

No. 753,559.

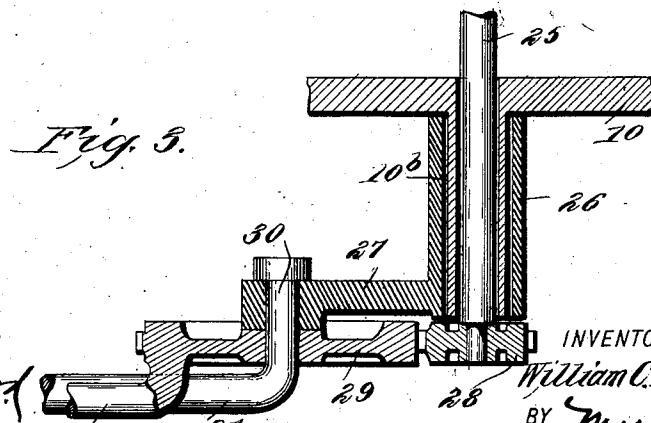
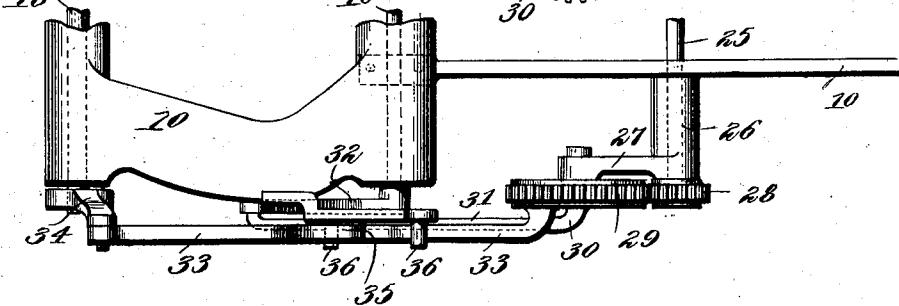
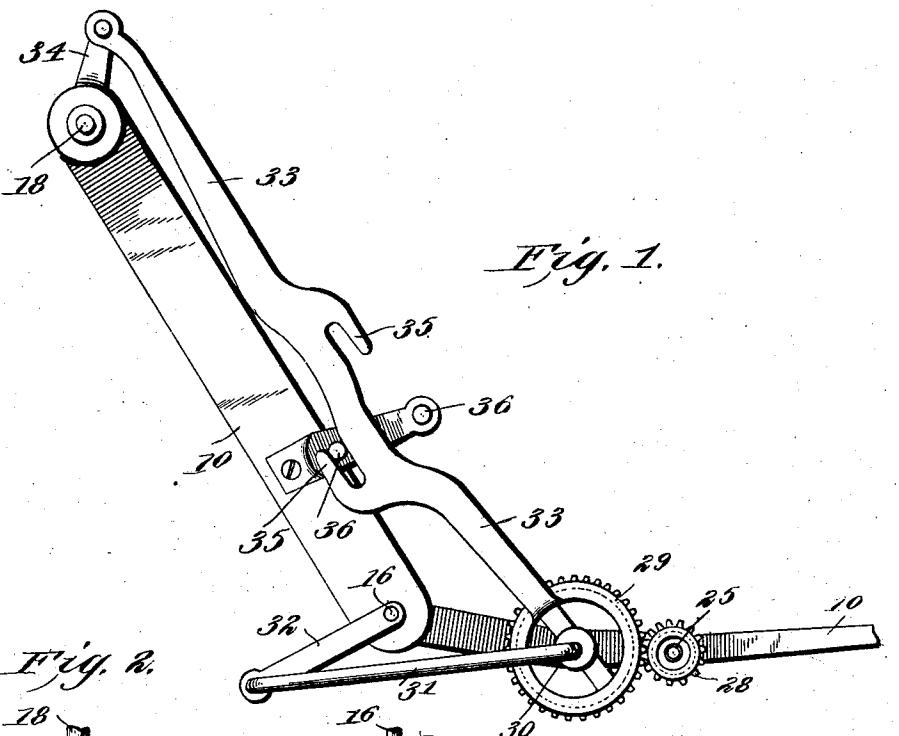
PATENTED MAR. 1, 1904.

W. C. DURYEA.

## MECHANICAL MOVEMENT ADAPTED TO GRAIN BINDERS.

APPLICATION FILED JULY 28, 1903.

NO MODEL.



WITNESSES:

ATTORNEYS

## UNITED STATES PATENT OFFICE.

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## MECHANICAL MOVEMENT ADAPTED TO GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 753,559, dated March 1, 1904.

Original application filed April 14, 1902, Serial No. 102,794. Divided and this application filed July 28, 1903. Serial No. 167,813.  
(No model.)*To all whom it may concern:*

Be it known that I, WILLIAM C. DURYEA, a citizen of the United States, and a resident of Blawenburg, in the county of Somerset and State of New Jersey, have invented a new and Improved Mechanical Movement Adapted to Grain-Binders, of which the following is a full, clear, and exact description.

My invention relates to improvements in mechanical movements adapted to grain-binders; and the subject-matter of the present application constitutes a division of a prior application for Letters Patent filed by me on the 14th day of April, 1902, Serial No. 102,794.

The object that I have in view is the provision of novel means for driving the rotating knotter-shaft and the rocking needle-shaft without resorting to the use of a long train of gears and a complicated clutch mechanism usually employed for the actuation of these parts.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the novelty will be defined by the annexed claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a portion of a grain-binder, illustrating my improvements and representing the lever 33 in a position where it is free from engagement with both fulcrum-studs, so as to indicate the shifting adjustment of said lever. Fig. 2 is a partial plan view thereof, and Fig. 3 is a transverse section through the driven shaft and the planetary gearing which is driven by the shaft and is operatively related to the rocking needle-shaft and the rotating knotter-shaft.

In the drawings of this application I have only shown enough of the parts of an ordinary grain-binder to enable others skilled in the art to understand the improvements which I have made for driving the rocking or needle shaft and the rotating or knotter shaft; but for a full explanation of the type of grain-binder on which the present improvements are used reference is to be made to my prior application,

hereinbefore referred to. The stationary parts 50 of the binder mechanism are indicated generally at 10 in the several figures of the drawings. The rocking or needle shaft is indicated at 16, and the rotating or knotter shaft at 18.

The stationary frame 10 is provided with a 55 tubular boss 10<sup>b</sup> on its right-hand side. This boss loosely supports a driven shaft 25, the latter constituting a continuation of a drive-shaft of the binder mechanism and serving, primarily, to impart movement to the rocking 60 needle-shaft and the rotating knotter-shaft and their allied parts. Mounted to turn loosely around the boss 10<sup>b</sup> is a sleeve 26, the latter carrying an arm 27. The end of said driving-shaft 25 projects beyond the boss 10<sup>b</sup> and carries a pinion 28, which is in mesh with a planetary gear 29. Said gear 29 is mounted to revolve loosely on the transversely-turned end 30 of a rod 31, the latter being connected by a crank 32 with the rocking or needle shaft 16, 70 as shown by Figs. 1 and 2. The transversely-turned end 30 of the rod 31 passes loosely through the planetary gear 29, and it is carried loosely in the end of the arm 27, as shown by Fig. 3. Fastened rigidly to or formed integral 75 with the planetary gear 29 is an upwardly-extending arm 33, the free end of which is connected to the rotating or knotter shaft 18 by means of a crank 34 on said shaft. This arm 33 is provided on its opposite edges with hooks 80 35, which are disposed out of transverse alignment with each other and are arranged to face or extend in opposite directions, as shown by Fig. 1. The hooks of the arm 33 are adapted to engage individually with studs 36, which are provided on an upstanding part of the binder-frame 10, the engagement of the hooks with said studs being at alternate periods or intervals—that is to say, one hook engages with its corresponding stud and is disengaged 85 therefrom, while the other hook begins its engagement with its complementary stud. These hooks and studs form temporary fulcra for the rod 33, which during these periods is transformed into a lever for the proper operation 90 of the rotating or knotter shaft. Assuming that one hook is in engagement with its stud, the rocking movement of the arm 33 begins 95

with the hook fully engaged with the stud, and during the progress of the rocking movement the hook is gradually disengaged from its stud. After one hook becomes fully disengaged from its supplemental stud and as the arm continues to move or shift the other hook engages with its respective stud, so as to operate as another fulcrum for the arm 33 and convert the same into a lever. When one hook is being withdrawn from its stud and as the shaft 25 turns and drives the gear 28, the arm 27 and the gear 29 are caused by the arrangement of the parts 26, 27, 29, and 33 to sweep around the gear 28. This imparts a rotary motion to the knotter-shaft and a rocking motion to the needle-shaft.

It will be observed that the rod 31 serves not only as a means to drive the rocking or needle shaft, but as a center or axis for the planetary gear 29. As the arm 33 moves upward the lower hook 35 is engaged with the corresponding stud 36, and the arm rocks or turns around this stud similar to a lever; but as the arm 33 moves in a downward direction the upper hook 35 engages with its corresponding stud 36, and the arm again rocks as a lever. By this construction and arrangement of parts I am enabled to secure the force necessary for driving the rotating or knotter shaft 18 and to turn the crank 34 past the two dead-centers which said crank necessarily assumes with respect to the rotating or knotter shaft and the driving power. It will of course be understood that the parts 35 36 must be accurately adjusted with relation to one another in order that the engagement of said parts will be effected at the proper time and place.

My improved mechanism provides a direct and powerful means for driving the rotating or knotter shaft; and it dispenses with the long train of gears and the complicated clutch mechanism which are commonly employed in connection with this part of grain-binders as usually constructed.

Although I have shown and described my improved mechanical movement in connection with the rotating knotter-shaft and the rocking needle-shaft of a grain-binder, it will be understood that my invention is not restricted to this specific type of machine, because the improved mechanical movement may be employed in other arts and other relations than in grain-binders.

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

1. The combination of the rotating shaft, a driven shaft for operating the rotating shaft, and mechanism between the said shaft and rotating shaft, consisting of a gear fastened to the driven shaft, a planetary gear coacting with the first-named gear, and a connecting-rod fastened to the planetary gear and operatively connected with the rotating shaft.

2. The combination of the rotating shaft having a crank-arm, a driven shaft for oper-

ating the rotating shaft, and mechanism between the said shaft and the crank-arm of the rotating shaft, consisting of a gear fastened to the driven shaft, a planetary gear coacting with the first-named gear, and a connecting-rod fastened to the planetary gear and connected with the crank-arm of the rotating shaft.

3. The combination with a suitable frame, of the rotating shaft, a driven shaft for driving the rotating shaft, a sleeve mounted to turn loosely on a boss on the frame, through which boss the said driven shaft is loosely projected, an arm carried by the sleeve, a planetary gear mounted to turn on the arm, a gear fastened to the said driven shaft and meshed with the planetary gear, and a connecting-rod attached to the planetary gear and operatively connected with the rotating shaft.

4. The combination of a rotating shaft, a shaft for operating the rotating shaft, and mechanism between said shafts, consisting of a gear fastened to the driven shaft, a planetary gear coacting with the first-named gear, and a connecting-rod attached to the planetary gear and operatively connected with the rotating shaft, said rod having a changeable fulcrum.

5. The combination of a rotating shaft having a crank-arm, a shaft for operating the rotating shaft, and mechanism between the said shafts, consisting of a gear fastened to the driving-shaft, a planetary gear coacting with the first-named gear, and a connecting-rod rigidly attached to the planetary gear and connected with the crank-arm of the rotating shaft, said connecting-rod projecting approximately radially from the planetary gear and having a changeable fulcrum.

6. The combination of a rotating shaft, a shaft for operating the rotating shaft, and mechanism consisting of a gear fastened to the said shaft, a planetary gear coacting with the first-named gear, a connecting-rod attached to the planetary gear and operatively connected with the rotating shaft, and a part stationary with respect to the connecting-rod and adapted to be engaged periodically thereby to form a temporary fulcrum therefor.

7. The combination of a rotating shaft, a shaft for operating the rotating shaft, and mechanism between said shafts, consisting of a gear fastened to the said shaft, a planetary gear coacting with the first-named gear, a connecting-rod extending from the planetary gear and operatively connected with the rotating shaft, and two members stationary with respect to the connecting-rod and arranged out of transverse alignment at opposite sides thereof, said stationary members constituting temporary fulcrs for the connecting-rod.

8. The combination of a rotating shaft, a shaft for operating the rotating shaft, and mechanism between said shafts, consisting of a gear fastened to the said shaft, a planetary

gear coaxing with the first-named gear, a connecting-rod extending between the planetary gear and the said rotating shaft, the connecting-rod having oppositely-disposed hooks located on opposite sides thereof, and relatively stationary studs adapted to be alternately engaged by said hooks to form temporary fulcra for the connecting-rod.

5 9. The combination of a rotating shaft, a 10 rocking shaft, a driven shaft, a gear fastened to the driven shaft, an arm mounted to swing around the axis of the driven shaft, a rod pivotally connected with the arm and having connection with the rocking shaft, a planetary 15 gear mounted on the arm coincident with the pivot of said connecting-rod, the planetary gear coaxing with the gear on the driven shaft, and a second connecting-rod extending between the planetary gear and the rotating 20 shaft.

10 10. The combination of a rotating shaft, a 15 rocking shaft, a driven shaft, a gear fastened to the driven shaft, an arm mounted to swing around the axis of the driven shaft, a rod pivotally connected with the arm and having connection with the rocking shaft, a planetary 25 gear mounted on the arm coincident with the pivot of said connecting-rod, the planetary gear coaxing with the gear on the driving- 30 shaft, a second connecting-rod extending between the planetary gear and the rotating shaft, and a member stationary relative to the second connecting-rod and adapted to be periodically engaged thereby, for the purpose 35 specified.

11 11. The combination of a rotating shaft, a 16 rocking shaft, a driven shaft, a gear fastened to the driven shaft, an arm mounted to swing around the axis of the driven shaft, a rod pivotally connected with the arm and having connection with the rocking shaft, a planetary 20 gear mounted on the arm coincident with the pivot of said connecting-rod, the planetary gear coaxing with the gear on the driving- 25 shaft, a second connecting-rod extending between the planetary gear and the rotating shaft, and two relatively stationary members located on opposite sides of the second connecting-rod and adapted to be alternately engaged 30 thereby.

12 12. The combination of a rotating shaft, a 26 rocking shaft, a driven shaft, a gear fastened to the driven shaft, an arm mounted to swing around the axis of the driven shaft, a rod pivotally connected with the arm and having connection with the rocking shaft, a planetary 31 gear mounted on the arm coincident with the pivot of said connecting-rod, the planetary gear coaxing with the gear on the driving- 36 shaft, and a second connecting-rod extending between the planetary gear and the rotating

shaft, the said second-named connecting-rod having two oppositely-disposed hooks on opposite sides thereof, and two relatively stationary members arranged on opposite sides 65 of the second-named connecting-rod and adapted to be alternately engaged by said hooks on the connecting-rod.

13. The combination of a rotating shaft, a 70 rocking shaft, a driven shaft, an arm mounted to swing around the axis of the driven shaft, a gear fastened to the driven shaft, a connecting-rod having a laterally-turned end pivotally mounted on the arm and having connection with the rocking shaft, a planetary 75 gear mounted to turn on the said laterally-turned end of the connecting-rod and coaxing with the gear on the driving-shaft, and a second connecting-rod attached to the planetary gear and having connection with the rotating 80 shaft.

14. The combination with a rotating shaft, and a driven shaft, of an arm connected with the rotating shaft, cooperating gears for making an end portion of the arm describe an orbital movement around the driven shaft, said arm being attached rigidly to one of said cooperating gears, and temporary fulcra for said arm during its traversing movement. 85

15. The combination with a driven shaft, 90 and a rocking shaft, of means for actuating said rocking shaft from the driven shaft, said means including an arm mounted for rotation on an axis coincident with the driven shaft, a connecting-rod between said arm and the rocking shaft, and gearing actuated by the driven shaft and operatively connected with the arm for driving the latter. 95

16. The combination with a driven shaft, and a rocking shaft, of an arm mounted for 100 rotation on an axis coincident with the driven shaft, a gear on said driven shaft, a planetary gear revoluble with said arm and meshing with the driven-shaft gear, and a connection between said arm and the rocking shaft. 105

17. The combination with a rotating shaft, a rocking shaft, and a driven shaft, of an arm rotating on an axis coincident with the driven shaft, a gear on the driven shaft, a planetary gear revoluble with said arm and meshing 110 with said driven-shaft gear, an arm fixed to the planetary gear and connected with the rotating shaft, temporary fulcra for said last-mentioned arm, and a connection between the first-mentioned arm and the rocking shaft. 115

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

WILLIAM C. DURYEA.

Witnesses:

Wm. H. SCHULTZ,  
JOHN B. JONES.