated detent h. Said pawl g is mounted at the end of a rocker arm i which is actuated by a connecting rod i' extending to the crank i'' provided on cam e. The ratchet wheel j is adapted normally to be engaged by the pawl g'' and advanced with each motion of the rocker arm i in contra-clockwise direction, thereby intermittently actuating the gear train shown in dotted lines and its connected belt k supporting the fanned-out bank of sheets b.

At each upward movement of member g, its arm g' is brought into engagement with the end of the resiliently mounted adjustable stop l, as shown in Fig. 2, which serves to throw the pawl g'' out of engagement with the ratchet wheel and the arm g^3 to the other side of the spring-actuated detent h, thereby temporarily disabling the pawl and permitting the rocker arm to move independently of the ratchet wheel which is held by its detent j'.

It will be observed that the relation of the fanned-out bank of sheets is shown to be such in Fig. 2 that the testing roller is thereby elevated to support the bell-crank lever out of engagement with the cam e so that its roller does not follow the entire contour of said cam. Accordingly, the lever arm d' fails to contact with the adjusting screw f and controlling lever f^3 hangs in substantially vertical position so that the trip f^4 is cleared by the arm g' upon each downward rocking movement of the pawl. Accordingly the ratchet is not actuated under these conditions and the fanned-out bank of sheets temporarily is not advanced beneath the rotary suction head a'. However, immediately upon the decrease of the number of sheets beneath the testing roll to the assumed critical thickness of Fig. 1, roller d' once more will contact with cam e and insure the intermittent testing of the sheets by roller c, the corresponding actuation of controlling lever f^3 by the lower end d' of the bell-crank lever and the throw of the pawl g'' into its engaging position with ratchet wheel, as shown for the actuation of the latter in Fig. 1. Thus, the sheets are advanced to the rotary suction head by the intermittent operation of the pawl, its gear train and controlled belt in accordance with the existing conditions in the sheet feeding mechanism from time to time; the intermittent testing being found to secure the greatest accuracy in its control of the presentation of the sheets of this, so-called, continuous feeder.

This testing mechanism is equally applicable to other types of sheet feeders, and I have shown in Figs. 5 and 6 one type of pile feeder wherein essentially the same mechanism is employed for permitting the intermittent elevation of the pile of sheets into operative relation with the rotary suction head. Thus, the pile of sheets m is supported by a table m' at the required height; said table and sheets being intermittently elevated by means of lateral endless supporting chains n actuated by the sprocket n', its gear wheel n'' and the worm n^3 provided upon the shaft n^4. The relation of these parts is best shown in Fig. 6 wherein the testing roller c bears upon the forward portions of the sheets m as before. Fig. 5 illustrates substantially the same actuating mechanism previously described with respect to Figs. 1 and 2 but mounted in inverted position with the ratchet wheel j at the end of shaft n^4 for the purpose of intermittently rotating the worm and gear controlling the height of the supporting table. In this adaptation, however, the bell-crank lever is modified slightly to form a pivoted lever o having a downwardly extending arm o' for engaging the end of the controlling lever f^3 which carries the trip f^4 at its upper end for intermittent engagement with the arm g' of the pawl, as previously explained. A rigid adjustable stop p is provided for disengaging the pawl at the upper limit of its stroke.

Corresponding parts are lettered in accordance with the previous description of this mechanism and it will be apparent that the actuation of the rocker arm i by its connecting rod normally will advance the ratchet together with its connected members to elevate the supporting table intermittently with each movement of said rocker arm. However, the support of roller c by the elevated sheets serves, as before, to tilt the lever o and prevent its roller from engaging the depression of cam e, whereby in turn, the trip f^4 upon controlling lever f^3 is held out of engagement with arm g' and the pawl g'', accordingly, is held out of engagement with the ratchet wheel by the spring detent h, so that the supporting table and pile of sheets temporarily remain stationary until the rotary suction head a' has advanced one or more said sheets to the roller transfer table q upon the left.

From a consideration of the foregoing, it will be seen that the controlling mechanism comprises essentially a testing member intermittently applied to the sheets of paper for the purpose of disabling means other-

wise actuating the pawl into operative relation with its ratchet wheel. Thus, the trip invariably must be shifted each time for engagement with the pawl member and at its lowermost throw, in order to insure the movement of the ratchet wheel. Moreover, the adjustment of the interposed screw *f* permits this actuation with varying numbers of sheets beneath the testing roll, as may be required for different operating conditions of the sheet feeding mechanism.

The frequently intermitted testing of the sheets presented immediately for the operation of the suction head insures the unimpeded advance of the topmost sheet one by one, and the promptest actuation of the means for presenting the sheets to the feeding mechanism. The adjustments provided in the counterweight and intermediately of the testing means and the trip for the pawl render the operation of the mechanism flexible and effective with all classes of paper stock.

Having now described slightly modified forms of apparatus embodying my improvements and their principal advantages and operation I claim as new, and desire to secure by Letters Patent, the following:—

1. In apparatus of the class described, the combination with sheet-testing means, of sheet-presenting means, a ratchet connected to actuate the latter, a pawl-mounting associated with said ratchet, means for continuously operating said mounting, a pawl carried thereon, a controlling lever, a trip mounted thereon for actuating the pawl, adjusting means interposed between said lever and the sheet-testing mechanism, and a timed cam for operating said sheet-testing mechanism, and for permissively actuating the trip, substantially as set forth.

2. In apparatus of the class described, the combination with sheet-advancing means, of a sheet-testing appliance, means for presenting the sheets for advancement, a ratchet connected to actuate the latter, a pawl-mounting associated with said ratchet, means for continuously operating said mounting, a pawl carried thereon, a controlling lever for the pawl, a timed cam operatively associated with said testing-means and lever, and an adjustment interposed between said testing-means and the operating lever, substantially as set forth.

3. In apparatus of the class described, the combination with sheet-advancing means, of a sheet-testing appliance, means for presenting the sheets for advancement, a ratchet connected to actuate the latter intermittently, a pawl-mounting associated with said ratchet, means for continuously operating said mounting, a variably-positioned pawl carried thereon, a pawl-disabling member, a trip controlled by said sheet-testing appliance for actuating the pawl into its operative position, and adjusting means between said trip and sheet-testing appliance, substantially as set forth.

4. In apparatus of the class described, the combination with sheet-advancing means, of an associated sheet-testing appliance, means for presenting the sheets for advancement, a ratchet connected to actuate the latter intermittently, a pawl-mounting associated with said ratchet, a variably-positioned pawl carried thereon, a pawl-disabling member, a trip controlled by said sheet-testing appliance for actuating the pawl into its operative position, adjusting means interposed between said trip and testing appliance, and timed means for actuating the pawl-mounting, the testing means and the trip, substantially as set forth.

5. In apparatus of the class described, the combination with sheet-advancing means, of an associated sheet-testing appliance, means for presenting the sheets for advancement, a ratchet connected to actuate the latter intermittently, a pawl-mounting associated with said ratchet, a variably-positioned pawl carried thereon, a pawl-disabling member, a trip associated with said sheet-testing appliance for actuating the pawl into its operative position, timed means for actuating the pawl-mounting, the testing means and the trip, and a screw adjustment interposed between the testing means and the trip, substantially as set forth.

6. In apparatus of the class described, the combination with sheet-advancing means, of an associated sheet-testing appliance, means for presenting the sheets for advancement, a ratchet connected to actuate the latter intermittently, a pawl-mounting, associated with said ratchet, means for actuating said mounting, a variably-positioned pawl carried thereon, a spring-actuated detent therefor, a pawl-disabling member, a controlling lever, a trip provided thereon for actuating the pawl into its operative position, adjusting means interposed between said trip and sheet-testing appliance, and a timed cam operatively associated with said testing appliance and operating lever, substantially as set forth.

In testimony whereof I do now affix my signature.

ANDREW OLSON.