J. K. HARRIS.

Harvester.

No. 21,804.

Patented Oct. 12, 1858.

Fig. 2.

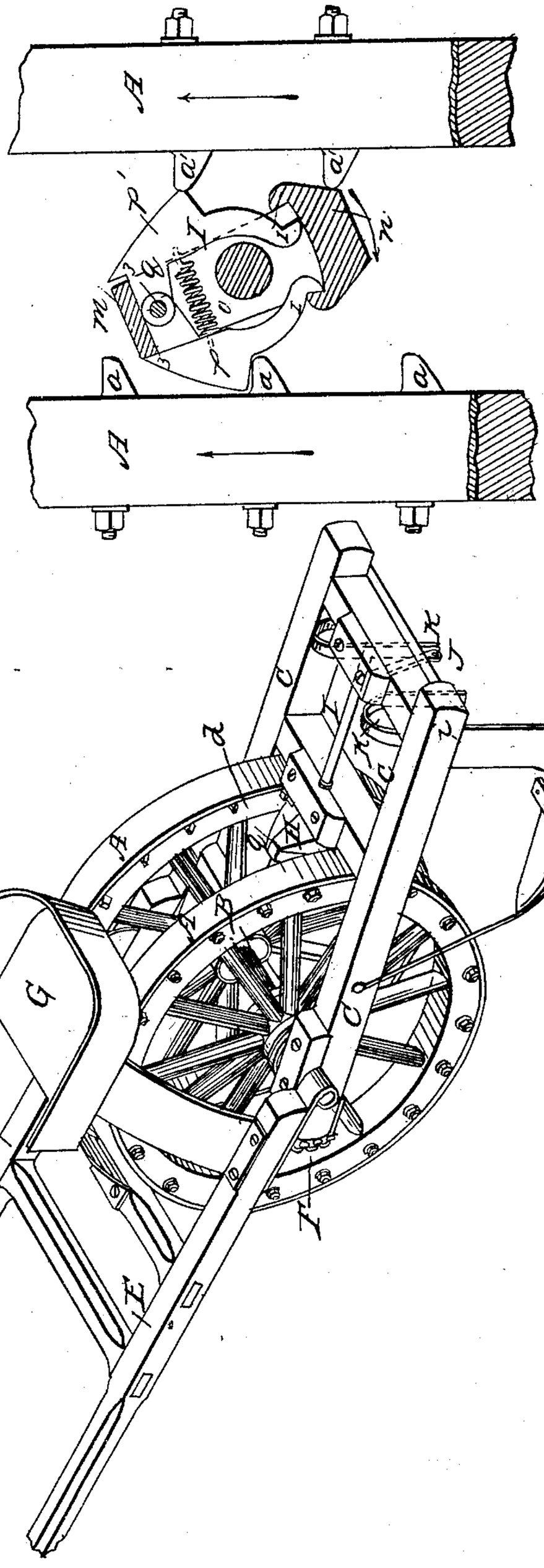

Fig. 1.

UNITED STATES PATENT OFFICE.

JNO. K. HARRIS, OF ALLENSVILLE, INDIANA.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **21,804**, dated October 12, 1858.

To all whom it may concern:

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

Figure 1 is a perspective view of a harvesting-machine as constructed by me, a portion only of the finger-bar being shown. Fig. 2 is an elevation, on a larger scale, of a portion of the drive-wheels of the rocking pinion, with one plate removed to exhibit its internal construction.

This invention relates to that class of harvesting-machines in which the cutter-bar has a longitudinal reciprocating motion imparted to it by means of a rock-shaft and pinion meshing alternately on opposite sides with cogs on the driving-wheel; and it consists in a novel construction of rocking pinion, which by reducing friction and avoiding sudden concussions and lost or intermittent motion lessens the draft and wear and tear of the machine and increases its efficiency, and which, without change of parts, admits of backing the machine with no transmission of motion to the cutter-bar or sensible resistance from the pinion. The following may be mentioned as common disadvantages in this class of machine. First, the rapid reciprocations of the pinion cause sudden concussion between the cogs, which are injurious to the whole machinery, and especially wearing on the cogs themselves; second, if the cogs on the driving-wheel are placed sufficiently near together to take into gear with one side of the pinion immediately the other side is released, the cog which passes out of gear will resist the return motion of the pinion. This will be readily understood by an examination of Fig. 2 of the drawings. It is therefore found necessary to place the cogs at such a distance apart that while the driving-wheel continues to rotate the pinion (and consequently the cutting apparatus) will remain quiescent after every stroke a sufficient time to allow the cog which is passing out of gear to advance beyond reach of the return-stroke of the pinion. This involves lost motion and consequent choking of the cutters, to reduce which as much as possible the cogs on both pinion and wheels are frequently made very thin at the point of contact. This renders them so subject to wear that they soon become incapable of efficient operation. Again, it frequently happens that the cogs are inaccurately spaced, or placed slightly too close together, in which case the cogs which are passing out of gear will receive a severe concussion on the return motion, which destroys the cogs and materially impedes the motion of the machine. It is also evident that any motion of the drive-wheels without acting upon the pinion is followed by a severe concussion when they again engage.

To enable those familiar with harvesting-machines to understand the manner in which I have obviated these difficulties, I will proceed to describe my machine, the description of the pinion being, in the first place, confined to that represented in Fig. 2, which is of the construction preferred.

A A′ represent the two parts of a duplex driving-wheel, provided on their inner faces, near the periphery, with alternate cogs *a a′*, and rigidly fixed to a common axle, B, so as to rotate in unison. The axle B is journaled in a gravitating frame, C, to the rear of which is attached the finger-bar D, adapted to receive a reciprocating cutter-bar of customary construction.

E E are the thills for the attachment of one or more horses, which thills are also journaled on the shaft independently of the frame C.

F are adjustable guard-chains, limiting the possible elevation of the frame C to any extent desired.

G is the driver's seat.

H is the rocking pinion, attached to the rock-shaft I, from which depends an arm, J, which communicates motion to the cutter-bar.

K K are springs, so arranged on each side of the rocking arm J as to receive the momentum of the cutter-bar at the end of each stroke and assist its return, thus avoiding concussion between the cogs.

The rocking pinion H is constructed as follows: *m n* represent respectively the upper and lower portions of the frame of the pinion, connected together by plates *o*, one of which is omitted in Fig. 2 to exhibit the interior construction. *p p′* are yielding cogs pivoted (*q*) near their upper ends to the plates *o*, and furnished with elongated arms 1 1, which, pro-

jecting downward, are confined by lugs 2 2 to prevent their spreading to too great an extent. The upper portions of the cogs *p* are rabbeted at 3, so as accurately to fit the upper plate, *m*. *s* is a spring exerting an outward pressure upon the cogs *p*.

By reference to Fig. 2 the manner in which the pinion operates will now be readily understood. It is here represented as having just completed its stroke in one direction and in the act of commencing the return-stroke in the direction indicated by the arrow.

The cog *a* takes fully into gear with the cog *p* on the pinion the instant that the cog *a'* passes out of gear with the opposite cog, *p'*. It is therefore evident that the cog *a'* will offer resistance to the return motion of the pinion; but the cog *p'*, yielding to the pressure, passes easily over the end of the cog *a'*, after which it is returned to its outward position by the spring *s*, and presents a rigid bearing for the next cog *a'*, which engages with it and again reverses the motion the instant the cog *a* has ceased to act.

It will be observed that the portions *m* and 2 of the pinion-frame afford rigid bearings for the cogs *p* and *p'* during the action of the cogs on the driving-wheel, so that no strain is brought upon the pivot *q* at that time.

It will also be seen that during the backward motion of the driving-wheel the cogs *p p'* will yield without sensible resistance, and without imparting any motion to the cutting apparatus; but on a forward motion being resumed, in whatever position the pinion may be, the cutting apparatus, without sudden jar, instantly resumes its uniform reciprocating motion, which proceeds without halt or variation.

An additional advantage derived from constructing the pinion as above described is the durability of the cogs, as well from the great reduction of friction by the yielding of the teeth as from the fact that the wheel cogs admit of being much larger at the end than is practicable when the cogs in the pinion are rigid. The pinion-cogs *p p'* are usually steel-faced, and by withdrawing the pivot *q* may be readily taken out to be faced or renewed when worn. The relative positions of the pinion-cogs may be made adjustable by set-screws or similar devices, so as to be expanded or contracted and set to any desired depth of gear, or may very easily be thrown entirely out of gear when desired, so as to admit of the machine being drawn from place to place without operating the cutters. A simple means of accomplishing the latter object is by screws or pins inserted through the plate *o*, so as to engage with the arms 1 1 and hold the cogs in a retracted position when so placed.

It will be seen that the position of the spring *s* entirely protects it from injury or undue strain. The ground-spurs on the two wheels should be placed opposite to avoid any unequal strain. The wheel-cogs are case-hardened, and have screw-shanks, which pass through the wheels at an angle slightly oblique to the radius, as seen in Fig. 1, so that the cog itself is close to the tire of the wheel, while an interval occurs between the tire and the shank to which the nut is applied.

I claim as new and of my invention herein—

The rocking pinion H, constructed substantially as set forth, with cogs *p* and *p'*, adapted to yield, as explained, when passing the ends of the wheel-cogs, or on the backward motion of the drive-wheel.

In testimony of which invention I hereunto set my hand.

JOHN K. HARRIS.

Witnesses:

GEO. H. KNIGHT,

OCTS. KNIGHT.