

No. 776,032.

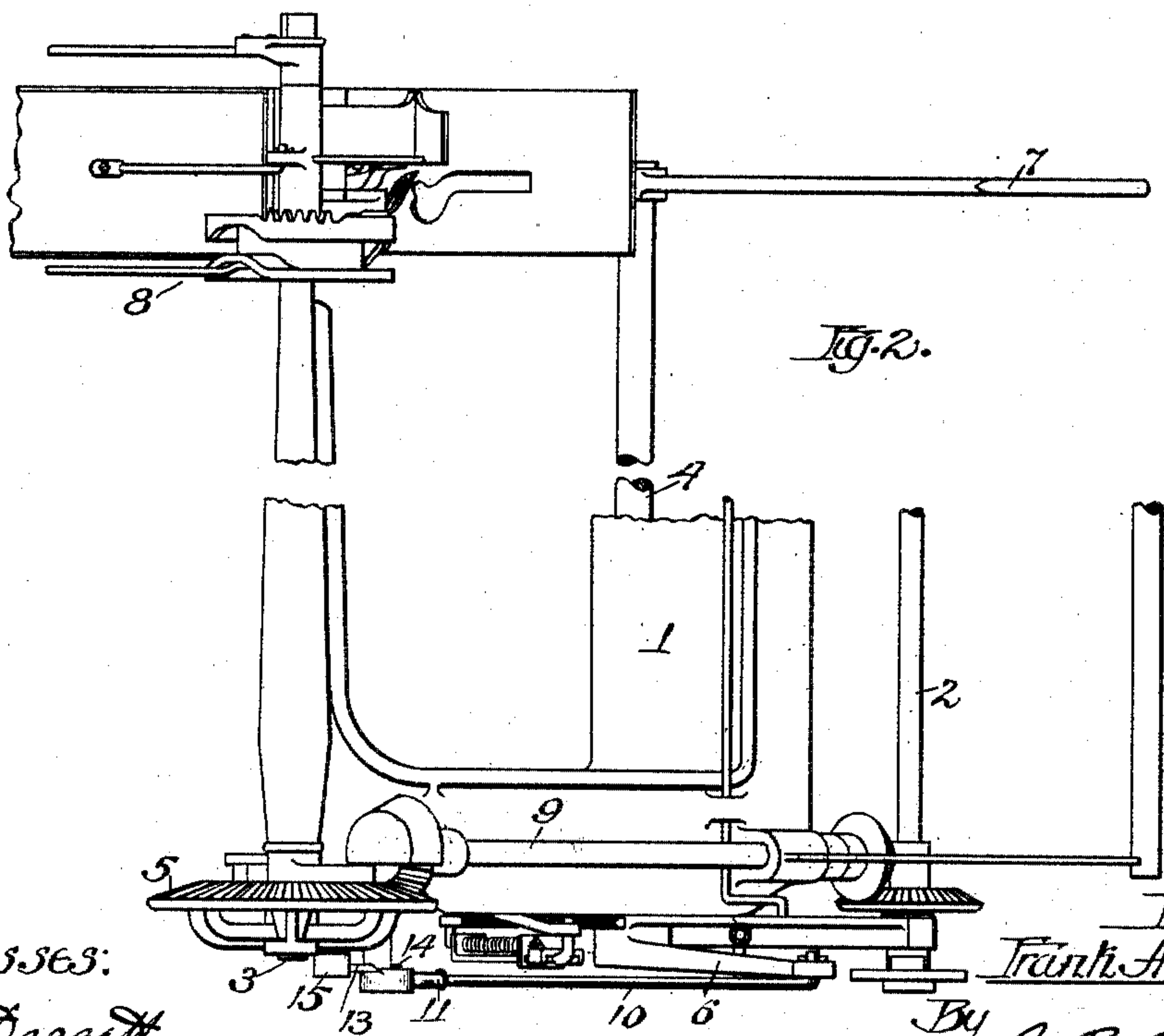
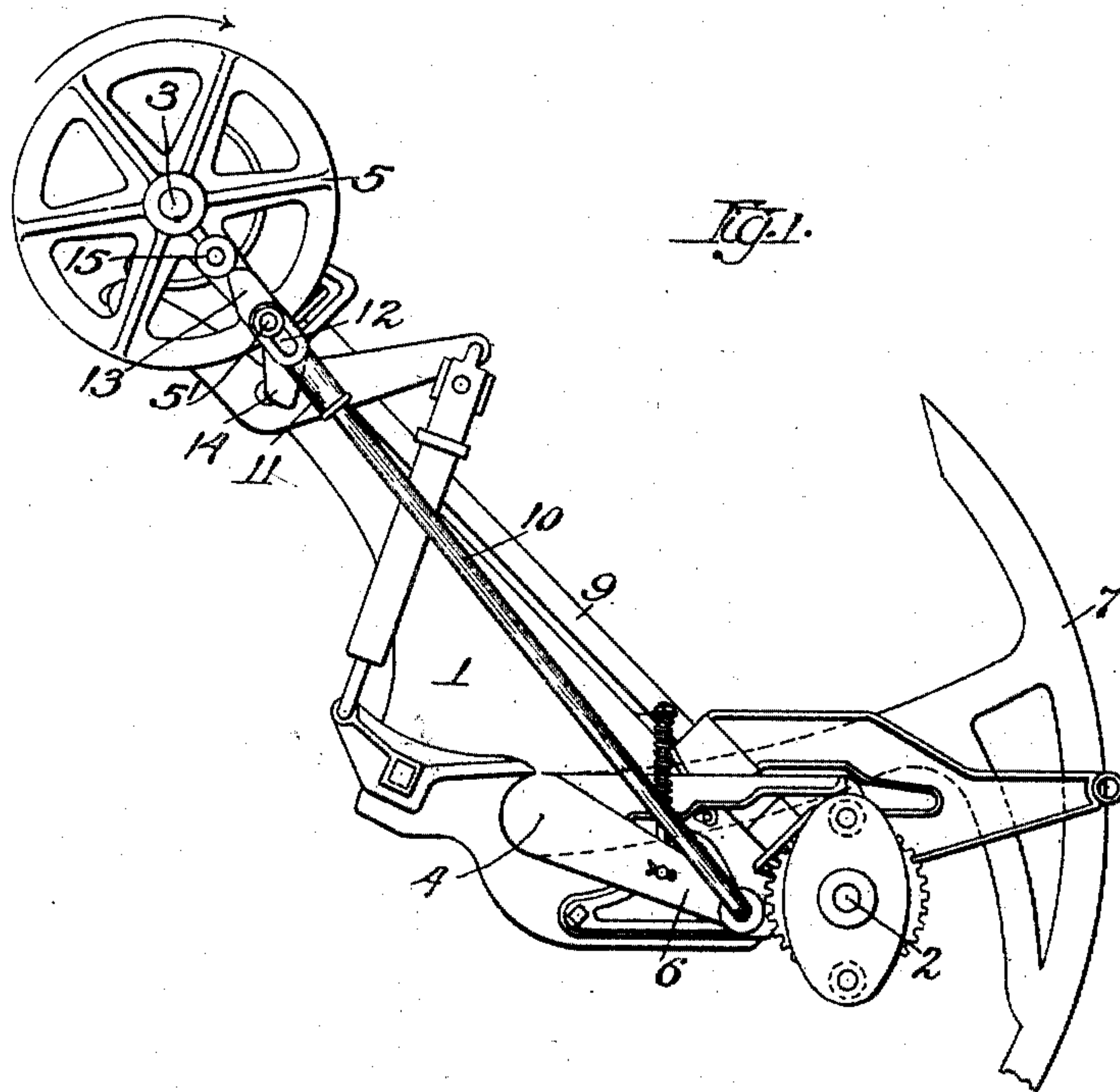
PATENTED NOV. 29, 1904.

F. A. RYHER.
GRAIN BINDER.

APPLICATION FILED SEPT. 19, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
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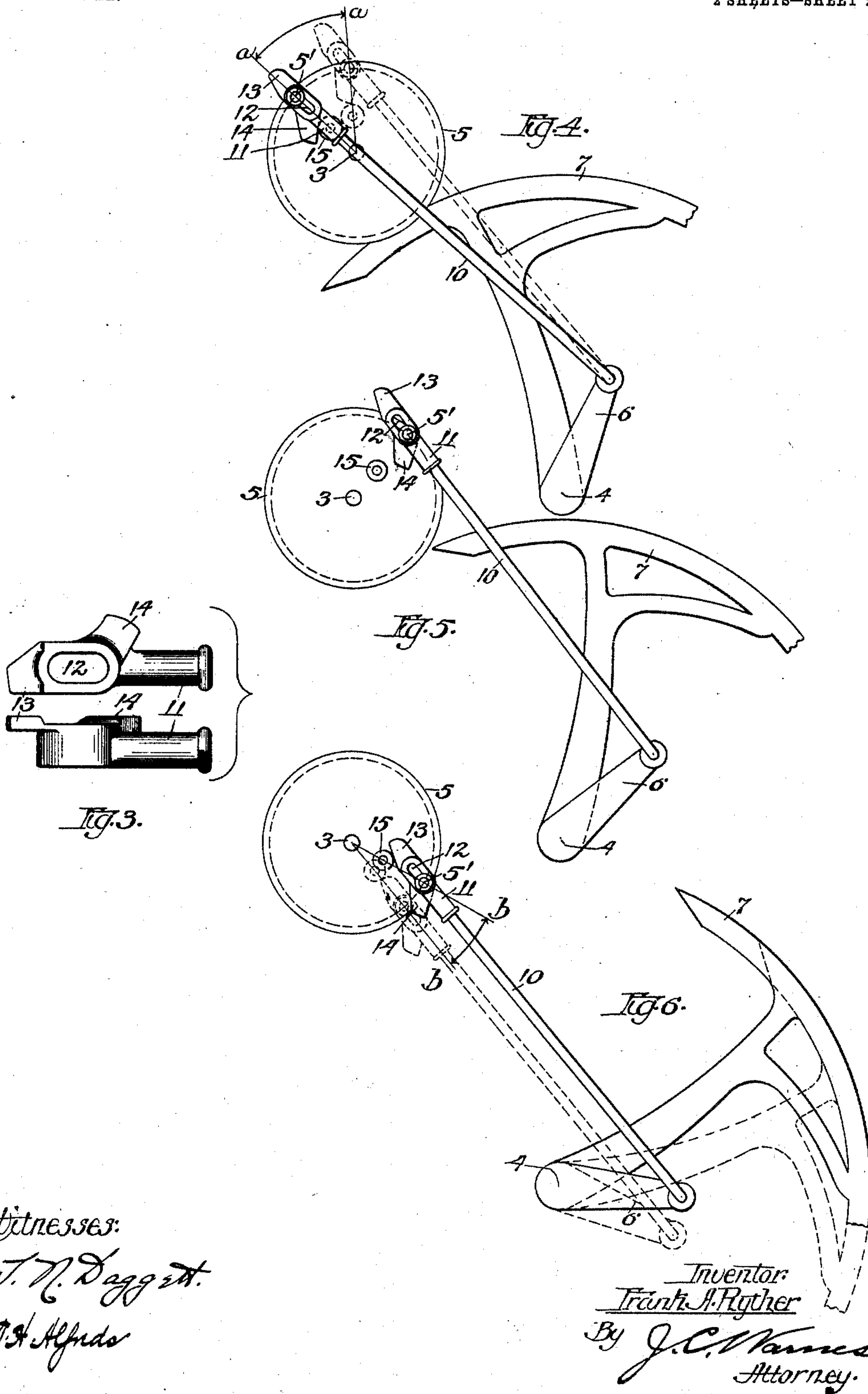
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRANK A. RYTHUR, OF CHICAGO, ILLINOIS, ASSIGNOR TO INTERNATIONAL HARVESTER COMPANY, A CORPORATION OF NEW JERSEY.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 776,032, dated November 29, 1904.

Application filed September 19, 1904. Serial No. 225,016. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. RYTHUR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Grain-Binders for Harvesters, of which the following is a complete specification.

This invention relates to the needle-driving mechanism for grain-binders, the object thereof of being to provide improved and simple means for holding the needle for a short interval of time in its upper or forward position, thus providing ample time for the knotting device to complete its operation.

I am aware that it is not broadly new to momentarily hold the needle while the knot is being formed; but heretofore devices for this purpose have been more or less complicated and made to indirectly effect such results.

Referring to the accompanying drawings, Figure 1 represents a front elevation of the principal parts of a binder attachment for grain-harvesters embodying my improved pitman connection between the cam-shaft and the needle-shaft. Fig. 2 is a plan view of same. Fig. 3 represents detailed views of the slotted pitman-head which has the double cam formed thereon. Figs. 4, 5, and 6 show the relative positions of the slotted pitman, the cam-shaft, and the needle-shaft with the needle thereon, Fig. 4 representing the pitman and needle when in their upward limiting position, the wrist-pin then occupying a position in the upper end of the slot, while the dotted lines in this view indicate the positions of the several parts when the wrist-pin has moved to the lower end of the slot. Fig. 5 shows the relation of the several parts when the pitman is midway between the upper and lower limiting positions; and Fig. 6 shows the initial contact of the roller and cam on the return stroke of the pitman, the dotted lines in this position indicating the lower limit of the return movement thereof.

In the following description and accompanying drawings like characters refer to like parts.

1 designates the frame of a binder, in which are journaled the packer-shaft 2, the cam-gear

shaft 3, and the needle-shaft 4. On the forward end of the cam-gear shaft is rigidly secured the cam-gear 5, while the forward end of the needle-shaft terminates in the crank 6.

7 is a needle secured rigidly to the rear end of the needle-shaft, and 8 is the knotting mechanism, which may be of any suitable type.

The binding mechanism is operated through the gear-shaft 9, which is provided with suitable connections with the packer-shaft 2 and the cam-gear 5.

The above-mentioned are elements characteristic of the type of binder now in common use, and hence a further detailed description of such parts is deemed unnecessary.

The essence of this invention lies in the novel connection between the cam-gear 5 and the crank 6 of the needle-shaft. This connection is effected by means of a pitman, the lower end of which pivotally engages the crank 6 of the needle-shaft 4 in the usual manner. The pitman is preferably comprised of the rod 10, threaded above, and the pitman-head 11, which receives the threaded end of said rod. 12 is a slot formed in said head and engaging the wrist-pin 5' on the cam-gear 5, the function of this slot being to admit of a limited independent movement of the cam-gear shaft with respect to the needle-shaft for the purpose hereinafter explained. On the pitman-head 11 are formed the upper and lower cam projections 13 and 14, respectively, (see Fig. 3,) and on the cam-gear is journaled the roller 15, arranged to alternately contact said cams.

The operation of the device is as follows: After a bundle has been formed and the binding mechanism set in operation through suitable tripping devices the cam-gear, rotating in the direction indicated by the arrow in Fig. 1 and from the position shown therein, will, through the pitman, rock the needle forward until both the pitman and needle are brought to their upward limiting positions or to the position shown in Fig. 4. During this movement the wrist-pin 5' contacts the upper end of the slot 12 in the pitman-head 11. Simultaneously with the pitman and needle reaching their upper and forward po-

sition the roller 15 on the cam-gear impinges the downwardly-projecting cam 14 on the pitman-head. Continued rotation from the position shown in Fig. 4 will affect the angular relation between the line of the pitman and the center of the cam-gear, which will cause the roller to engage the cam along its surface. The contour of the contacting surface of this cam is such that the upward thrust given to the pitman by the said roller will uniformly correspond to the distance which the wrist-pin on the cam-gear recedes from its upper position, these corresponding movements continuing until the wrist-pin has reached the lower end of the slot. The extent of the cam-surface is such that by the time the wrist-pin reaches the lower end of the slot the cam projection 14 will quit contact with the roller 15. In this manner longitudinal movement of the pitman and needle is prevented for an interval of time in their upper position, this interval of time producing a period of rest for the needle, which is measured by the arc *a a*. (See Fig. 4.) The length of the slot and extent of the cam are such that this period of rest is represented by practically one-eighth of the time required for one revolution of the cam-shaft. The wrist-pin 5' now engages the lower end of the slot 12, which will start the pitman and needle on their return movement. Fig. 5 represents the relation of the parts midway of their upper and lower positions, and by inspection of this figure it will be seen that the cam and roller have parted contact, showing that the function of these elements is merely to control the movement of the pitman when the wrist-pin is moving from one end of the slot to the other. Before the needle and pitman reach their lower position the upper cam 13 is contacted by the roller 15, as shown in Fig. 6. Further movement of the cam-gear from this position will now force the pitman downward rapidly, thus accelerating the needle speed until simultaneously with the parts reaching their home position the wrist-pin is made to engage the upper end of said slot. The period of time required for this accelerated movement of the pitman is indicated by the arc *b b* in same figure, the dotted lines here indicating the home position or the position from which they started.

From the foregoing it will be seen that the needle is moved forward slowly for the full upward stroke, the slow movement thus occurring at the time when the needle is meeting its greatest resistance. Furthermore, it will be observed that upon reaching its forward position the needle will remain at rest for practically one-quarter of the return movement of the cam-gear. Then follows the intervening step in which the ordinary speed is imparted to the several parts, and finally ending with the accelerated movement in the last quarter of the return.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grain-binder for harvesters, in combination, a knotting mechanism, a needle arranged to cooperate therewith, a slotted-pitman connection interposed between said knotting mechanism and needle, and single means for momentarily restraining longitudinal movement of the said pitman in its upper position and for accelerating the return movement thereof, substantially as and for the purpose set forth.

2. In a grain-binder for harvesters, in combination, a knotting mechanism, a needle arranged to cooperate therewith, a slotted-pitman connection interposed therebetween, a cam formed on the slotted end of said pitman, and a roller arranged to contact said cam when the pitman has reached its upward position and thereby restrain for a limited time longitudinal movement of said pitman, substantially as and for the purpose set forth.

3. In a grain-binder for harvesters, in combination, a knotting mechanism, a needle arranged to cooperate therewith, a slotted-pitman connection interposed therebetween, a double cam formed on the slotted end of said pitman, and a roller arranged to contact said cam at the end of the upward and on the downward stroke of said pitman, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK A. RYTHUR.

Witnesses:

W. S. TYSON,

O. A. ANDERSON.