R. DUTTON & A. TÖRNQUIST.
Harvesting Machines.

No. 212,303. Patented Feb. 18, 1879.

Fig. 1

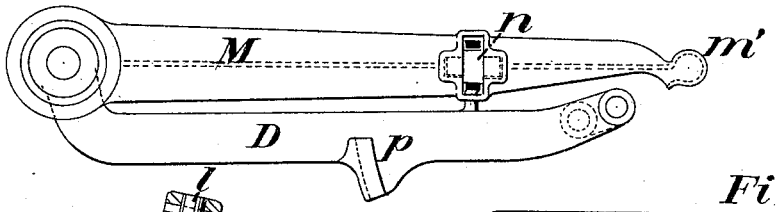

Fig. 2

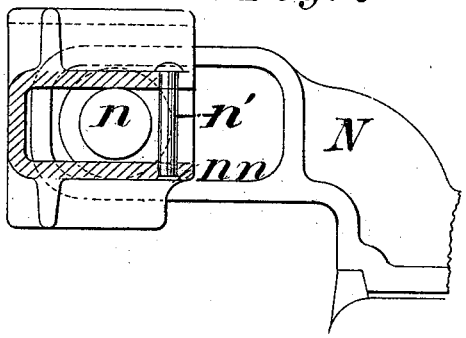

Fig. 3

Witnesses:
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UNITED STATES PATENT OFFICE.

RUFUS DUTTON, OF YONKERS, AND ALFRED TÖRNQUIST, OF NEW YORK, N. Y.; SAID TÖRNQUIST ASSIGNOR TO SAID DUTTON.

IMPROVEMENT IN HARVESTING-MACHINES.

Specification forming part of Letters Patent No. **212,303**, dated February 18, 1879; application filed November 7, 1878.

To all whom it may concern:

Be it known that we, RUFUS DUTTON, of the city of Yonkers, county of Westchester, State of New York, and ALFRED TÖRNQUIST, citizen of Sweden, now resident in the city, county, and State of New York, have invented a new and useful Improvement in Harvesting-Machines.

Our invention relates to the gearing and driving mechanism for giving motion to the knife of a harvesting-machine.

Heretofore differential gears, one of which oscillates upon a gimbal-joint giving motion to a vibrating arm and fly-wheel, have been used on harvesting-machines.

The objection to the use of the gimbal-joint for this purpose is that the gimbal-joint, not being a true universal joint, will not give uniform motion.

It is further complicated and expensive and the joints are very liable to wear in use, causing the lower end of the vibrating arm to drop down in contact with the frame.

The object of our invention is to provide a method for using differential gear on harvesting-machines without the gimbal-joint and secure uniform motion, thereby simplifying and making more durable the mechanism for driving the knife. The gimbal-joint above referred to restrains the oscillating gear from the rotation with the main axle which the rotating gear tends to give it; but with the ball-and-socket joint it is required to furnish a support independent of the joint for that purpose, and to prevent contact with the frame as the arm oscillates. This support is most conveniently applied to the vibrating arm at some convenient point between its free end and its connection with the oscillating gear.

The invention consists in differential bevel-gears, one of which rotates with the main axle, and the other oscillates upon a ball-and-socket joint, and a vibrating arm for giving motion to the knife, fastened rigidly to the oscillating gear, and a support for said arm, which will prevent rotation of said oscillating gear, but will permit free reciprocation.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 3 is a section of the upper side of the frame of the machine, the gear, vibrating arm, the fly-wheel, and the ball-and-socket joint. Fig. 1 is an end view of the frame and driving-arm and friction-roller for supporting the lower end of the driving-arm. Fig. 2 is an enlarged view of the friction-roller and support.

D D, Fig. 3, represent the frame; K, the main axle; F, the driving-gear; E, the oscillating gear; M, the driving-arm; *m*, the brace; *m'*, the ball on the lower end of the arm, to which one end of the connecting-rod is attached. *l* is the crank-shaft; L, the crank-wheel; *l'*, the crank, and *l''* the crank-pin, on which works one end of the driving-arm M. O is the ball; *o*, the socket, one-half of which is formed in the oscillating gear E. *m''* is the socket-ring in the driving-arm, into which the sockets *o* are firmly fastened. N, Figs. 1, 2, and 3, is the friction-roller support. This support is bolted firmly by the bolt *n''*, Fig. 3. *n* is the friction-roller, Figs. 1 and 2. *n'* is the recess or opening in the driving-arm M, in which the ends of the roller move.

The operation of the device is as follows: When power is applied to the main axle K from the driving-wheels, the gear F, being fastened rigidly to the axle, turns with it. The gear E, in this case, has two more cogs than F. The ball-and-socket joint at O allows a free movement in any direction to the gear E and the driving-arm M; but the driving-arm being supported by the friction-roller *n*, it can only receive that movement the crank *l* and friction-roller allow it, which is a continual tipping or oscillating motion of the gear E round the ball O, bringing all the teeth on E successively in contact with the teeth on F, and giving to the end *m'* a reciprocating motion.

Now, when the two gears are in contact, and the gear F turns, the pressure from F upon the gear E, which has the tendency to tip the gear E round the ball O, just so as it is free to do, will give it the oscillating motion, causing the crank to turn, and the ball *m'*, to which the pitman is connected, to move back and forth, thus giving the motion to the knife. The gear F moves forward at each oscillation of the gear E as many teeth as equal the difference between the two gears—viz., two teeth.

What we claim is—

1. A gear which rotates with the main axle, and in mesh therewith, a gear oscillating upon a ball-and-socket joint, and an arm for driving the knife, fastened rigidly to said oscillating gear, combined with a support for said arm adapted to prevent rotation of said oscillating gear, but to permit free reciprocation of said arm.

2. The roller *n*, in combination with the driving-arm M and support N, as and for the purpose set forth.

3. In combination with the oscillating gear E, friction-roller *n*, and support N, the crank *l*, for equalizing the oscillations of the gear E and giving uniformity to the length of the vibrations of the arm at *m'*, substantially as described.

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