(No Model.)

4 Sheets—Sheet 1.

G. H. HOWE.

REAPING MACHINE.

No. 387,684. Patented Aug. 14, 1888.

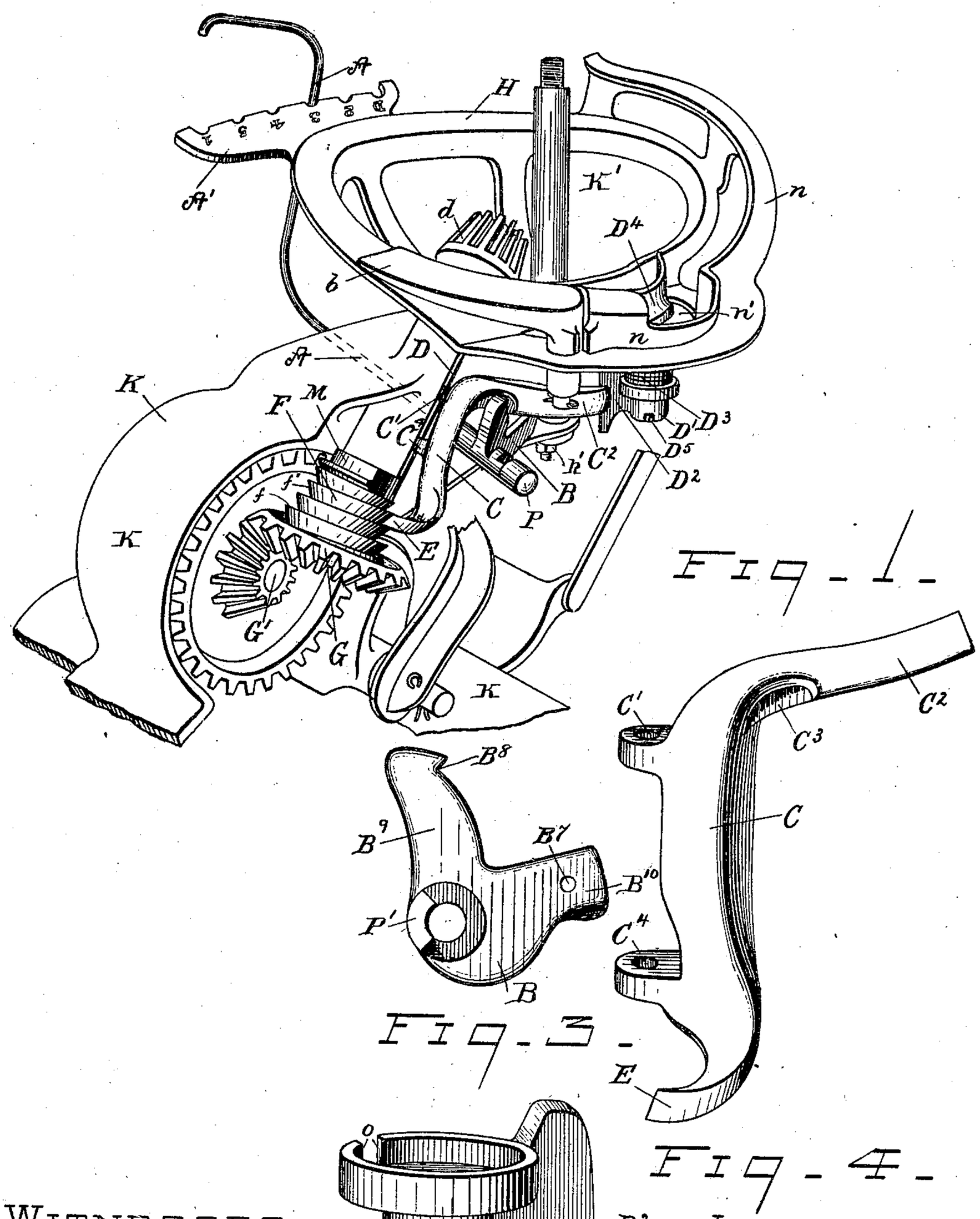

FIG. 1.

FIG. 3.

FIG. 4.

FIG. 5.

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(No Model.)

4 Sheets—Sheet 2.

G. H. HOWE.

REAPING MACHINE.

No. 387,684. Patented Aug. 14, 1888.

Fig. 2.

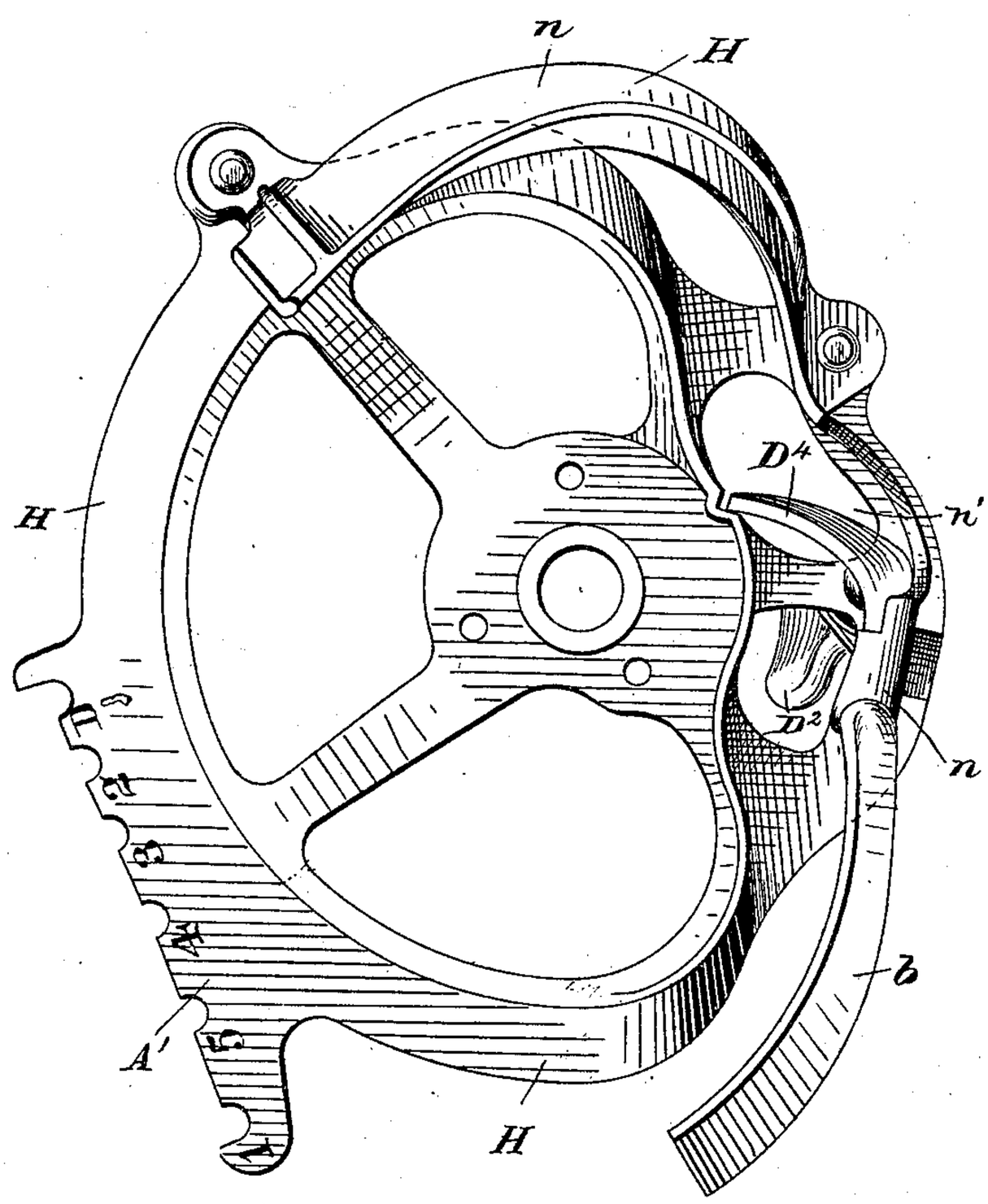
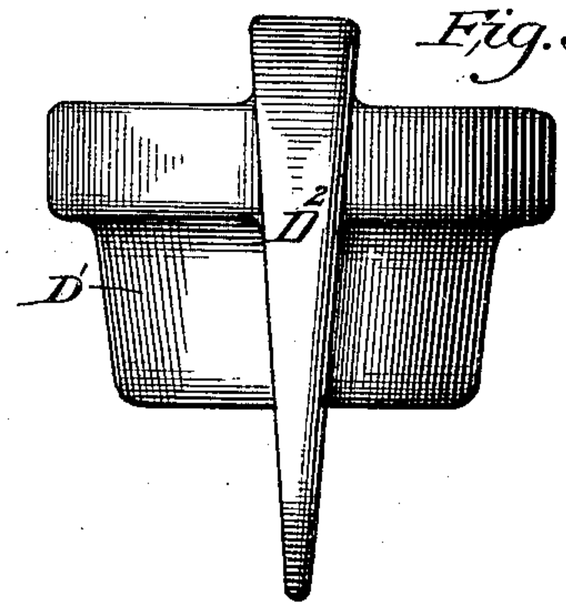


Fig. 5.a



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4 Sheets—Sheet 3.

G. H. HOWE.

REAPING MACHINE.

No. 387,684. Patented Aug. 14, 1888.

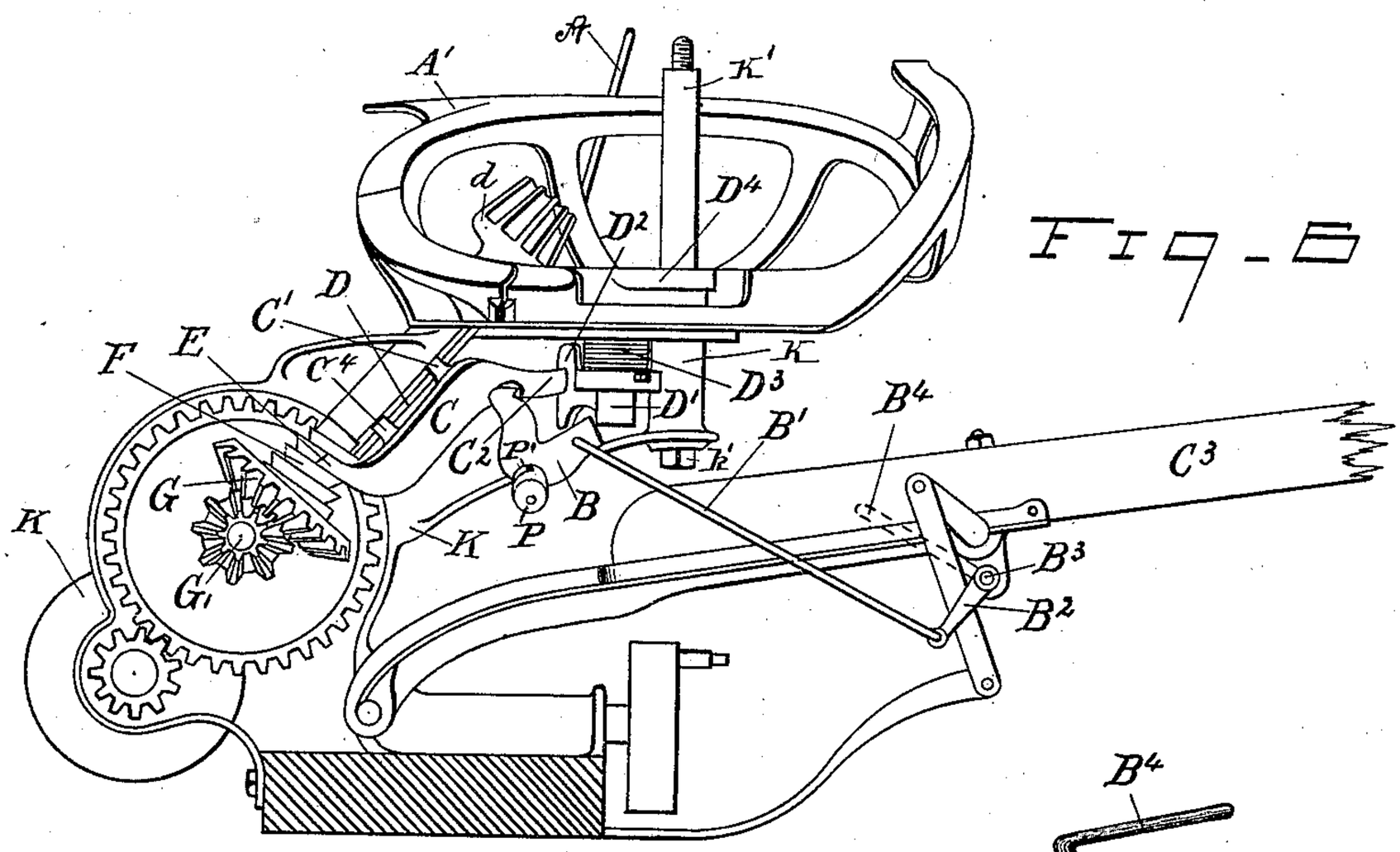

FIG-6

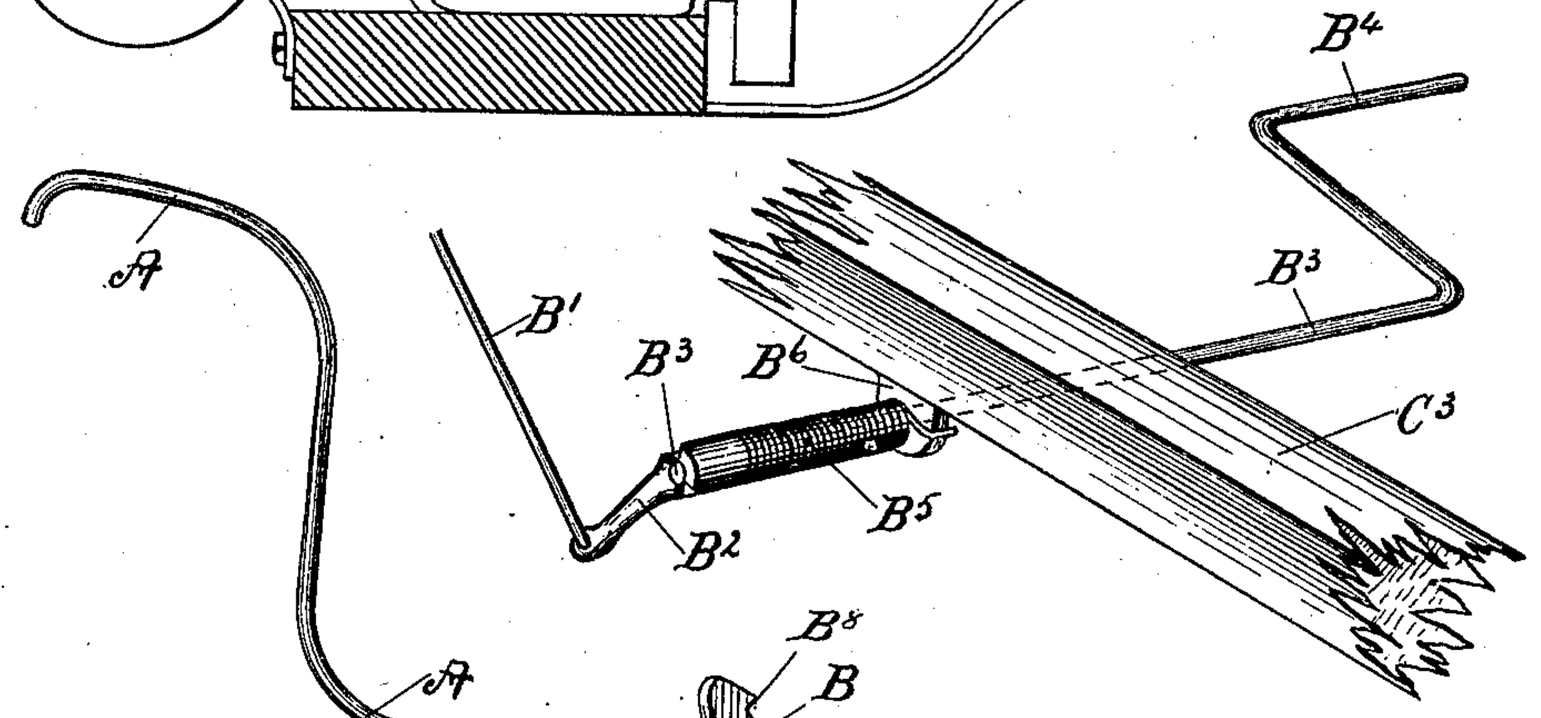

FIG-8-

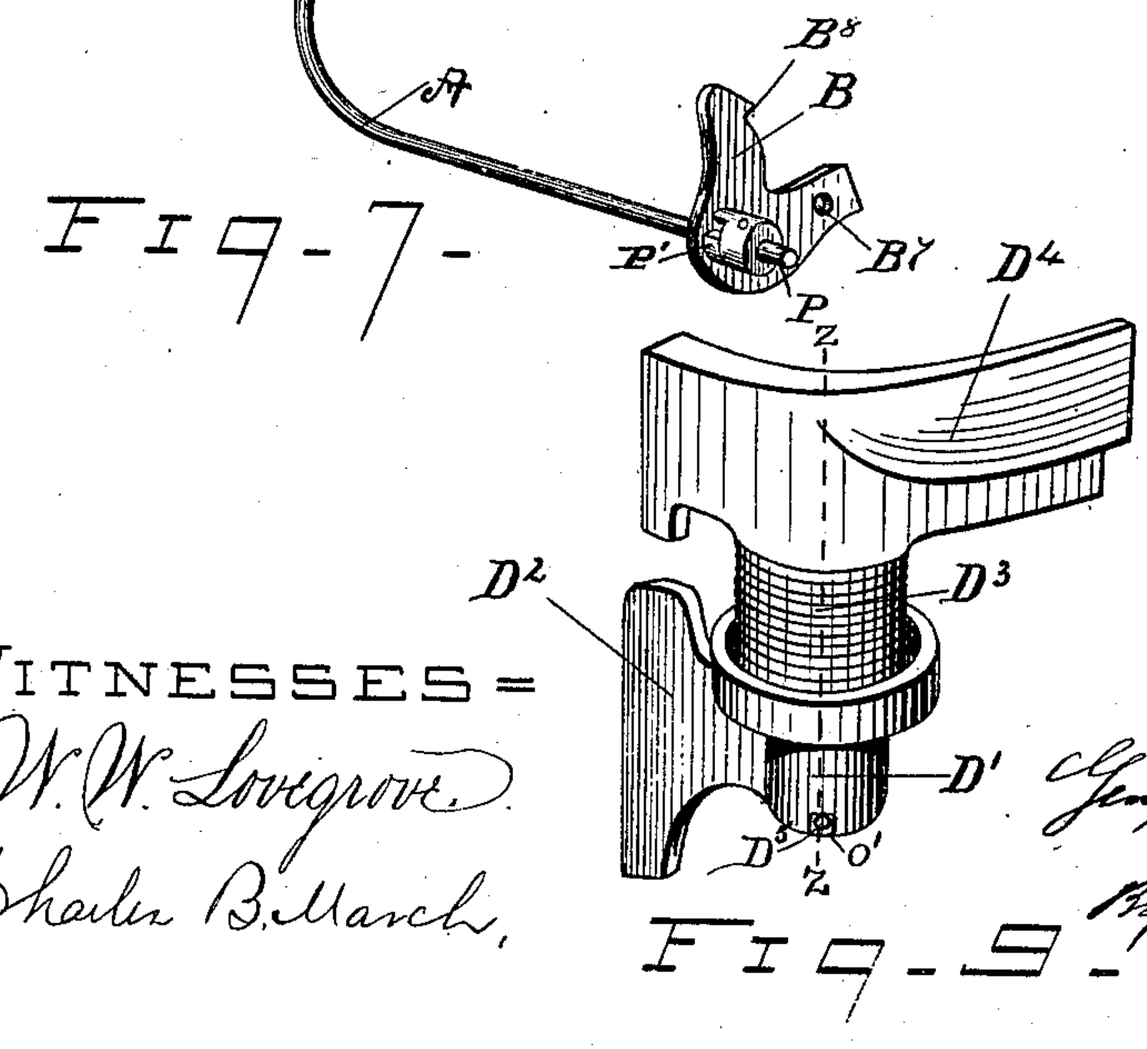

FIG-7-

FIG-9-

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4 Sheets—Sheet 4.

G. H. HOWE.

REAPING MACHINE.

No. 387,684. Patented Aug. 14, 1888.

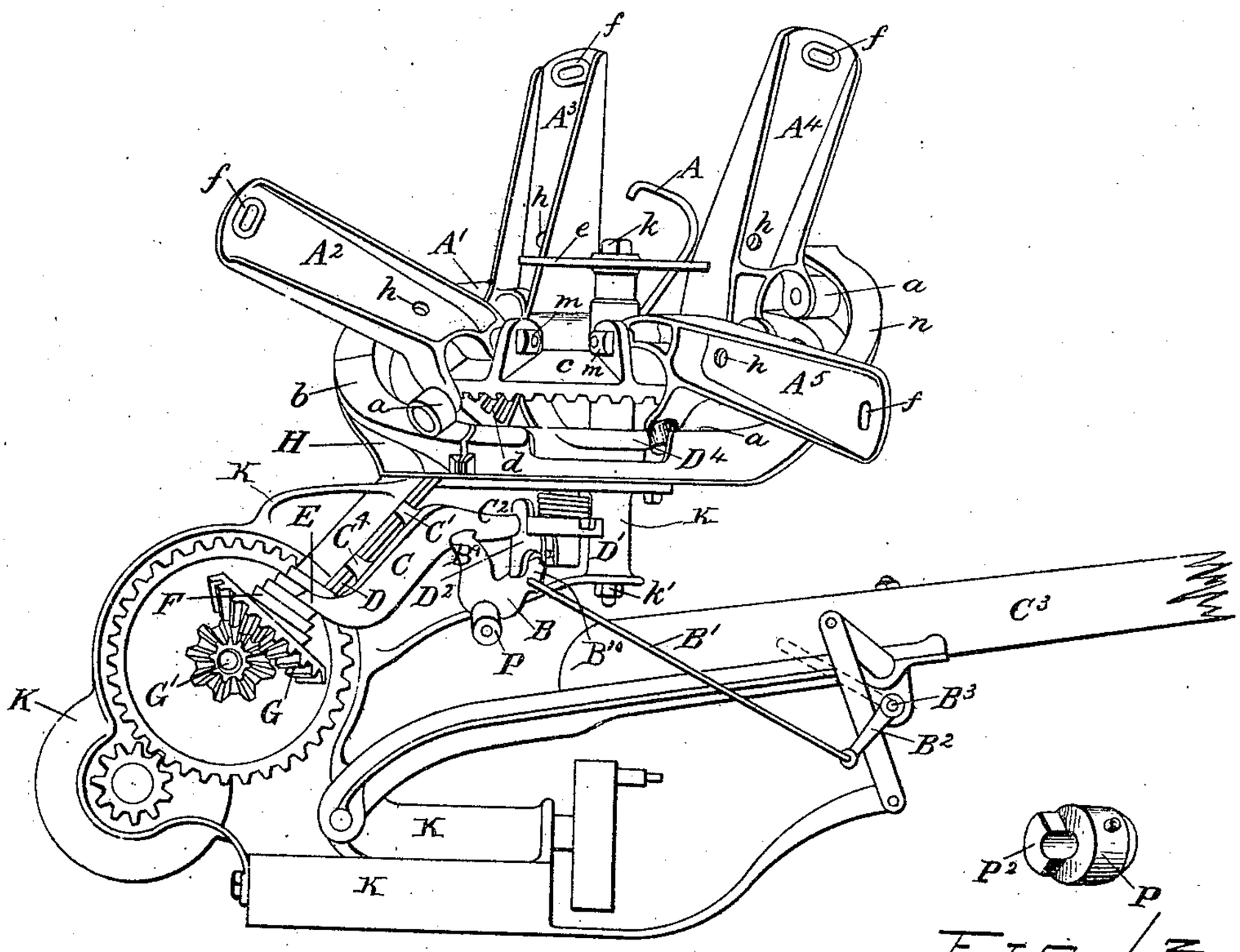

Fig. 10.

Fig. 13.

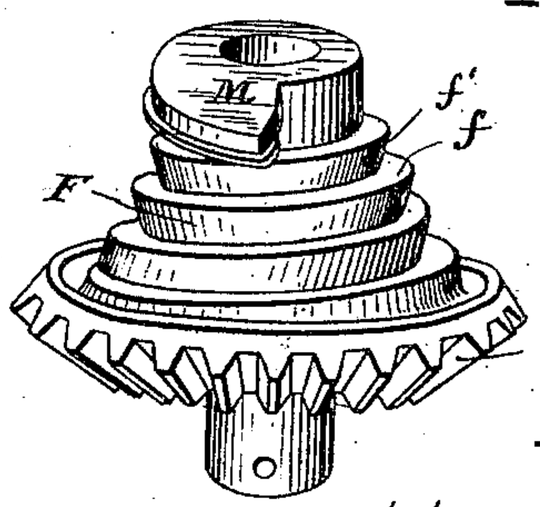

Fig. 11

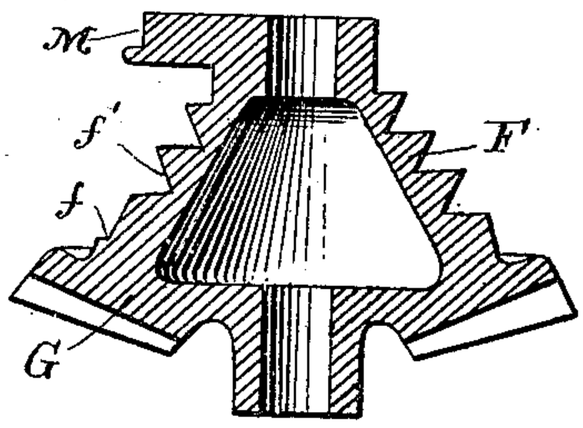

Fig. 14

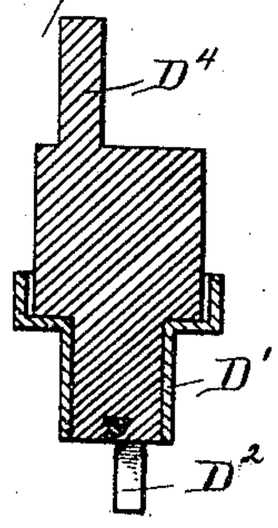

Fig. 12

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UNITED STATES PATENT OFFICE.

GEORGE HUTCHINS HOWE, OF HOOSICK FALLS, NEW YORK, ASSIGNOR TO THE WALTER A. WOOD MOWING AND REAPING MACHINE COMPANY, OF SAME PLACE.

REAPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,684, dated August 14, 1888.

Application filed December 5, 1887. Serial No. 257,021. (No model.) Patented in England April 29, 1886, No. 5,838.

To all whom it may concern:

Be it known that I, GEORGE HUTCHINS HOWE, a citizen of the United States, residing at Hoosick Falls, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Reaping-Machines, (for which Letters Patent No. 5,838 of 1886 have been granted in Great Britain on the 29th day of April, 1886;) and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification.

My invehtion relates to that class of machines known as "sweep-rake reapers," in which a series of rakes sweep the accumulated grain from the platform, and more particularly to the controlling mechanism by which the said rakes are caused to act either as beaters to lay the grain upon the platform or as both beaters and rakes to sweep the grain therefrom, as will be more fully hereinafter described, and pointed out in the claims.

Referrring to the accompanying drawings, in which similar letters of reference indicate like parts, and in which only so much of a sweep-rake reaper is shown as is necessary to illustrate my invention—

Figure 1 is a perspective view of my automatic controlling mechanism. Fig. 2 is a plan view of the cam-track, its switch and latch. Fig. 3 is an elevation of the forked stop-plate which determines the point on the spiral to which the lever shall fall. Fig. 4 is a perspective of the lever which automatically controls the action of the rakes. Fig. 5 is a perspective view of a wing and collar attached to the switch, through which the switch is operated by the lever shown in Fig. 4. Fig. 5ª is a rear elevation of the wing shown in Fig. 5. Fig. 6 is an elevation of my invention. Fig. 7 is a perspective view of the lever for setting the rakes to any desired order of operation. Fig. 8 is a detached view in perspective of the lever and its attachments by which the driver controls the rakes. Fig. 9 is a perspective view of the switch and its operating wing and attachments. Fig. 10 is an elevation, the arms to which the rakes are attached being shown. Fig. 11 is a perspective of the spiral and its integral cam and pinion; Fig. 12, a vertical section through Fig. 11. Fig. 13 is a perspective view of a collar attached to the setting-lever. Fig. 14 is a vertical cross-section through line Z Z, Fig. 9.

Motion is imparted from the driving-wheel (not shown in the drawings) in any well-known way to the bevel-pinion G′, which drives the pinion G, secured by a pin passing through a hole in its hub to an inclined shaft supported in suitable bearings in the frame K. On the upper end of this shaft is fastened the bevel-pinion *d*, which meshes into and drives the large inverted-crown-shaped bevel gear-wheel *c*, on the upper surface of which are hinged the arms A^2 A^3 A^4 A^5, to which are bolted the rakes or beaters. The number of teeth in the bevel-wheel *c* must always be a multiple of the number of teeth in the pinion *d*, and this multiple must correspond with the number of rakes; and in the construction shown, as there are four rakes, so there are four times as many teeth in the bevel-wheel *c* as there are in pinion *d*. The rakes are fastened to the arms A^2 A^3, &c., by bolts passing through holes *h* at their lower and slots *f* at their upper ends. These slots permit the proper adjustment of the rakes or beaters with reference to the platform. The inverted bevel gear-wheel *c* is provided with a long hub, and is supported upon a shaft or stud, K′, on which it turns loosely. This shaft or stud is fast in the forward part of the frame K. The shaft K′ passes down through the frame K, and the nut *k*′, screwed on its lower end, prevents it from moving upwardly. The nut *k*, which is screwed onto the upper end of the shaft K, holds the disk *e* in place on shaft K′. (See Fig. 10.)

The inverted bevel-wheel *c* is provided with a pair of ears for each rake, between which ears the arms A^2 A^3, &c., are hinged by the bolts *m*, passing through holes in the ears and in the lower ends of the arms A^2 A^3, &c. By this arrangement the rakes are capable of receiving an up-and-down movement while passing over the platform on which the grain falls. Below the wheel *c*, which supports the rakes,

is a cam-shaped track, H, supported upon the frame and of somewhat greater diameter than the wheel *c*. The arms A^2 A^3, &c., are bifurcated at their lower ends. One limb of the bifurcation forms part of the hinge before alluded to, which connects the arms to the gear-wheel *c*, and the other limb is furnished with a roller, *a*, which turns loosely on a stud fastened in the arm. When the bevel gear-wheel *c* revolves, it carries the rake-arms with it, and the rollers *a* follow the contour of the cam-track H. The cam-track H is inclined, and the part thereof adjacent to the platform is sufficiently lower than its other portion to permit the rakes to sweep the platform, which they would always do were not some way provided to guide the rollers *a* away from this portion of this cam-track H. The portion of the cam-track adjacent to the platform is provided with an outer wall, *n*, which curves outwardly at the opening *n'*, and is provided with the switch D^4, the vertical pin of which passes through the cam-track and has secured thereto at its lower end a cup-shaped collar, D', provided with the wing D^2, Figs. 1, 5, 6, 9, 10, and 14. A spiral spring, D^3, is coiled around the vertical pin of the switch, and its upper end is fastened to the cam-track or to some fixed portion of the machine and the lower end is fastened in the notch *o* in the periphery of the collar. The tendency of the spring is to force the free end of the switch D^4 against the inner wall of the cam-track H, as hereinafter explained, and shown in Fig. 1, the vertical pin of the switch turning freely in its bearings in the cam-track. The outer wall, *n*, is also provided with the pivoted latch *b*, which normally rests with its free end upon the cam-track H, but is capable of being swung outwardly on its pivot.

It is evident that when the parts are in the position shown in Fig. 1 the roller secured to the rake will be guided from the inner wall of the cam-track H over the switch D^4, wall *n*, and latch *b*, and that the rake will be raised above the platform. When, however, the switch D^4 is moved against the wall *n* or in the opening *n'*, the roller will follow the contour of the inner wall of the cam-track H and will swing the latch *b* outwardly and the rake will sweep the platform. The succeeding roller, which rides over the switch D^4 and wall *n*, will as it advances gradually move the latch *b* back to the position shown in Fig. 1.

The bevel-pinion G on the lower end of the inclined shaft, through which motion is imparted to the rakes, is made integral with a cone forming its hub, on which a spiral, F, is cast, extending from the bottom to the top, where it is extended into the cam M. A crooked lever, C, is provided with two ears, C' C^4, with holes which take over the rod D, Figs. 1, 6, and 10, by which arrangement the lever can slide up and down, as well as turn upon the rod as a pivot. The end E of the lever C rests upon the face *f* of the spiral F, and it is plain that if the spiral be revolved and the end E be also held against the face *f'* the lever C will ride up on the spiral onto the cam M on the apex of the spiral. As the lever C is raised by the spiral F, its upper bent arm, C^2, bears against the face of the wing D^2, which is made wedge-shaped to compensate for the constantly-decreasing diameter of the convolution of the spiral upon which the end E rests, so that the end E of the lever C may be held upon the spiral. The collar on which the wing D^2 is formed is secured to the vertical pin of the switch D^4 by a pin, D^5, passing through the transverse slot *o'* in the collar, so that the spring D^3, besides holding the switch D^4 against the inner wall of the cam-track H, also has a tendency to keep the wing D^2 against the arm C^2 of the lever C, the slot *o'*, by which the collar of the wing D^2 is fastened to the vertical pin of the switch D^4, permitting the wing D^2 a limited rotary movement independent of the switch.

A' is the index-plate, mounted on the upper edge of the cam-track and provided with the notches 1 5 4 3 2 D, to receive the bent lever A, which is so formed as to spring into the notches and remain there, except when moved by the operator. The lever A passes downwardly from the index-plate A' and horizontally through the frame, in which it has a bearing. It is provided on its inner end with the collar P, pinned fast thereto. The forked plate B is mounted loosely on the lever A, and the adjacent faces of the collar P and forked plate B are provided with the projections P^2 P'. In the hole B^7 of the plate B is hooked a rod, B', the other end of which is hooked into an arm, B^2, of the rod B^3, which is journaled in suitable bearings, B^6, on the pole of the machine, and has a second crank-arm, B^4, in suitable position for the driver to operate it with his foot, the rods B' and B^3 forming leverage-connections to the forked plate B, within reach of the driver. A coiled spring, B^5, is slipped over the rod B^3, and its force is applied to push the plate B backward, so that the projection P' will abut against the projection P^2. When the end E has been raised by the spiral F onto the cam M and when it leaves the cam M, it is evident that the lever C will drop upon the arm B^9 of the plate B, which forms a stop therefor and will rest upon it, and the lower end, E, will rest upon one of the convolutions of the spiral; also, that the convolution of the spiral upon which it shall rest will be determined by the position of the projection P^2 on collar P, against which the projection P' is forced by the spring B^5, and that this position of the projection P^2 is determined by the rocking of the lever A. The upper arm of the lever C is made with a thin flange, C^3, on its under side, which, when the plate B is moved forwardly by the driver pressing on the crank-arm B^4, rests in the notch B^8, and when in this position the lower end of the lever C will be held clear of the cam M of the spiral.

e is a disk placed upon the top of the shaft

which supports the wheel *c*, and the arms supporting the rakes bear against the periphery of the disk after they have passed by the platform and are prevented from being thrown too far backwardly.

The operation of my invention is as follows: When the lever A is placed in the notch marked 5 on the index-plate, the arm B^9 of the plate B will take such a position that the lever C when dropped will rest on the lowest convolution of the spiral, and as the spiral revolves the lever C will be raised by the spiral and will slide upward on the rod D, and the upper end of the lever will move along the wedge-shaped wing D^2. When the lower end comes in contact with the cam M, the lever will be swung on the rod D as a hinge, and, bearing against the wing D^2, will close the switch D^4, or move it against the outer wall, *n*, and the roller *a* will follow the contour of the inner wall of the cam-track H and sweep the grain from the platform; but a sufficient time has been consumed in raising the lever from the lowest convolution of the spiral to the cam M, so that the four rakes have passed over the switch D^4, and consequently acted as beaters only, the succeeding rake raking the grain from the platform. After the cam M has closed the switch D^4 through lever C and wing D^2, the switch being then held closed by the roller passing behind it, the lever C will fall by gravity again to the lowest convolution of the spiral, and after the roller on the rake-arm has passed the switch D^4 the spring D^3 will throw the free end in against the inner wall of the cam-track H, and the succeeding rake will act as a beater only. This operation will be continued as long as the lever A is left in the notch 5. When it is placed in the notch marked 4, every fourth rake will rake; in that marked 3, every third, and in that marked 2, every other. When it is placed in the notch marked D, the lever C will rest in the notch B^8 and will be held clear of the spiral, but not a sufficient distance therefrom, so that it will close the switch, and all the rakes will act as beaters. When the lever is placed in the notch marked 1, and after the lever C has been raised by the revolution of the spiral onto the cam at its apex, the spring B^5 will force the arm B^{10} backward, so that the arm C^2 will rest upon the end of the arm B^{10} and the lever C will be held continuously against the cam at the apex of the spiral, and every rake will act as a rake. The driver in his seat can at any time change the action of the rakes from rakes to beaters by putting his foot upon the crank-arm B^4, thereby overcoming the action of the spring B^5 and moving the plate B forward, so that the arm C^2 of the lever C, which is free to slide on its pivot in the frame, will rest in the notch B^8 and the lever C will be held away from the spiral. It is also evident that the arrangement for controlling the rakes independently of the lever A necessitates having the plate B loosely mounted on the lever A, for otherwise it might be secured thereto, and the collar P and projections P′ and P^2, which permit the plate B to be moved forwardly by the foot of the driver, done away with. It is also evident that by providing more rakes and a longer conical hub a greater variety of changes in the action of the rakes from rakes to beaters may be had.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a rake-controlling mechanism for sweep rake reapers, the combination, with a cone formed with a spiral on its surface, of the sliding lever resting upon the spiral and raised by the revolution thereof, and a switch and a wing attached thereto, against which the lever is raised to operate the switch, substantially as and for the purpose described.

2. The combination, with the cone formed with a spiral on its surface, of a sliding and swinging lever resting upon the spiral and adapted to be raised by the revolution thereof, the spring-switch provided with a projecting wing against which the upper end of the lever bears, and a cam formed on the apex of the cone to swing the sliding lever after it has been raised by the spiral thereon against the projecting wing of the switch to close the switch, substantially as and for the purpose specified.

3. The combination, with the cone formed with a spiral on its surface, of the sliding and swinging lever resting upon the spiral, a cam at the apex of the spiral onto which the lever is raised by the revolution of the cone, the switch and its wing against which the lever is swung to open the switch, and an adjustable stop to regulate the distance to which the lever drops after leaving the cam, substantially as and for the purpose specified.

4. The combination, with the rakes, their cam-track and its switch, of a spring adapted to keep the switch open to compel the rakes to act as beaters, a projecting wing attached to the switch, the conical spiral, the lever resting upon the spiral, the cam at the apex of the spiral, upon which the lever is raised by the revolution of the spiral, and by which the lever is swung against the projecting wing of the switch to close the same against the action of the spring, tending to keep it open, substantially as and for the purpose specified.

5. The combination, with the cone formed with a spiral on its face, of the lever resting on the spiral, the cam at the apex of the spiral, the switch and its wing against which the lever is swung by the cam to operate the switch, the forked plate upon which the lever falls after leaving the cam, and leverage-connections within reach of the driver's foot attached to the forked plate, whereby the driver at will may move the lever resting on the spiral free and clear therefrom.

6. The combination, with the cone formed with a spiral on its face, of a lever resting on the spiral, a cam at the apex of the cone, the index-plate, a lever taking into the index-plate, a forked stop-plate loosely mounted on the index-lever, and the abutting projections on the

forked stop-plate and the index-lever, substantially as and for the purpose specified.

7. The combination, with the cone formed with a spiral on its face, of a lever resting upon the spiral, a cam at the apex of the cone, a switch, and a wing attached thereto, against which the lever raised by the spiral onto the cam is swung to operate the switch, the index-lever, the forked stop-plate loosely mounted on the index-lever, abutting projections on the forked stop-plate and index-lever, leverage-connections with the forked plate within reach of the driver, and a spring attached to such leverage-connections within reach of the driver, acting to force the forked stop-plate backwardly against the projection on the index-lever, substantially as and for the purpose described.

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