GOODWIN & SMITH.

Harvester.

No. 75,677. Patented Mar. 17, 1868.

Fig: 1.

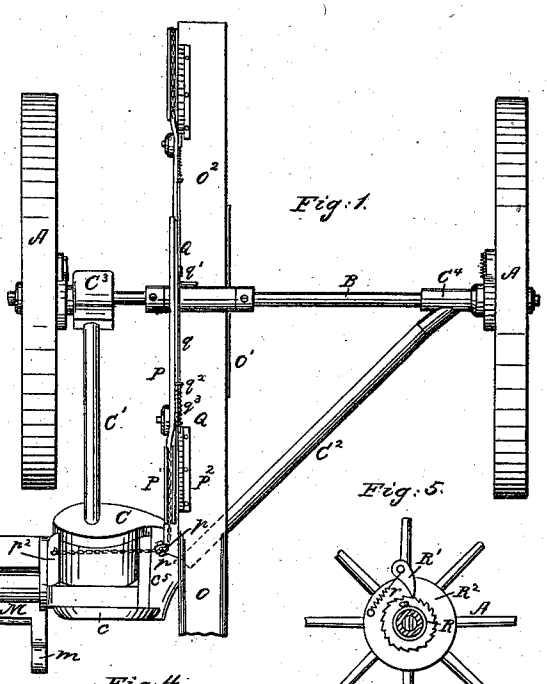


Fig: 2.

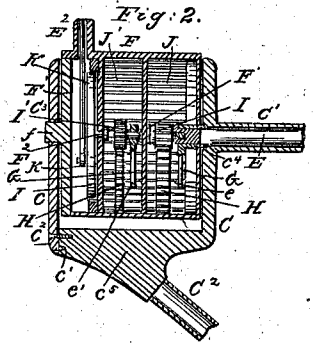


Fig: 3.

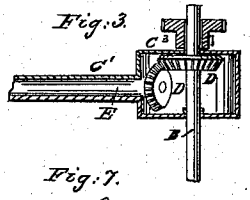


Fig: 4.

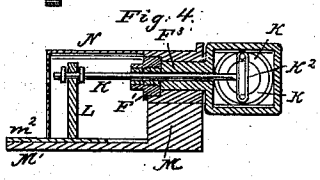


Fig: 5.

Fig: 6.

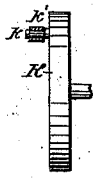


Fig: 7.

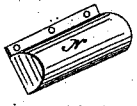


Fig: 8.

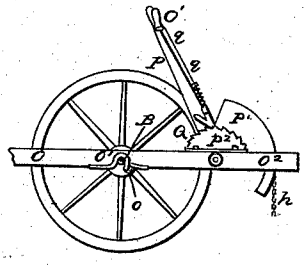


Fig: 9.

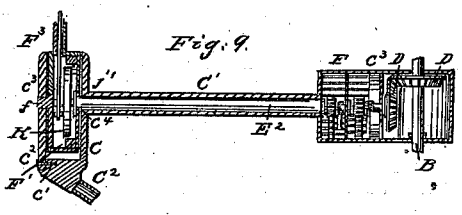
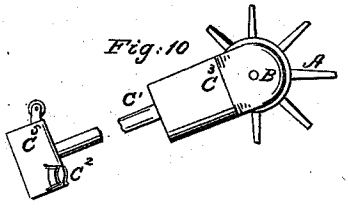


Fig: 10.



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United States Patent Office.

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Letters Patent No. 75,677, *dated March* 17, 1868.

IMPROVEMENT IN HARVESTERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, WILLIAM F. GOODWIN, of East New York, county of Kings, and State of New York, and A. M. SMITH, of Washington, District of Columbia, have invented a new and useful Improvement in Harvesters; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a plan or top view of a harvesting-machine embracing our improvements.

Figure 2 is an enlarged horizontal section through the gear-case and cutter-frame, at the junction of the finger-bar therewith, showing in section the pivots or centres of movement of the cutter-bar relative to and with the gear-box.

Figure 3 is a horizontal section through the box or case at the point of intersection of the main axle and counter-shaft.

Figure 4 is a transverse vertical section through the gear-box, and the pivotal connection of the shoe and finger-bar therewith, showing the arrangement of the driving-crank, cutter-bar head, and connecting-rod.

Figure 5 is a side elevation of one of the backing-ratchets connected with the drive-wheel.

Figure 6 represents a side view of the crank-wheel detached.

Figure 7 is a perspective view of the connecting-rod; cap, or box, detached.

Figure 8 is a longitudinal section of the axle between the wheels, showing the tongue-extension, with the ifting-lever mounted thereon, adapting the machine to a rear cut; and

Figures 9 and 10 represent modification in the arrangement of the gearing relative to the frame and axle.

Similar letters of reference denote corresponding parts.

Our invention consists in a novel construction of the gearing through which motion is communicated from the main drive-wheel or wheels to the sickle-bar, in the arrangement of the multiplying-gear at the inner end of the cutting-apparatus, and in line with the hinge connection of said cutting-apparatus with the main or cutting-frame, and in the arrangement of the crank-shaft, or its equivalent, in line with its driving or counter-shaft or shafts, and so combined therewith as to have a movement in the same direction with, but independent of, said shaft or shafts. It further consists in forming the two hinges or pivots upon which the finger-bar turns on the gear-box or drum, and in certain details of construction and arrangement of parts hereinafter described.

In the accompanying drawings, A represents the carrying and driving-wheels mounted upon the axle B, and connected thereto by means of backing-ratchets, hereinafter described. C is the main or cutter-frame, mounted at one end upon the axle B, in such manner as to vibrate freely thereon, said frame consisting in this instance of two tubular arms C^1 C^2, so arranged as to form the two sides of a right-angled triangle, of which the angle B forms the third side, the arm C^2 representing the hypothenuse, the side or arm C^1 forming a right or nearly right angle to the axle, and terminating at its axle-end in a case or box, C^3, which encloses the bevel-wheels D D^1, one of which is connected to and turns with the drive-wheel axle, and the other is mounted upon and drives a counter or driving-shaft, E, which has its bearings in the tube or arm C^1 of the cutter-frame. The axle-end of arm C^2 of the cutter-frame terminates in a sleeve, C^4, mounted upon the axle in the manner shown in fig. 1. Said sleeve may, if preferred, be extended to enclose the axle and connect with the bevel-gear case C^3. The opposite ends of the arms C^1 C^2 terminate in a yoke, the form of which is represented at C^5, in the sectional view, fig. 2, cast with the said arms, or otherwise rigidly connected thereto in any suitable manner. The end-plate *c* is made separate from the yoke, and is secured thereto by means of a tongue or flange, c^1, fitting into a corresponding recess in the part C^5, and by screws c^2, or in any other suitable manner, and is provided with a perforation, c^3, forming a bearing for the pivot *f* of the gear-box or drum F, arranged in line with the shaft E, as represented in fig. 2. The opposite side of the gear-box is provided with a tubular pivot, f^1, or sleeve surrounding the shaft E, and fitting into a suitable bearing-socket, c^4, in the yoke C^5. The gear-box or case consists of an internally cogged drum or cylinder, having a concentric arrangement with the shaft E, and may be cast in one piece with the teeth or cogs, or the teeth may be cast separately in rings, with partitions placed between the separate rings to afford bearings for the multiplying-shafts or spindles hereinafter described. The case is represented in this instance as cast with the teeth, and the partitions correspondingly notched are

inserted and secured by suitable internal flanges or lips, or, if prefered, they may be secured by means of screws from the exterior of the case F.

F^1 is a head for closing the drum or case after the gearing and bearing partitions have been properly arranged within the case, said head having cast with or secured to it the pivot *f*, before referred to.

The gearing may be described as follows: A small bevel-wheel, D, before referred to, is keyed to and turns with the drive-wheel axle B, and drives a similar bevel-wheel, D^1, keyed to one end of shaft E.

On the opposite end of shaft E, which terminates within the internally cogged gear-case F, as represented in fig. 2, is mounted an arm, G, which turns with the shaft E, and is provided at its outer swinging end with a fixed stud or short shaft, *e*, on which is loosely mounted a transmitting spur-wheel, H, the teeth of which mesh with the teeth of the stationary drum F. The rotation of the arm G with its shaft causes the wheel to traverse the drum and to receive a rotary motion on its axle *e*, which is communicated to a pinion, I, mounted upon and turning shaft E^1, which at one end has a pivot bearing in shaft E, and near its opposite end has a bearing in the diaphragm or partition J. The end of shaft E^1 projecting through partition J is provided with an arm, G^1, which rotates with it, and is provided with a stud, e^1, on which is mounted a second transmitting-wheel, H^1, gearing with the drum F, and with a second pinion, I^1, keyed to a third shaft, E^2, which, in this instance, is the crank-wheel shaft arranged in line with shafts E and E^1, and having at one end a pivot bearing in shaft E^1, and near its other end a bearing in a second partition, J^1. The end of this shaft projects through the partition J^1, and has attached to it a crank or crank-wheel, hereinafter described.

The drum or internal gear-case F being supposed to have (for the purpose of illustration) forty-eight teeth, and the pinions $I\,I^1$ twelve teeth each, the operation of the gearing would be as follows: The shaft E, revolving at about the same speed as the main axle, carries with it the arm G, and the transmitting-wheel H, meshing with the drum, receives a rotary motion on its own shaft, therefrom, which is communicated to the pinion I and its shaft or hub E^1, in the same direction with the shaft E; the two shafts turning together and in the same direction, the shaft E^1 receives one revolution from shaft E, and the pinion I, having, as stated, twelve teeth, and being driven through transmitting-wheel H by the drum F, having forty-eight teeth, receives four revolutions therefrom. The shaft E^1 and pinion I receiving, therefore, one revolution with and from the shaft E, and four revolutions from the drum F, have five revolutions to one of shaft E; consequently the arm G^1, connected to and turning with shaft E^1, causes its transmitting-wheel H^1 to traverse the cogged drum five times while the arm H traverses said drum once; the pinion I^1 is consequently operated upon five times by the teeth of the drum while the pinion I is operated upon once by said teeth, and the shaft E^2 receiving one additional revolution from and with each revolution of the shaft E^1, the pinion I^1 and its shaft E^2 have imparted to them five revolutions to one of shaft E^1 and pinion I, and twenty-five to one revolution of shaft E, or of main axle B and drive-wheel A.

K is a crank or fly-wheel, mounted on the outer end of shaft E^2, and provided with a friction-roller, k^1, from which motion is imparted to the cutter-bar through pitman K^1. The pitman or connecting-rod K^1 is provided at its inner end with a vertical yoke, k^2, embracing the crank-pin and roller, and passes through a sleeve or tubular pivot, F^3, formed upon the gear-case F, and is attached at the outer end to the sickle-bar head, or to a standard, L, thereon, as represented in fig. 4. M is the shoe at the inner end of the finger-bar M^1, either perforated itself, and mounted directly upon the pivot or sleeve, or provided with a perforated standard, of any desired height, to give the required elevation to the drooping end of the cutter-frame to remove it out of the way of obstructions, said standard in such case being perforated to receive sleeve F^3, and secured thereto by means of a jam-nut, F^4, or in any other suitable manner. The shoe M is elongated in front or rear of the bar, either or both, and is adapted, at its forward end *m*, to receive a carrying-wheel applied thereto, and made adjustable in any desired or usual manner.

m^1 represents the fingers, m^2 the sickle-bar, and m^3 the sickle-section of the cutting-apparatus, all of which may be of any usual or desired construction.

N, fig. 7, is a cap or cover to the outer end of the connecting-rod and cutter-bar head, in the manner represented in red lines, figs. 1 and 4, of sufficient length to accommodate the outward throw of the connecting-rod, and serving to effectually protect the latter from injury and from all obstructing matter.

The attachment of the shoe to the gear-case is such as to allow the fingers and finger-bar to ride easily on the surface of the ground, conform their angle of presentation to such surface, whether the same is level or inclined, as the finger-bar may be turned completely over on its longitudinal axis or pivot F^3 in converting the machine from a front to a rear-cut machine, and the cutter-frame C is so attached to the axle as that it may be swung under said axle from front to rear, in such manner that the machine is changed from a front to a rear cut, and *vice versa*, without removing or adding thereto, and without displacement or disarrangement of any of the parts described.

O is the tongue attached at the axle-end to a tongue-plate, O^1, which is made in the form of an expanded hook, represented in side elevation, fig. 8, which hooks over the axle, or a cutter-frame sleeve thereon, and is held in place by means of a set-screw, *o*, or other suitable fastening-device which will allow the axle to freely turn in the tongue-plate or hook.

P is a lifting-lever, pivoted to the tongue or tongue-plate, and provided with a grooved sector, P^1, to which the chain or cord *p* is attached at one end. The other end of said chain passing under a grooved roller, p^1, mounted in lugs on the cutter-frame, is attached to a lug or upright arm, p^2, on the gear-case F. P^2 is a curved rack in which a spring-pawl, Q, engages to hold the lever, and therewith the cutting-apparatus in any desired position. Q^1 is a small bell-crank lever, pivoted to the handle of lever P, so as to be grasped by the operator in seizing said lever, and connected by a rod, *q*, working in guides, $q^1\,q^2$, to the pawl Q. q^3 is a spiral spring, surrounding rod *q*, and located between pawl Q and guide q^2, which serves at all times to keep the pawl engaged

with the ratchet when not thrown out by the driver in operating the lever. Q^2, figs. 1 and 8, represents an extension of the tongue, or its equivalent, to which the lifting-lever is attached when the machine is adapted to a rear cut, the position of the lever and its several connections being reversed, and operating in the reverse direction, as represented in fig. 8.

R is a ratchet-wheel, secured to and turning with the axle B, and R^1 is a spring-pawl, attached to the drive-wheel, or to a plate or disk, R^2, thereon, and r is a coil spring, attached at one end to a pin or stud on the drive-wheel A or disk R^2, and at its opposite end to the pawl R^1, in the manner represented in fig. 5. The relation of the points of attachment of said spring is such that when the pawl is in position to engage with the ratchet, the spring serves to hold said pawl in, but when the pawl is thrown out, the pin passes the centre or pivot, and the spring serves to hold said pawl out in a manner that will be readily understood.

In figs. 9 and 10 we have shown modifications in the location of the gearing, together with the necessary changes for adapting the said gearing to operate the cutters from such new location. Under such arrangements the ordinary crank and pitman may be employed, if desired, but we prefer to still use the crank-wheel, or its equivalent, and the yoke on the pitman-end in such manner as to give a direct reciprocation to the pitman. In either arrangement, however, the crank and yoke-end may be encased in a small box provided with the finger-bar pivot, arranged and operating as described.

Other changes may be made in the form or construction of the frame to adapt it to the changed location of the gearing, and in other parts of the machine, without departure from our invention.

Having now described our invention, what we claim as new, is—

1. The concentric arrangement of the multiplying-gear relative to the crank-shaft, or an extension of the axial line thereof, substantially as described.

2. The location of the multiplying-gear at the drooping end of the vibrating cutter-frame, and in line with the hinge connection of the cutting-apparatus with said frame.

3. The arrangement of the crank-shaft upon the vibrating cutter-frame, in line with the shaft from which it receives its motion.

4. The enclosing gear-box or case having one or more central bearing partitions, for the purpose and substantially as described.

5. The gear-box or case provided with the two pivotal bearings at right angles to each other, substantially as described.

6. The internally cogged drum or gear-case arranged relative to and vibrating with the cutter-frame, substantially as described.

7. The cutter-frame provided with the yoke to receive the gear-box, or its equivalent, and with the case enclosing the bevel-gears, substantially as described.

8. The arrangement of the crank-shaft and connecting-rod, in the described relation to the two pivots at right angles to each other, upon which the finger-bar turns in accommodating itself to the surface of the ground over which it is drawn.

9. The cap or case enclosing the outer end of the pitman, as described.

10. The removable hooked tongue-plate adapted to be secured to or removed from the axle or sleeve, substantially as described.

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