J. K. HARRIS.

Harvester.

No. 17,678. Patented June 30, 1857.

Fig. 2

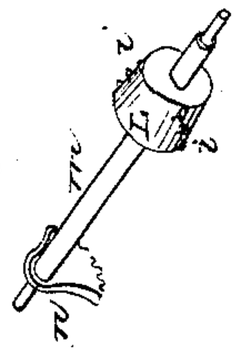


Fig. 4

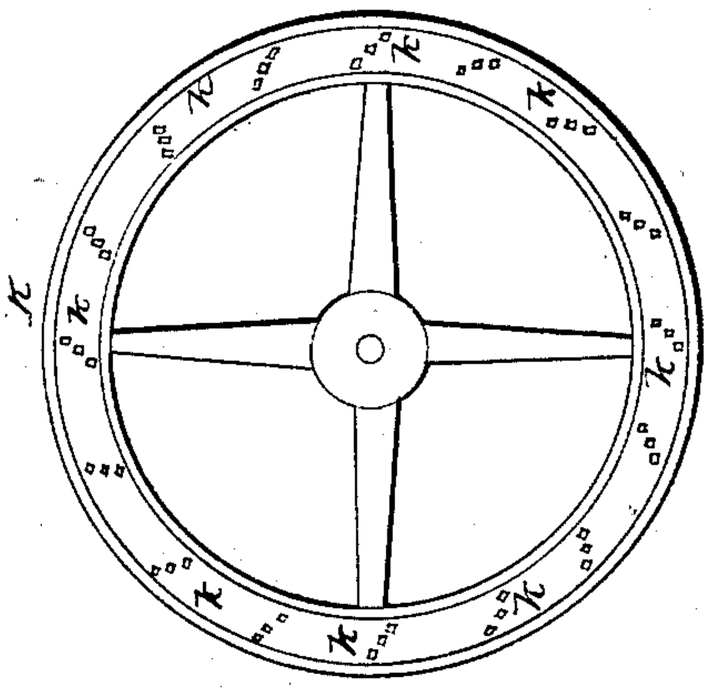


Fig. 3

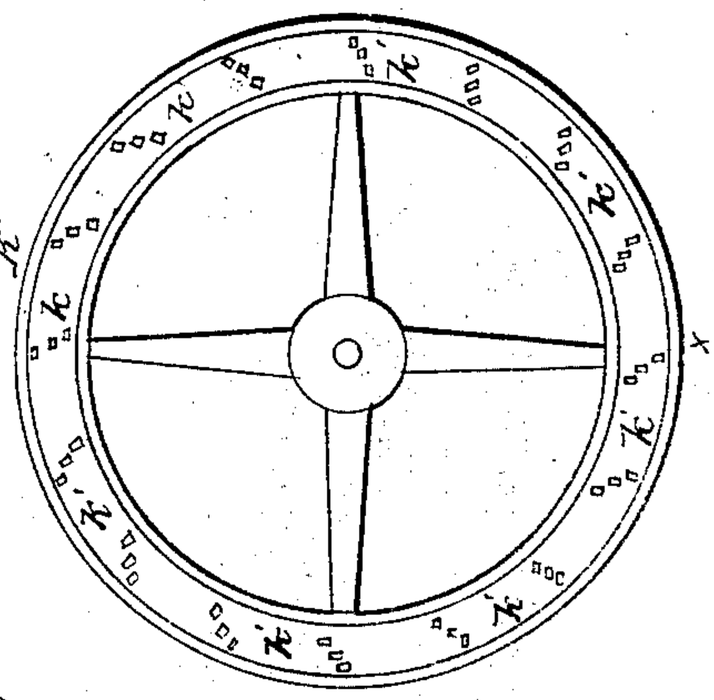
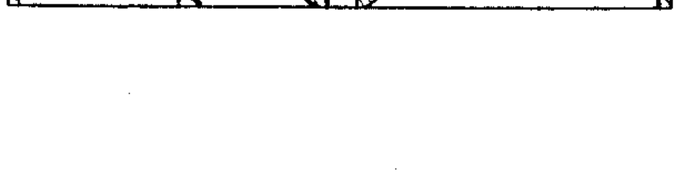


Fig. 1

Fig. 5



UNITED STATES PATENT OFFICE.

JOHN K. HARRIS, OF ALLENSVILLE, INDIANA.

IMPROVEMENT IN HARVESTING-MACHINES.

Specification forming part of Letters Patent No. **17,678**, dated June 30, 1857.

To all whom it may concern:

Be it known that I, JOHN K. HARRIS, of Allensville, in the county of Switzerland and State of Indiana, have invented new and useful Improvements in Harvesting-Machines; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

The chief object of my invention is to give a uniform and easy motion to the cutting apparatus.

The functions of a harvester-cutter require that the necessary advance of the fingers and frame should be accompanied by a constant and uniform action of the knives at all points of their stroke, more especially in cutting grass, which requires a uniform and quick stroke of the cutters to prevent clogging. In machines employing crank and cam motions the cutter-bar, although it moves very quickly at mid-stroke, moves slowly while the crank or cam passes the dead-points of its stroke, thus imparting to the cutters a rapid succession of slow and quick motions, which is the main cause of their choking. The various expedients—such as different forms of fingers and knives and of actuating and transmitting mechanism—which have been resorted to fall so far short of removing this evil that the team has often to be driven beyond its proper speed in order that the motion of the knives at the slow periods may still be sufficiently rapid to prevent choking.

In the accompanying drawings, Figure 1 represents a perspective view of the machine as adapted for mowing; Fig. 2, a detached view of the pinion and segment; Figs. 3 and 4, side elevations of the respective inner disks or faces of the combined drive-wheels, and Fig. 5 an axial section through the line K′ *x* of Fig. 3.

The cutter-frame *a* and tongue *b* are severally secured to the axle in such manner as to admit of their independent vertical motion.

Of the cheeks by which the tongue is secured to the axle the inner one, *c*, is of somewhat extended diameter, and is pierced with apertures, as represented. A pin, *d*, being inserted in one of these, limits the ascent of the frame *a* to any extent desired, while its rise or fall may be eased or restrained by a spring, *g*, projecting from its front end and confined between the adjustable pins *c f*.

The cutters *i* and fingers *j* may be of usual construction.

K K′ are two wheels of similar form and dimensions, which, being both made fast to one axle, compose together the duplex drive-wheel K K′. A beveled face is formed on the inside of each of these wheels near its periphery, on which are arranged alternately oblique sets of two or more cogs, *k k′*.

L is a beveled pinion with two sets of teeth obliquely arranged, corresponding to those on the drive-wheels, with which they mesh alternatingly. The consecutive sets of cogs on each wheel respectively are placed just so far apart as to permit the escape and free backward rotation of the side of the pinion which has been last advancing. In the illustration here given there are three of the cogs *k k′* in each set, forming as many concentric circles of cogs, of which those composing the inner circles are "pitched" one tooth in advance of the next tooth outside in the same set. Hence the teeth on the pinion and those on the drive-wheel where they engage with the pinion range in lines pointing obliquely forward and upward, the effect of which is that the match-teeth of the respective sets engage always "deep in gear," and (without danger of interfering with each other or "hanging" on the back vibration of the pinion) impart a more sustained, easy, and extended vibration to the pinion at a constantly-uniform speed than would result from the use of single teeth. If desired for greater strength, the backs of these teeth may be "bucketed," as they are only required to work one way.

The rear end of the pinion-shaft *m* is mounted with a segment, *n*, having teeth formed on its periphery, which mesh into a straight rack, *o*, on the cutter-bar.

Attached by a hinge to the beam *a′* are springs *q q′*, which, during the working of the machine, confine between them a lug, *p*, on the cutter-bar, by means of which the force derived from the momentum of the cutter-bar is at the completion of each stroke transferred to the spring, and becomes available on the return-stroke to overcome the inertia of the bar. By this means the concussion and jar which would otherwise occur at each change of stroke is pre-

vented, while the even and unirorm reciprocating motion of the cutters is sufficiently preserved, the length of stroke of the knife increasing as the radius of the segment *n* exceeds that of the rocking pinion L *l l'*.

Upon the least increase of labor in the cutters the stress on the pinion tends to raise the bar from the ground, and thus the weight of the entire frame and its appurtenances is made to enforce the action of the cutters, while at the same time the increased downward pressure of the drive-wheel increases its traction or hold on the ground.

s is a small lever attached to the duplex spring *q q'*, which, while said spring is in action, rests on the beam *a'*. By raising this lever the spring is withdrawn from operating on the lug *p*, allowing a more extended motion to the cutter-bar, at which time (the pin *d* being removed) a slight elevation of the frame *a*, by means of the handle *r*, brings the cogs on one side of the pinion L into contact with those of one of the drive-wheels in an inverse direction, rotating the pinion until the cogs thereon attain a vertical position, and thus throwing the cutting apparatus out of gear. The pin *d* being then inserted in a hole of the cheek *c* underneath the frame, and the latter steadied by means of the handle *r*, the machine may be conveyed freely from place to place on its own wheels without imparting motion to the cutting mechanism.

The means of throwing the cutting apparatus out of gear may, if preferred, consist of a suitable lever connecting with the cutter-bar to move it in either direction until the cogs on the pinion are brought into a vertical position, as stated. A device equivalent to this will in any event be desirable for throwing the machine in gear when desired.

The lever *s* may be confined in the desired position by any customary means.

The handle *r* is available, also, while the machine is in action, to temporarily elevate the finger-bar *h*, and enable it to pass over obstructions.

A machine of this construction may be drawn easily by one horse, instead of requiring two, three, or more.

An inferior modification of my plan may consist of a single drive-wheel gearing at opposite extremities of its disk into two pinions, each having but one set of cogs and both attached to the segment-shaft.

This machine may be adapted to harvesting grain by the application of a reel and other customary appliances.

Having thus described my machine, what I claim therein as new and of my invention is—

Imparting to the cutter-bar of harvesting-machines a uniform reciprocating motion by means of the duplex drive-wheel K K', when used in combination with the rocking pinion L, said wheel and pinion being geared by means of alternate and oblique sets of cogs *k k' l l'*, in the manner above set forth.

In testimony of which invention I hereunto set my hand.

JOHN K. HARRIS.

Attest:

GEO. H. KNIGHT,

OCT. KNIGHT.