No. 661,231. Patented Nov. 6, 1900.

J. A. SHARP.

SELF BINDING HARVESTER.

(Application filed Mar. 28, 1900.)

(No Model.) 2 Sheets—Sheet 1.

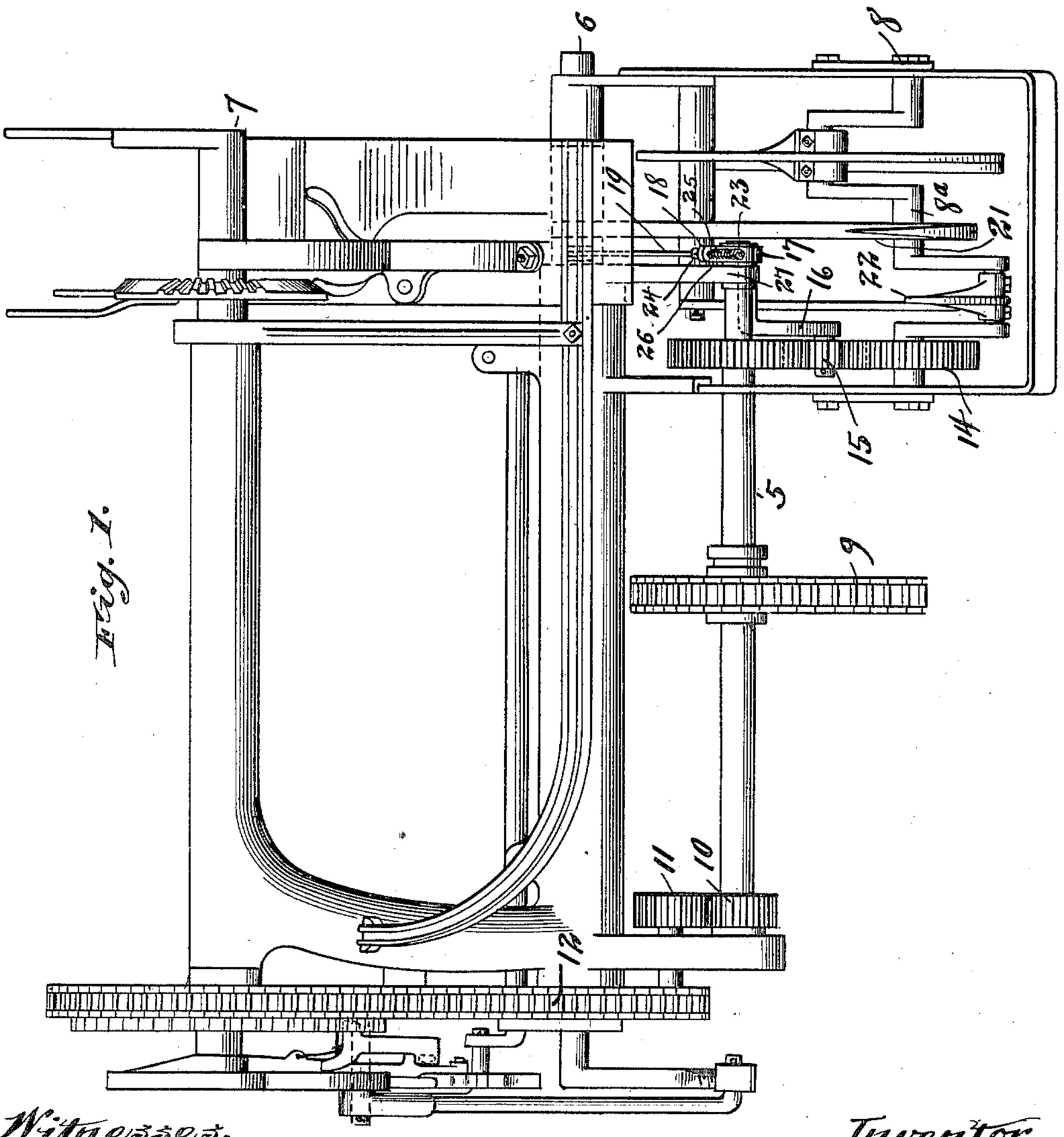

Fig. 1.

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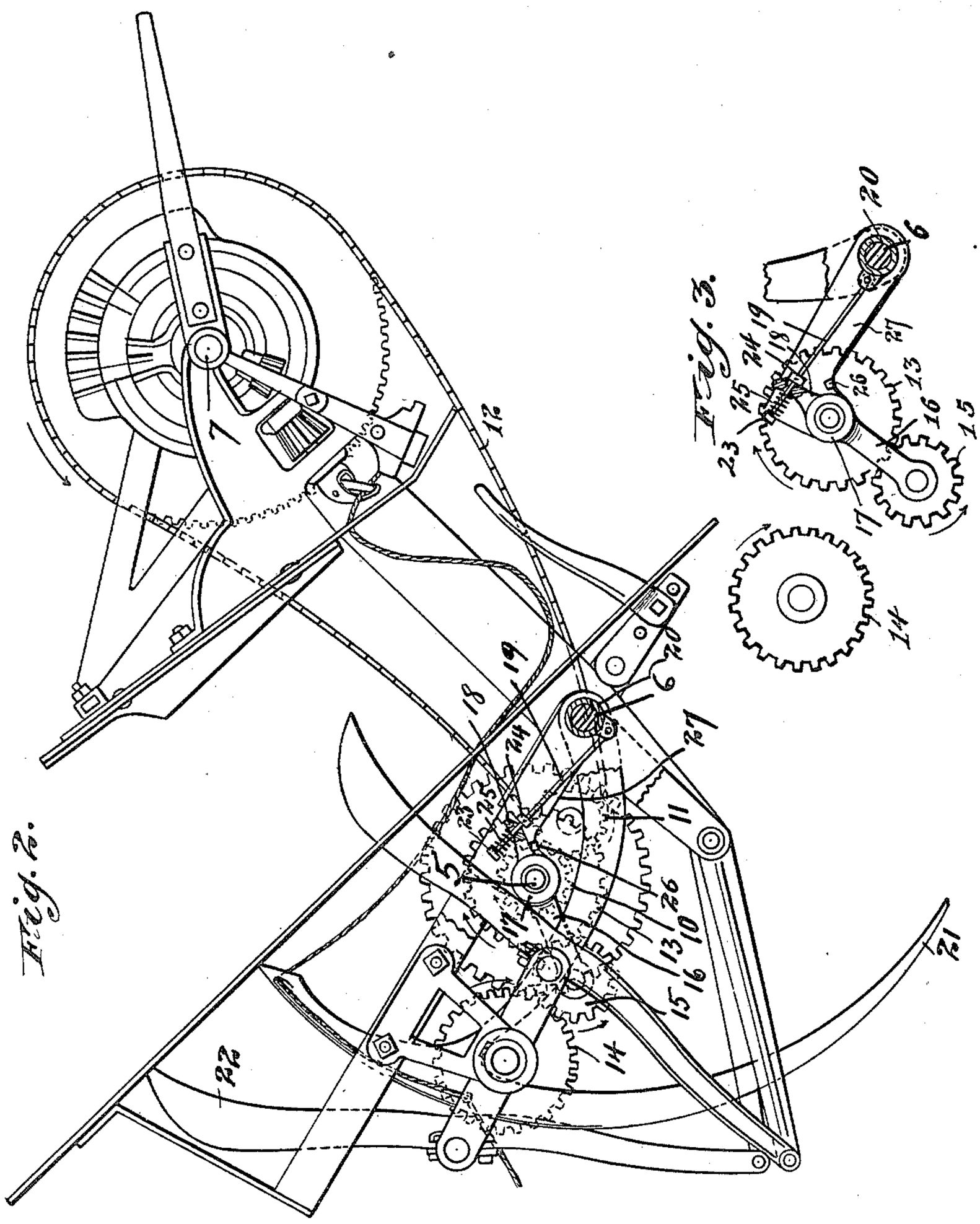

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES A. SHARP, OF HARVEY, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHARLES F. CRAVER, OF SAME PLACE.

SELF-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 661,231, dated November 6, 1900.

Application filed March 28, 1900. Serial No. 10,493. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. SHARP, a citizen of the United States, residing at Harvey, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Self-Binding Harvesters, of which the following is a specification.

This invention relates to certain improvements in the gearing for driving the packer-shaft of self-binding harvesters. In the working cycle of a self-binding harvester there are usually employed a constantly-rotating driving-shaft, an intermittently-rotating knotter-shaft upon which the discharge-arms are mounted, an intermittently-rocking needle-shaft, and an intermittently-rotating packer-shaft. These several shafts are arranged parallel to each other, and it is common to employ a link belt and clutch mechanism for driving the packer-shaft and rocking the needle-shaft and intermeshing spur-gears for driving the packer-shaft. Such spur-gears are usually mounted the one on the driving-shaft and the other on the packer-shaft, and various devices have been employed for throwing said spur-gears into and out of gear. In the operation of the machine the packers run, while the needle is at rest, to compact the flowing grain into a gavel, and when the needle starts forward, carrying the cord around the gavel, the packers are thrown out of gear. In one construction (Patent No. 552,503, of January 7, 1896) the driving-shaft is so mounted that it is capable of being moved bodily to carry the spur-gear mounted thereon out of mesh with the spur-gear on the packer-shaft, and the needle is made to effect this movement of one end of the packer-shaft by engaging a pivoted arm in which the bearing for said end of the driving-shaft is carried.

I have shown in the accompanying drawings a binder-head carrying the several shafts and the general type of gearing illustrated in said patent and have applied my improvement thereto.

Said improvement consists in combining with a constantly-rotating driving-shaft carrying a spur-gear an intermittently-rotating packer-shaft having also a spur-gear and an intermediate gear carried upon a vibrating arm or movable bearing, which arm or bearing is moved through the forward movement of the needle, so as to carry the intermediate gear out of contact with the driver, thus bringing the packers to rest as the needle starts forward on the tying movement.

In the accompanying drawings, Figure 1 is a plan view of the binder-frame and the parts mounted thereon. Fig. 2 is a side elevation thereof; and Fig 3 a detail in side elevation, showing the base of the needle, the needle-shaft, driving-shaft, packer-shaft, the gears carried by said two last-mentioned shafts, and the intermediate gear, the needle being forward in this view.

In the drawings, 5 represents the driving-shaft for the binder; 6, the needle-shaft; 7, the knotter-shaft, and 8 the packer-shaft. The driving-shaft is constantly rotated through the drive-chain 9 and communicates through the gears 10 11 constant rotary motion to the link belt 12. This belt runs over a sprocket-wheel loosely mounted on the knotter-shaft 7 and is clutched therewith during a certain part of the operation, so as to drive the knotter and discharge-arms. These devices being familiar and constituting no part of my invention are neither particularly shown nor described.

The needle-shaft is rocked at intervals by mechanism of known or any desirable construction. The packer-shaft 8 is likewise intermittently driven and receives its power from the driving-shaft through the spur-gear 13, mounted thereon. The packer-shaft has the spur-gear 14, but is out of mesh with the gear 13. Rotary motion is communicated between gears 13 14 through the intermediate gear 15, mounted on the arm 16, which is sleeved over the end of the driving-shaft 5 by means of a hub 17. Said hub has the extension or lug 18 perforated for the passage of a pitman or thrust rod 19, said rod being pivoted on the hub 20 of the needle. The needle has the usual curved guard or tailpiece 21 and rests upon the intermediate straight portion 8^a of the packer-shaft 8 when in its idle position. The arm 16 is offset, as shown in the plan view, and passes beneath the driving-shaft 5 to a point near the side of the gear 13 and then extends at right angles to said shaft parallel and close to the face of said

gear. This provision is made so as to enable the packer 22 to vibrate without interference.

The operation will be readily understood from an inspection of Figs. 2 and 3 of the drawings. In Fig. 2 the needle is shown in the idle position and the packers are running, the packer-shaft being rotated because of the intermeshing of the intermediate gear 15 with the gears 13 14. As the needle starts forward toward the position shown in Fig. 3 the pitman or thrust rod vibrates the arm 16, carrying the intermediate gear, causing said gear to roll in contact with the gear 13 and out of mesh with the gear 14. As the needle returns to its position of rest the pitman rocks the arm 16, causing the intermediate gear to traverse upon the gear 13 and into mesh with the gear 14. I preferably make the connection between the hub of the needle-shaft and the vibrating arm carrying the intermediate gear yielding, and this for the reason that if the connection were rigid and the teeth thereof did not exactly coincide with the spaces and thereby intermesh with the teeth of the packer-shaft gear there would be danger of stripping the teeth. This yielding connection is readily afforded by providing on the pitman 19 the stops 23 24 and the spring 25 encircling the outer end of the pitman and bearing at one end upon the upper side of the lug of the vibrating arm. A stop-lug 26 is provided on the frame member 27, which prevents the intermediate gear from being thrown too far. The spring is intended to afford the necessary flexibility or yield, and as it is compressed during the forward movement of the needle it will tend to assist in running the intermediate gear into mesh with the packer-shaft gear as the needle comes back to its position of rest.

There are certain advantages in the foregoing construction over the older construction previously described. The alinement of all of the shafts, gears, and driving-belts is preserved, thereby avoiding wear and breakage. The intermediate gear is easily operated and without much labor upon the needle. As the needle starts forward the strain on the packers is greatest, and this strain of course tends to roll the intermediate gear out of engagement with the packer-shaft gear. As the needle returns to its position of rest, the bundle having been discharged, there is no labor whatever upon the packer-shaft, and the spring of itself would roll the intermediate gear into mesh. It is well known that the tendency of two intermeshed gears is to roll into contact when an initial movement is imparted to one of them toward the other, while the tendency is to roll out of mesh when this initial movement is imparted in a direction to separate their axes.

The structural features herein described are believed to be well adapted to the purpose of my invention, but may be varied within wide limits without departing from the spirit and scope thereof.

I claim—

1. In a self-binding harvester, the combination with a constantly-rotating driving or power shaft, of an intermittently-rotating packer-shaft, gear-wheels mounted upon said driving-shaft and packer-shaft, and an intermediate gear movably mounted, and means actuated by the binding mechanism for moving said intermediate gear into position to transmit rotary motion from the driving-shaft to the packer-shaft, substantially as described.

2. In a self-binding harvester, the combination with a constantly-driven shaft having a spur-gear thereon, of an intermittently-driven packer-shaft having also a spur-gear thereon, an intermediate gear movably mounted and constantly in mesh with the driving-gear, and means actuated by the binding mechanism for causing said intermediate gear to traverse upon the driving-shaft gear and to roll into and out of mesh with the packer-shaft gear, substantially as described.

3. In a self-binding harvester, the combination with a driving-shaft having a spur-gear thereon, a packer-shaft also having a spur-gear thereon, an intermediate gear mounted on a vibrating arm whose axis is concentric to the driving-shaft, a rocking needle-shaft, and a connection between said needle-shaft and said vibrating arm whereby the oscillation of the needle-shaft is caused to move said arm and thereby move the intermediate gear out of driving mesh with the packer-shaft gear, substantially as described.

4. In a self-binding harvester, the combination with a driving-shaft and packer-shaft and their gears, of an intermediate gear, a vibrating arm on which said gear is mounted, a needle having intermittent oscillation, and a yielding connection between the needle-shaft and said vibrating arm, substantially as described.

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Witnesses:
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