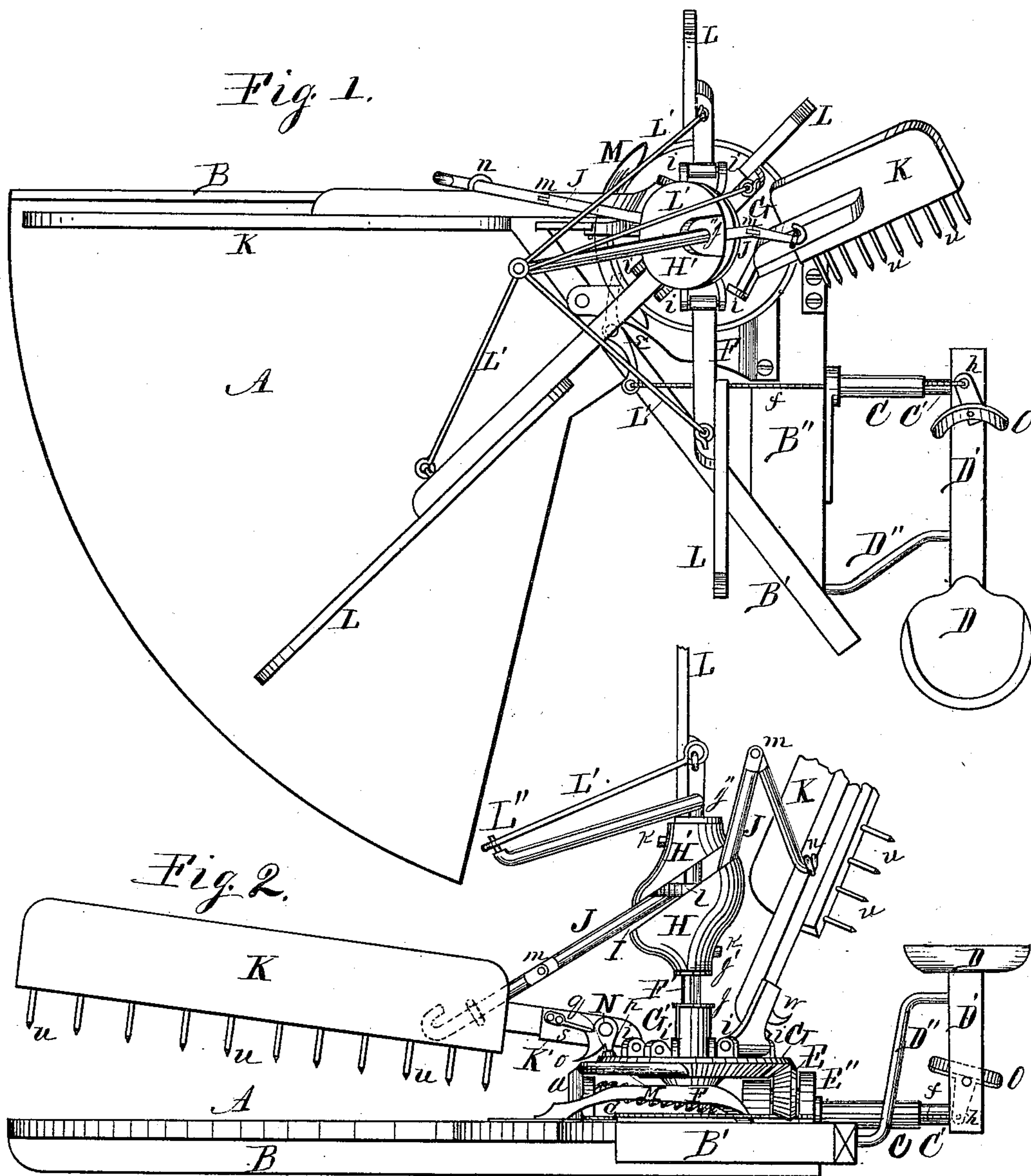


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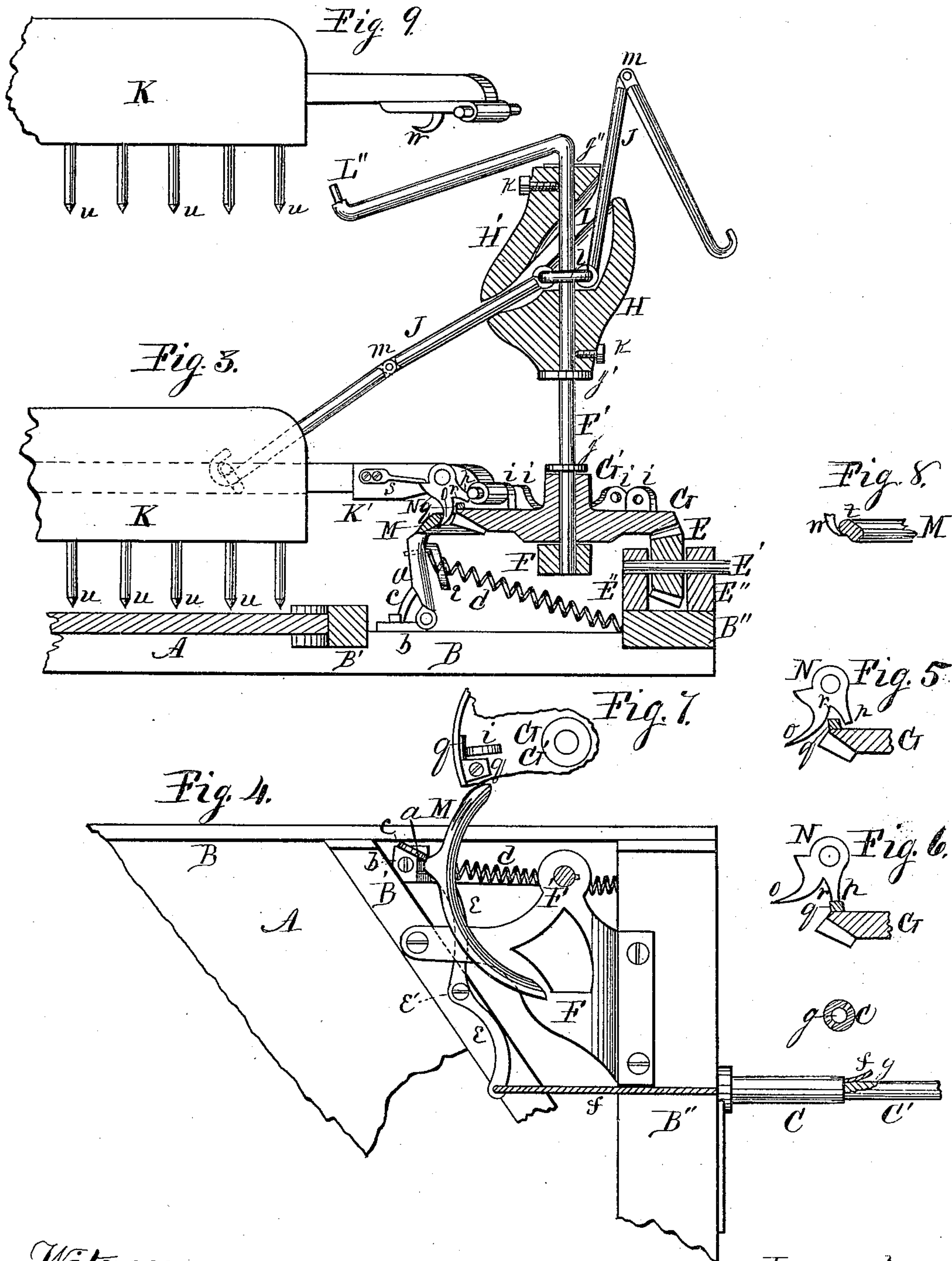
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# UNITED STATES PATENT OFFICE.

DANIEL L. EMERSON, OF ROCKFORD, ILLINOIS.

## HARVESTER-RAKE.

SPECIFICATION forming part of Letters Patent No. 230,867, dated August 10, 1880.

Application filed July 27, 1878.

*To all whom it may concern:*

Be it known that I, DANIEL L. EMERSON, of Rockford, Winnebago county, State of Illinois, have invented new and useful Improvements in Reaping-Machines, of which the following is a full description, reference being had to the accompanying drawings, consisting of two sheets, in which—

Figure 1 is a plan view of my improved harvester-rake, of which Fig. 2 is an elevation; Fig. 3, a vertical section of the crown-wheel and the devices located thereon and operated thereby; Fig. 4, a detail, being a top or plan view of the swinging cam-switch and the devices for operating the same. Figs. 5, 6, 7, and 8 are details of swinging cam-switch stop and pivoted engaging-pawl; and Fig. 9 is a detail, showing a different form of the engaging-catch.

This invention relates to devices for operating the rake-heads and reel-bats of a harvester; and its principal objects are to make the reel-bats travel in a different pathway from that usually traversed by the rake-heads, and to change the operation of the rake-heads, if desired, so that they will operate as reel-bats; and its nature consists in running the cord or rod which operates the tripping device through the axle of the driving-wheel; in providing a cam located upon and extending entirely around the rake past or support for operating the rake-heads; in attaching the jointed connecting-rods to the rake-heads in such a manner that they can slide through an eye projecting from the rake head or arm when the rake-heads are operating as reel-bats; in locating the cam so that the center of motion for the jointed connecting-rods is coincident, or nearly so, with the center of motion of the crown-wheel; in locating the pivot for the reel-bats to one side of the cam, so as to give a different center for the movement of the bats from that which actuates the rake-heads; in producing a swinging cam-switch with which a projection or catch on the rake-head will engage for changing the movement of the rake-heads; in providing a pivoted pawl of a peculiar construction located on the rake head or arm, and operating with the swinging cam or switch, as hereinafter specified; in providing a stop on the crown-wheel to engage with the piv-

oted pawl to hold the rake-head up from the platform; in providing a lever and spring for operating the swinging cam or switch, and in the several parts and combination of parts hereinafter set forth.

In this application only such parts of a complete machine are shown as are necessary to represent my invention. Other portions required to produce a complete machine may be any of the known devices employed in any known form for like purposes, and hence are neither shown nor described.

In the several figures, A represents the receiving-platform of a harvester; B, the cutter-bar; B', angle-beam, and B'' end beam. These parts, framed and joined in the manner represented, constitute the main frame, and are substantially the same as machines now found in the trade.

C represents the axle-arm of the main driving-wheel, fixed to the main frame and fitted to receive a driving-wheel to revolve thereon. This axle-arm is provided with a lengthwise central opening, *g*, to receive the cord or rod *f*, for a purpose hereinafter to be explained.

C' represents an extension of the axle-arm, which, in connection with the curved bracket D'', serves to receive the seat-support D', on which is mounted the driver's seat D.

E represents a pinion mounted on a shaft, E', fitted to revolve in bearings E'', fixed on the main frame, and in such relative position with the crown-wheel that its teeth will engage the teeth of the crown-wheel.

F represents a spider fixed to the main frame, which serves to support the rake-post F' in a vertical position, having its lower end portion firmly fixed in the spider.

G represents a crown-wheel having its hub G' bored to receive the lower vertical portion of the rake-post F', on which it is fitted to revolve in such relative position with the pinion that the teeth of the respective wheels shall engage each other in a proper working manner. A collar, *j*, on the rake-post serves to hold the crown-wheel in working contact with the gear-toothed pinion.

The operating-cam to control the movements of the rake-heads is composed of two portions, H and H', mounted on the vertical portion F' of the rake-post at a proper distance above



the crown-wheel, the lower portion, H, resting on the collar  $j'$ , and the upper portion, H', against the collar  $j''$ . These portions are separately fixed to the rake-post by suitable set-screws  $k$ , by means of which they can be properly adjusted.

The adjacent working-faces of each portion of the cam are oblique and inclined to the vertical axis of the rake-post, as shown in Figs. 2 and 3, and the contour of these edges is that of an imperfect oval partaking of the form of an ellipse.

The upper oblique face of the lower portion, H, of the cam is cut away in its vertical center, which gives to its upper portion a shell form, and produces a center surface at right angles to the rake-post, to receive a ring-support,  $l$ , to revolve on the post in the center of the cam.

The two portions of the cam are separated a sufficient distance to form the inclined groove I for the free passage of the jointed connecting-rods J.

The connecting-rods J are formed of two pieces or links pivoted to each other at  $m$ , the inner links being hinged at their inner ends to the ring-support  $l$ , located centrally between the two portions of the cam, to revolve on the vertical portions of the rake-post, and the outer links having their outer ends made in hook form, to engage an eye,  $n$ , on the rake-heads or arms; to carry the rake-heads suspended in the hook of the jointed connecting-rods controlled by the cam throughout their entire revolution; to direct the movements of the rake-heads on their hinged connection with the crown-wheel in their entire revolution; to cause them when approaching the cutter-bar to descend to, or nearly to, and traverse the platform in a plane substantially parallel thereto; to sweep the cut grain therefrom, and when the rake has delivered the gavel it will rise to a nearly vertical position to pass the driver and the team and again descend, as described, to sweep the cut grain from the platform.

K represents the rake-heads, which are of the usual form, provided with teeth  $u$  and with a hinged connecting portion,  $K'$ , pivoted between the ears  $i$  of the crown-wheel in such a manner as to permit of a free vertical swinging movement of the heads. These rake-heads are also capable of use as reel-bats to gather the grain to the cutters and deposit it on the platform, and are placed under the control of the driver, to be employed either as a reel-bat or a rake, for the purpose for which like devices are employed in harvesting-machines; to accomplish which I have employed a swinging cam-switch, M, of a segment-ring form, curved to conform to the outer curved edge of the crown-wheel, having its ends curved outward. This cam-switch is placed on the same plane of the crown-wheel and on the side thereof toward the platform, and is supported in position on a standard,  $a$ , pivoted to a foot-plate,  $b$ , fixed to the main frame in such a

manner as to permit the cam-switch to swing outward from the crown-wheel, which movement is limited by a stop,  $c$ .

$d$  represents a coiled spring, one end of which is fixed to the pivoted standard  $a$  and its other end to the main frame, in such a manner that its spring-action will operate to hold the cam-switch in its position nearest the crown-wheel.

$e$  represents a lever pivoted to the main frame at  $e'$ . Its forward end engages with the pivoted standard  $a$ , and its rear end is fitted with a cord,  $f$ , which is passed through the opening  $g$  in the axle, and its outer end is fixed to the free end of the arm  $h$  of the foot-lever O. From this arrangement it will be seen that if the foot-lever is moved in the proper direction the cam-switch will be moved from the crown-wheel in contact with the stop  $c$ , and if the action of the foot-lever be reversed the action of the spring  $d$  will cause the cam-switch to return to its position nearest the crown-wheel.

N represents an engaging-pawl pivoted to the rake-arm in such a manner that in the revolutions of the rake-heads its depending curved toe portion  $o$  will pass on the outside of the cam-switch, which, in the descent of the rake, will swing the pivoted pawl outward and cause its heel portion  $p$ , as the rake descends, to rest on the stop  $q$  on the crown-wheel, which will hold the rake elevated, as in Fig. 2, to operate as a reel-bat; and when the rake is thus employed the hooked portion of the jointed connecting-rod will slide endwise through the eye  $n$ , projecting from the rake arm or head, as represented in Fig. 1 and in dotted lines at Fig. 2. In this elevated position the rake will be carried over the platform in a plane parallel thereto until the jointed arm, in ascending the rear inclined surface of the cam, will withdraw the hooking portion of the jointed connecting-rod until its hooked end will engage the eye  $n$  and elevate the rake to a nearly vertical position, to be carried past the driver and team, to again descend and operate as a reel-bat in its second revolution. This operation will be repeated by each rake-head in each revolution of the crown-wheel when employed as a reel.

To relieve the frictional contact of the engaging-pawl with the cam-switch throughout its movement over the platform, I enlarge or elevate the forward portion of the cam-switch to seat the heel  $p$  of the pawl on the stop  $q$ , and then depress or reduce the cam-switch, which will relieve the pawl from contact therewith throughout the remainder of its movement, unless by accident the heel of the pawl is thrown from or shifted on the stop. When these rake-heads are required to operate as a rake to sweep the cut grain from the platform it is accomplished by means of the foot-lever O, to swing the cam-switch from the crown-wheel against the stop  $c$ , which will permit the depending curved toe portion  $o$  of



pawl N to engage the inner face of the cam-switch, which will swing the pawl inward, so that its heel *p* will pass over the stop *q*, and the curved toe of the pawl, engaging the inner face of the cam-switch, will cause the rake to descend to the platform suspended in the hook of the jointed arm or rods, to traverse the platform in a parallel plane thereto to sweep the cut grain therefrom.

10 *s* is a retaining-spring employed to limit the outward movement of the engaging-pawl.

In this operation the hooking-toe of the pawl engaging the cam-switch serves to hold the rake in its lowest position, limited by the hook of the jointed arm or link engaging the projecting eye *n* on the rake-arm. This operation may be repeated by each rake-head in each revolution, or they may be employed either as a rake or reel, but, when desired, governed and controlled by the will of the driver through the means of the foot-lever and its connection with the cam-switch.

In this construction I have made the stop *q* movable, which, when removed, will permit the rake-head to descend in each revolution, limited in its descent only by the hook of the jointed connecting-rods engaging the eyes *n*, projecting from the rake-arms. In this form the rake-heads will act continuously as rakes.

30 From the foregoing it will be seen that in my improved machine the rake-heads will revolve on the same vertical center with the crown-wheel when employed either as a rake or reel-bats.

35 The engaging-pawl N is capable of a reverse action, in which instance the construction of the parts would be such that in the passage of the depending toe of the pawl on the outside of the cam-switch, its heel would be carried over the outer edge of the crown-wheel, and permit the rake-head to descend to sweep the platform as a rake; and when its toe portion passes on the inside of the cam-switch its heel portion would be carried inward to rest on the crown-wheel, and carry the rake-head suspended above the platform to act as a reel-bat to deposit the grain on the platform, all of which would be within the scope of my invention.

50 *L* represents reel-bats employed to gather the standing grain to the cutters and deposit the cut grain on the platform. These reel-bats are of the usual form, and are hinged to the crown-wheel between the ears *i* thereon, in the usual manner, free to vibrate vertically, and they are suspended on their hinged connections with the crown-wheel by means of the links *L'*, hinged to the reel-arms and pivoted to a center, *L''*, overhanging the platform, and which in this instance is an angular declining portion of the vertical rake-post; but it may be a separate or independent piece fixed to and extending from the upper portion, *H'*, of the cam.

65 From this arrangement it will be seen that the reel-bats in their revolutions revolve on

two independent centers, one of which being the common vertical center of the crown-wheel and rake-heads, and the other the independent overhanging center *L''*. This arrangement gives to the reel-bats a different outline of travel from that usually traversed by the rake-heads, because they are controlled in their revolutions by an additional different center from the vertical coincident centers of the rake-heads, and being carried on their centers by the rotary movement of the crown-wheel in approaching the cutters, will descend into the standing grain, hold it against the cutters, and deposit it, when cut, on the platform.

In the several details, Figs. 5, 6, and 7, the parts designated by the reference-letters are the same as like parts designated by like letters of reference referred to in the foregoing description, and will be understood without further description.

In Fig. 9 I have represented a modification of the pivoted engaging-pawl, in which *w* represents the depending curved point of a catch fixed to the rake-arm, which, when the rake is employed as a reel-bat, is designed to engage the outer curved surface of the cam-switch to carry the rake above the platform to operate as a reel-bat, and to engage its inner surface, as at Fig. 8, when employed as a rake to sweep the cut grain from the platform. Motion being imparted to the driving-pinion from the moving parts of the machine, will be transmitted to the crown-wheel, causing it to revolve and carry with it the rake-heads and reel-bats pivoted thereon, by which movement the reel-bats will be made to revolve on their two independent centers, with which they are connected, and guided in the track of their movements to operate as reel-bats, as in the foregoing description, and the rake-heads will be made to revolve on their coincident vertical centers and guided in the track of their movements by their connections therewith, controlled by the cams to traverse the platform in planes substantially parallel thereto, but differing in height when employed as a rake or as a reel, as in the foregoing description.

In the foregoing I have represented and described a pivoted engaging-pawl as a device employed to change the rake to operate either as a rake or reel-bat, and I have also shown and described a depending fixed hook capable of use for the same purpose, but do not wish to confine myself to these particular forms, as it is evident that other forms equally simple and effective, such as a button or pivoted lever arranged to enter between the rake-arm and upper surface of the crown-wheel, operated by a cam-switch or other equivalent means, may be employed to hold the rake-head elevated above the platform in its rearward movement to operate as a reel-bat, and the reverse movement of the cam-switch or other like operating device would cause the button or lever to be removed to permit the rake to



descend to the platform and operate as a rake to sweep the cut grain therefrom.

I claim as my invention—

1. The combination, with the hollow main axle of the driving-wheel, of a tripping cord or rod passing through the axle and a tripping mechanism, substantially as and for the purpose hereinbefore set forth.

2. The combination, with a crown-wheel having rake-heads and reel-bats pivoted thereto and fitted to revolve on a fixed vertical rake-post, of a cam extending entirely around the rake-post and mounted thereon above the crown-wheel and on the same vertical center, and arms engaging at their ends with said cam, and their outer ends connected with the rake-heads, said arms constructed and adapted to allow the rake-heads to rise and approach the cam to within a distance less than the length of the supporting-arms, substantially as set forth.

3. A cam located upon and extending entirely around the rake-post above the crown-wheel, in combination with jointed connecting-rods and rake-heads, the connecting-rods pivoted to the rake-heads and mounted to revolve on the same vertical center of the crown-wheel, substantially as specified.

4. The combination, with a crown-wheel having rake-heads and reel-bats pivoted thereto, a fixed vertical rake-post, a cam extending entirely around the rake-post, and jointed rods engaging at one end with said cam and their opposite ends connected with the rake-heads, of the overhanging pivoted center of the reel-

bats and connecting-rods, their opposite ends connected with the overhanging center and the reel-bats, substantially as set forth.

5. The combination, with a cam surrounding the rake-post and jointed connecting-rods, their outer ends connected with the rake-arms and their opposite ends engaging with said cam, of a pivoted cam-switch and an engaging-pawl pivoted to the rake arm or head, substantially as set forth.

6. The combination, with a cam surrounding the rake-post and jointed connecting-rods their outer ends connecting with the rake-arm and their opposite ends engaging with said cam, of a pivoted cam-switch, an engaging-pawl pivoted to the rake arm or head, and operating devices, substantially as described, for actuating the switch, substantially as set forth.

7. The pivoted pawl or catch N, provided with the curved point *o* and the heel *p*, in combination with the swinging cam-switch M and stop *q*, engaging the heel *p*, for keeping the rake-heads clear of the platform, substantially as specified.

8. The outer link of the jointed connecting-rods J, provided with a hook, in combination with the eye projecting from the rake head or arm for making a self-adjusting connection for the rake-head, operating substantially as specified.

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Witnesses:

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