2 Sheets—Sheet 1.

# R. EICKEMEYER.

## HARVESTER.

No. 180,014. Patented July 18, 1876.

*Fig. 1.*

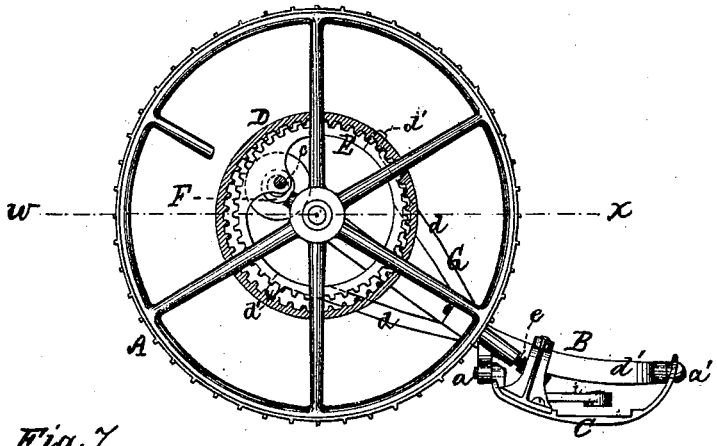



*Fig. 7.*

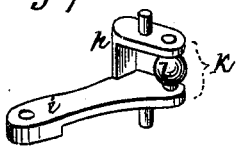



*Fig. 3.*

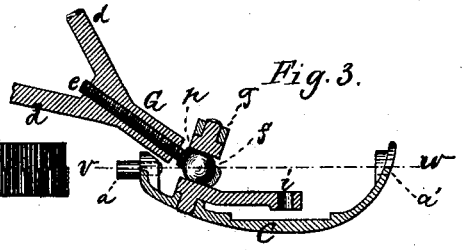



*Fig. 4.*

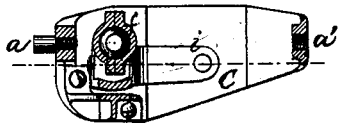
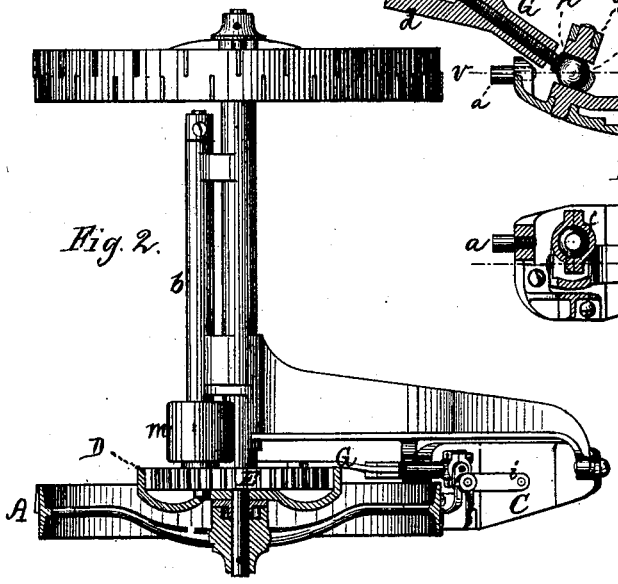



*Fig. 2.*

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2 Sheets—Sheet 2.

# R. EICKEMEYER.

## HARVESTER.

No. 180,014. Patented July 18, 1876.

*Fig 5.*

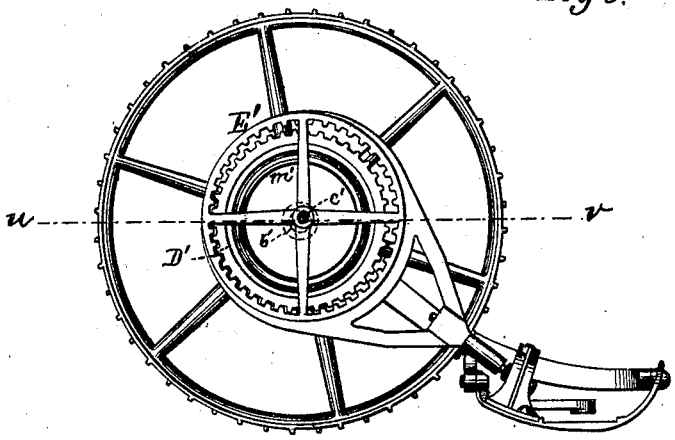
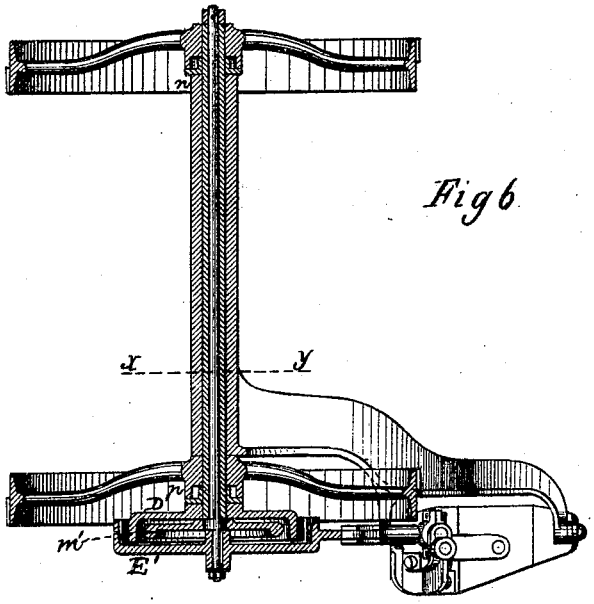



*Fig 6.*

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# UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

## IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **180,014**, dated July 18, 1876; application filed April 8, 1876.

*To all whom it may concern:*

Be it known that I, RUDOLF EICKEMEYER, of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Mowing-Machines and Harvesters; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a full and correct description thereof.

My invention relates to novel mechanism for imparting from a rotating drive-wheel to the cutter-bar its requisite reciprocating movement.

The main feature of my invention consists in the combination, with a rotating drive-gear, of a non-rotating gear, eccentrically mounted with relation to the driving-gear, upon a crank-pin which is parallel with the axis of the drive-gear, whereby the rotation of the drive-gear imparts to the non-rotative gear a reciprocating movement toward and away from the peripherical line of the drive-gear. My invention further consists in the combination, with the drive-gear, non-rotating gear, and its crank, of a balance-wheel, which assists the crank of the non-rotating gear to readily pass its centers; and, further, in the combination, with the non-rotating gear, its crank, and the drive-gear, of a rod rigidly secured to the non-rotating gear, and arranged to be longitudinally reciprocated thereby; and, also, in constructing said rod with two arms for attachment to the non-rotating gear at diametrically-opposite points thereon.

To more particularly describe my invention I will refer to the two sheets of drawings, in which—

Figure 1, Sheet 1, represents, in side view, a portion of a mowing-machine embodying my invention. Fig. 2, Sheet 1, represents the same partly in top view and partly in horizontal section on line *w x*, Fig. 1. Fig. 3, Sheet 1, represents, in longitudinal vertical section, a shoe of a mowing-machine provided with a portion of my novel mechanism for operating the cutter-bar. Fig. 4, Sheet 1, represents the same shoe, partly in top view and partly in horizontal section at line *v w*, Fig. 3. Fig. 5, Sheet 2, represents, in side view, a portion of a mowing-machine embodying my invention, but differing from that in Fig. 1 in its construction. Fig. 6, Sheet 2, represents this last machine partly in top view and partly in horizontal section at line *u v*, Fig. 5. Fig. 7, Sheet 1, represents, on an enlarged scale and detached, the bell-crank lever which connects with the cutter-bar.

In Fig. 1, A denotes one of the two axle-wheels of the machine, mounted in the usual manner. B denotes the portion of the frame to which the finger-bar and shoe C are attached by longitudinal pivoted heel and toe connections, as at *a* and *a'*, as heretofore. D denotes the drive-gear, which may be provided with a solid shell, or with arms and keyed to the main axle; or it may consist of a rim only, and be attached to the inner face of the axle-wheel in a manner well known. In this figure I show an internal drive-gear, although an external gear can be successfully employed, as will hereafter be described. E denotes a non-rotating gear, mounted eccentrically within the drive-gear. It has a periphery like any external gear. There is a difference between the external diameter of the non-rotating gear and the internal diameter of the drive-gear, which corresponds with the extent of reciprocating movement requisite on the part of the non-rotating gear for properly operating the cutter-bar. The non-rotating gear has, preferably, two less teeth than the drive-gear—as, for instance, the drive-gear may have forty-two and the non-rotating gear forty teeth.

The swinging or non-rotating gear derives its vibrating movement from the drive-gear; but it is controlled in its constantly-changing position with relation to the drive-gear by the crank at F. The crank is preferably provided with a long crank-shaft at *b*, which, in this instance, is housed in a suitable bearing attached to the rear of the axle-frame. This crank-shaft is also provided with a balance-wheel at *m*, which assists the non-rotating gear to readily pass its crank-centers when the machine is in operation. The axis of the crank is parallel with the axle of the machine, and the crank-pin at *c* is therefore parallel with the crank-shaft and the axis of the drive-gear. The swinging gear at one side has an interior enlargement for the reception of the crank-pin. The throw of the crank is equal

to the difference between the diameters of the swinging gear and the drive-gear, so that as the drive-gear revolves the teeth of the non-rotating gear, by swinging on the crank-pin, will successively be engaged with all the teeth of the drive-gear during a movement of the latter, which is equal to the space occupied by any two of its teeth, and therefore for every complete revolution of the drive-wheel the swinging gear will make twenty-one complete vibrations toward and away from the peripherical line of the drive-wheel. G denotes a connecting-rod, which is secured to the side of the swinging gear. This rod is preferably constructed with two arms, as at *d d*, which are connected to the swinging gear at diametrically-opposite points, as shown in the drawings, and at the end of each arm a guide-plate, as at *d'*, is provided, which always overlaps the side of the rim of the drive-gear, and serves to maintain the swinging gear in its proper position, and in a measure to relieve its crank-pin from undue twisting or racking strain while the machine is in operation. The lower end of the connecting-rod is tubular, with an internal screw-thread for the reception of a screw, as at *e*, by means of which the connecting-rod and a ball-socket at *f* are adjustably united. When thus united the non-rotating gear is supported on one side by its crank-pin, and on the other side by the connecting-rod and the ball-joint.

As has been before stated, the shoe C is pivoted or hinged to the frame of the machine at *a* and *a'*, so that it can rock laterally, and permit the rise and fall of the outer end of a finger-bar attached thereto in the usual manner. Mounted on the top of this shoe is a ribbed post, with a lateral projection at its top, as at *g*, which affords a bearing for the pivot of the bell-crank lever *h*, which has an arm at *i*, for connection with a cutter-bar, (not shown,) and another arm at *k* for union with the connecting-rod. As this bell-crank lever is subjected to rapid movement and severe service, it is important that it be not only of great strength, but so mounted that it will be true in its movements. The lower pintle of the bell-crank lever has a proper step in the shoe. The arm *k* of the lever is duplicated, or, in other words, has an upper and lower member, constituting one arm to the lever, with both of which members the ball-pin *l* is connected. At the opposite end the upper member is solidly united with the lower portion of the bell-crank, as is fully shown in Fig. 7. The ball-socket *f* is constructed in two parts, united with screws, in order that any undue wear between it and the ball may be readily taken up for preventing lost motion.

It will be seen by reference to Fig. 4 that the center of the ball, when the bell-crank is midway of its vibration, is in line with the shoe-pivots, and therefore the shoe and finger-bar may stand at any angle without unduly affecting the free and proper operation of the bell-crank lever. The end of the connecting-rod which is attached to the swinging gear has of course a movement corresponding with the throw of the crank, which controls the non-rotating gear in its swinging or vibrating movement; and there is also at the lower end of the connecting-rod a slight movement, which is well provided for by the ball and socket, which also permits the shoe to freely vibrate laterally on its pivots or hinges, and therefore the ball-joint has a peculiar value in this combination.

Instead of having the swinging gear within the drive-gear, it may be placed outside thereof with approximate results, although, if the drive-gear in both instances have the same number of teeth, the outside arrangement of the swinging gear will result in a slightly less number of vibrations than with the arrangement already described.

In Figs. 5 and 6 I show the rotating gear at D'. It is mounted outside the axle-wheel, and is an external gear. The non-rotating gear E' has internal teeth. Its crank-pin at *c'* is located near its center, and the crank-shaft at *b'* is located within the axle of the machine, which is made hollow to receive it. The crank-shaft balance-wheel *m'* is located within the drive-gear D'. With this form of construction the axle-wheel is between the down-hanging portion of the frame and the connecting rod, and therefore the shoe is projected somewhat farther from the frame than is shown in Figs. 1 and 2.

For single-wheel harvesters, whether mowers or reapers, the modification shown in Figs. 5 and 6 is preferable, because the one wheel, as shown, would carry all the driving mechanism, and it would be well balanced and proportioned if the axle and frame were terminated at the line *x y*, Fig. 6.

It will be understood that the well-known pawl-and-ratchet connections between the axle-wheels and drive-gear may be employed with my improvements, and I have shown in Figs. 5 and 6, at *n*, annular recesses therefor.

As shown in the drawings, the machine is adapted for use with a hinged or loose pole; but it is obvious that my improvements are applicable to mowers and harvesters of all kinds.

It will be seen that the mode of connecting the non-rotating gear with the cutter-bar may be extensively varied.

I am well aware, for instance, that a drive-gear could be mounted in line with the cutter-bar, so that a straight-line connection could be made between the non-rotating gear and the cutter-bar, in which case the drive-gear would be mounted in a frame prepared for it, with its axis at right angles to the axle of the machine, and connected with said axle by a rectangular shaft and bevel-gearing. With this suggested construction an unusually rapid reciprocation of the cutter-bar can be attained; but it involves considerable additional weight and complication.

I do not limit myself to the precise construc-

tion and arrangement herein shown, as any non-rotating gear which vibrates in the same plane with the drive-gear, and is arranged to operate any longitudinally-moving rods or levers between said reciprocating or vibrating gear and the cutter-bar, will embody the spirit of the main feature of my invention.

I claim as new and desire to secure by Letters Patent—.

1. The combination, with a driving-gear of a mowing-machine or harvester, of a non-rotating gear, eccentrically mounted with relation to the driving-gear, upon a crank-pin which is parallel with the axis of the drive-gear, substantially as described, whereby the rotation of the drive-gear imparts to the non-rotative gear a reciprocating movement toward and away from the peripherical line of the drive-gear, as set forth.

2. The combination, with the drive-gear of a mowing-machine or harvester, the non-rotating gear, and its crank, of a balance-wheel on the crank-shaft, substantially as described, whereby the non-rotating gear is assisted in passing its crank-centers, as set forth.

3. The combination, in a mowing-machine or harvester, with the non-rotating gear and its crank, of a longitudinally-reciprocating connecting-rod, rigidly secured to the gear, substantially as described.

4. The combination, in a mowing-machine, with the non-rotating gear and its crank, of a connecting-rod having two arms, which are rigidly united to said gear at diametrically-opposite points, substantially as described.

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