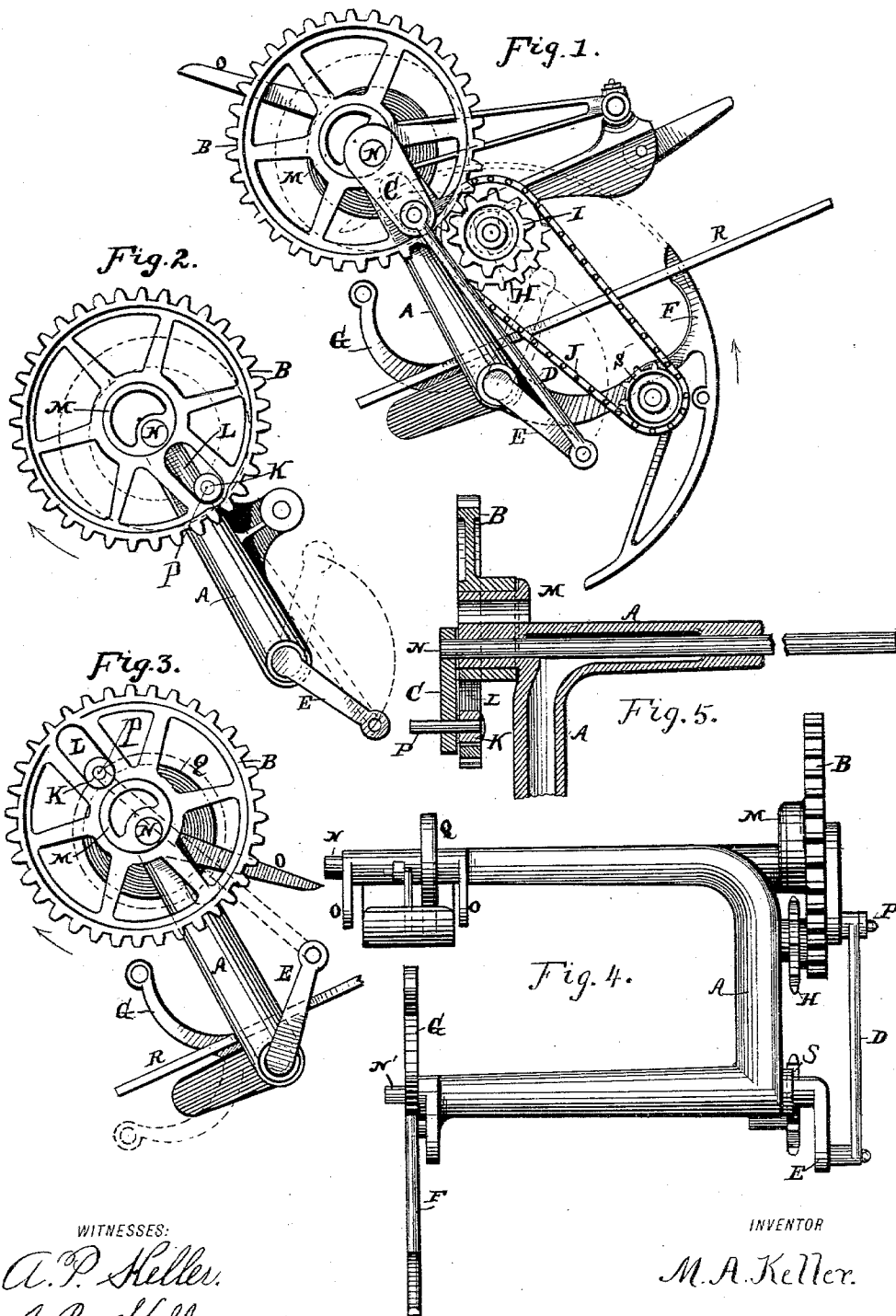


(No Model.)

M. A. KELLER.
BINDING MECHANISM FOR HARVESTERS.

No. 566,727.

Patented Aug. 25, 1896.



UNITED STATES PATENT OFFICE.

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BINDING MECHANISM FOR HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 566,727, dated August 25, 1896.

Application filed February 6, 1895. Serial No. 537,537. (No model.)

To all whom it may concern:

Be it known that I, MOSES A. KELLER, a citizen of the United States, residing at Batavia, county of Genesee, and State of New York, have invented a new and useful Improvement in Binding Mechanisms, of which the following is a specification.

The invention relates to improvements in the construction and arrangement of the driving and binding mechanism for harvesters, and its object is to simplify and render more efficient the mechanism for communicating motion to the knotter and needle shafts and ejector-arms.

The invention consists substantially in the construction illustrated in the accompanying drawings, set forth in the subjoined specification, and more particularly pointed out in the claims.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 is an end view of a portion of a harvester or grain-binder embracing my improvement. Fig. 2 is a similar end view, but with parts of the gearing removed to better show the construction of the improvement and with the parts in their normal position of rest. Fig. 3 is an end view, but with the parts actuated for about one-half of a revolution. Fig. 4 is an elevation of the stubbleward side of the binding mechanism. Fig. 5 is a vertical longitudinal sectional view taken through the axis of the upper portion of the frame supporting the knotter-driving shaft, and through the eccentric hub and gear mounted thereon and crank on the end of the shaft.

It is a well-known fact that in the operation of a binder in the field when an unusually large or heavy bundle is being bound the mechanism commonly in use is inefficient, and consequently the machine is clogged and the work delayed. The operation of the binding mechanism with heavy bundles has been improved by the use of what is known as the "eccentric gear," arranged upon the knotter-driving shaft and tending to give increased power during a portion of its revolution and accelerated speed during another portion of its revolution. Such a mechanism is set forth in the patent to Maurice Kane, No. 499,838, granted June 20, 1893.

The present improvement is designed to simplify such construction, while retaining its efficiency.

Referring to the drawings, A designates the main frame of the binder, in which are journaled the knotter-driving shaft N and the needle-driving shaft N'. A knotter-driving shaft N extends through this frame and has upon its outer end a crank C, which, through the medium of the pin P and connecting-rod D and another crank E, is connected to the needle-shaft, so that when the crank C is actuated both the knotter-driving shaft and the needle-shaft are actuated.

The gear for imparting motion to the knotter-driving shaft is designated by the letter B, and is arranged with its axis eccentric to said knotter-driving shaft, and preferably this axis, for the sake of economy and simplicity, is formed upon a hub or projection M of the main frame A. This relative eccentricity between the gear and the knotter-driving shaft is well illustrated in Figs. 2, 3, and 5, in which the hub M of the gear is very plainly shown as eccentric to the shaft N. Of course this gear may be shown by a spur-gear, a sprocket, or any other well-known form of gear, and receive its motion from the main shaft in the usual way. This gear B is designed to communicate motion to the crank C, fixed to the knotter-driving shaft, and through the intermediate connection before referred to through the needle-shaft. Inasmuch as the knotter-driving shaft and the gear B are not mounted on a common center, it follows that to allow for their variability there must be provided an opportunity for play in the connection which is made between these two parts; and in Figs. 2 and 3 of the drawings the pin P, which forms the connection, is illustrated as playing in an elongated slot L in a spoke or web of the gear. To lessen friction, the end of the pin P, which would contact with the walls of the slot in the gear, is provided with a roller K. The needle F is secured to the shaft N' and, as before described, is given its movement from the gear B, which, although itself a concentric gear, is yet eccentrically related to the knotter-driving shaft, so that as it revolves the roller K on the pin of the crank fixed to such shaft moves in the elongated slot toward and from

the center, and thereby varies the leverage on the gear-wheel, and consequently the power imparted by the same through the crank-pitman and needle-crank E to the needle-shaft.

5 By this construction it will be readily seen that the needle F is so arranged that just at the time it is compressing the bundle its power is greatly increased, and afterward, or during the last half-revolution of the wheel, the leverage thereof is decreased and the power correspondingly lessened. The bundle-ejecting arms O are so arranged upon the knotter-driving shaft that by means of the arrangement of the gearing with reference to such shaft the said arms are accelerated as they strike the bound bundle to remove it from the binding-table R, and thereby facilitate separation of the bound bundle from the unbound grain that is on the table. The knotter-actuating wheel Q, which is secured to the end of the knotter-driving shaft opposite that upon which is fixed the wheel B, has its speed reduced during the tying operation, because the speed of the shaft is reduced, and therefore the bundle is bound tighter and there is less liability of breaking the twine. The compressor G and the connecting-gears H, I, J, and S, that communicate power to the wheel B, may be of any suitable style desired, and the wheel B, which is shown as a cog, may, of course, be a sprocket. In the drawings and description thus far the connection between the wheel B and the crank consists of a pin with roller and elongated slot, but it is evident that many modifications may be made in the form of connection without departing from the principle of the invention, and that particular arrangement of the gear B with reference to the knotter-driving shaft is not necessary, it only being required that these parts may have eccentric relation, and it is equally evident that this eccentric relation may be provided between any pair of gears arranged between the driving-shaft and the needle-shaft, instead of the particular pair illustrated in the accompanying drawings, provided the effect of this eccentric relation is communicated eventually to the needle-shaft.

50 What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a grain-binder, the combination with a needle and needle-shaft, of mechanism for operating the same, including a concentrically-mounted gear, a crank mounted upon an axis eccentric to the axis of the gear, but within the periphery thereof, and devices between such crank and gear for causing them to engage each other and thereby effect a rotation of the crank; substantially as and for the purpose set forth.

2. In a grain-binder, the combination with a needle and needle-shaft, of mechanism for

operating the same, including a concentric gear and a crank mounted upon an axis eccentric to the axis of the gear, within the periphery thereof, and sliding connections between such gear and crank; substantially as and for the purpose set forth.

3. In an automatic binding mechanism for harvesters, the combination with a knotter-operating shaft, and a crank rigidly affixed to such shaft provided with a roller, of a binder-frame having a driving-gear journaled on an eccentric hub about the knotter-actuating shaft, and provided with a radial slot in such gear adapted to form a guideway for the roller of the crank-arm, whereby the needle-shaft is operated with a variable motion; substantially as and for the purpose set forth.

4. In an automatic binding mechanism for harvesters, the combination with a binder-frame, a knotter-driving shaft journaled therein, a crank secured to such shaft, and means for connecting such crank to the needle-shaft, of a driving-gear journaled upon the hub of the frame eccentric with the knotter-actuating shaft, and provided with a radial slot or its equivalent, and means for movably connecting such crank-arm with the driving-gear, whereby variable motion is communicated to the needle-shaft by the uniform motion of the driving-gear; substantially as and for the purpose set forth.

5. The combination with the binder-frame, having an eccentric hub about the main knotter-actuating shaft, a driving-gear journaled on said eccentric hub and provided with a radial slot, the knotter-actuating shaft provided with a roller or its equivalent to engage the slot of the driving-gear, bundle-ejecting arms, also affixed to said knotter-actuating shaft, a knotter-actuating shaft, also journaled in said frame and provided with a crank-arm, a pitman connecting the needle-crank with the crank of the knotter-operating shaft, whereby variable motion is communicated to the needle; the whole combination combined and arranged for operation; substantially as and for the purpose set forth.

6. The combination with the binder-frame having an eccentric hub, a driving-gear journaled on said hub, a main knotter-actuating shaft journaled in the frame eccentrically to the hub, means connecting the driving-gear with the needle-operating shaft and bundle-ejecting arms and devices connecting the same with the driving-gear, whereby a variable speed is given to all of said parts by uniform speed of the driving-gear; substantially as and for the purpose set forth.

M. A. KELLER.

Witnesses:

C. M. SHAW,
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