2 Sheets--Sheet 1.

J. S. DAVIS.

Harvesters.

No. 139,122. Patented May 20, 1873.

Fig. 1.

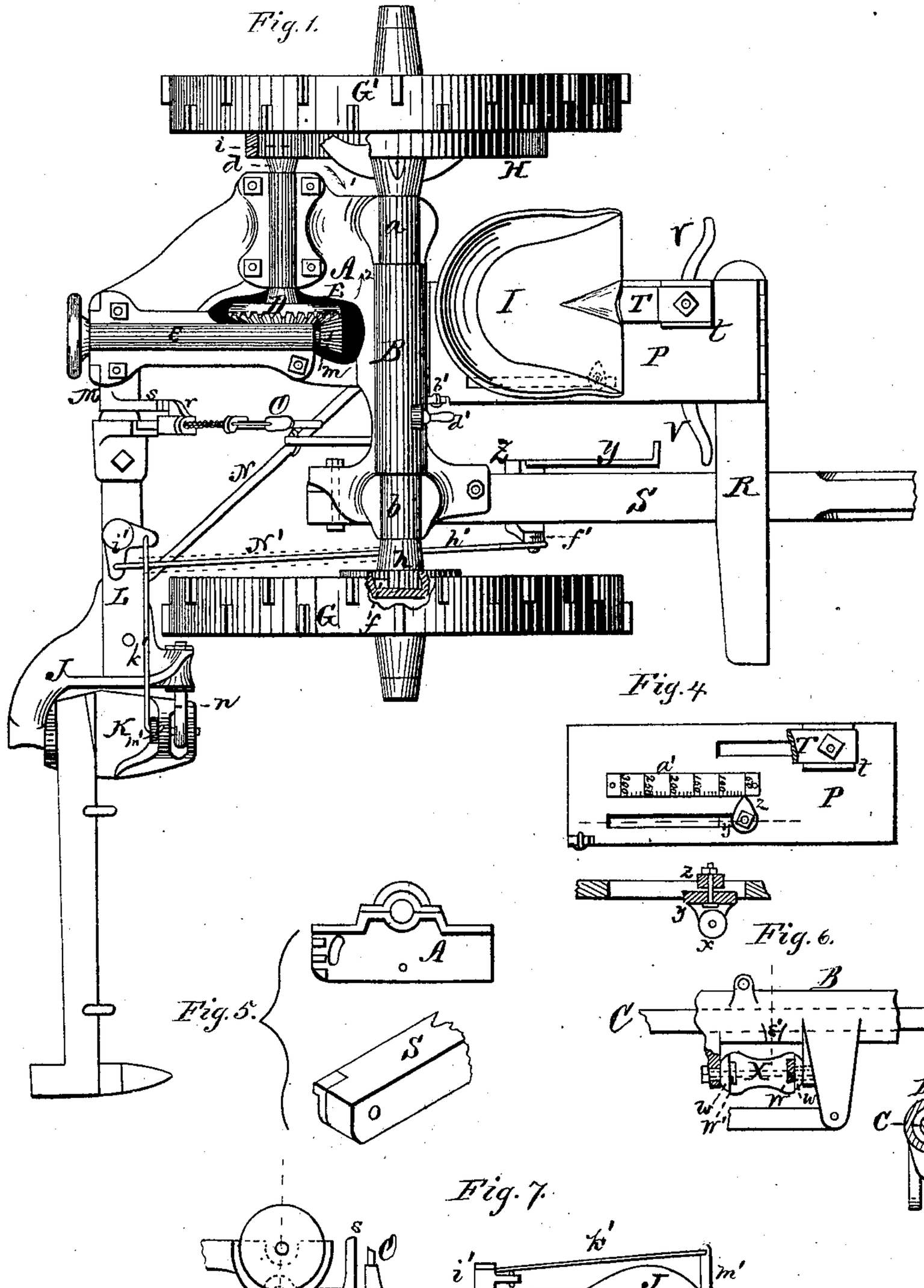
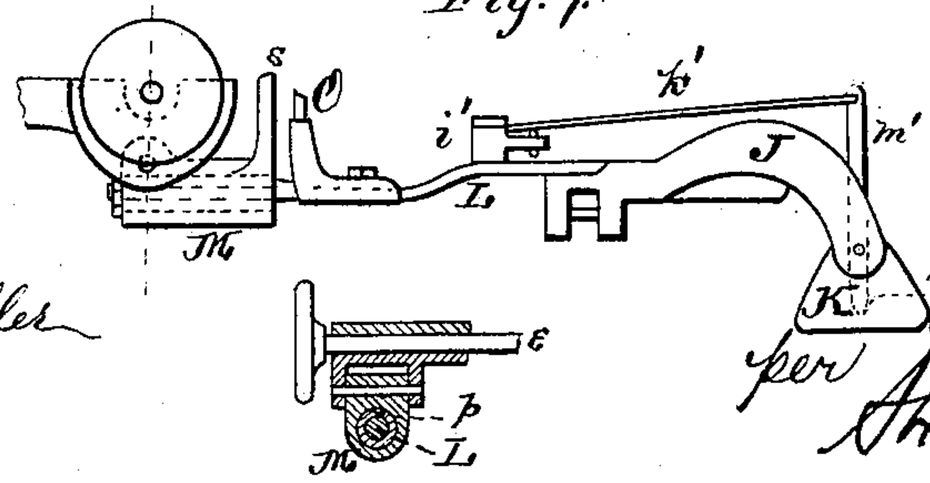


Fig. 4

Fig. 6.

Fig. 5.

Fig. 7.



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2 Sheets--Sheet 2.

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Fig. 2.

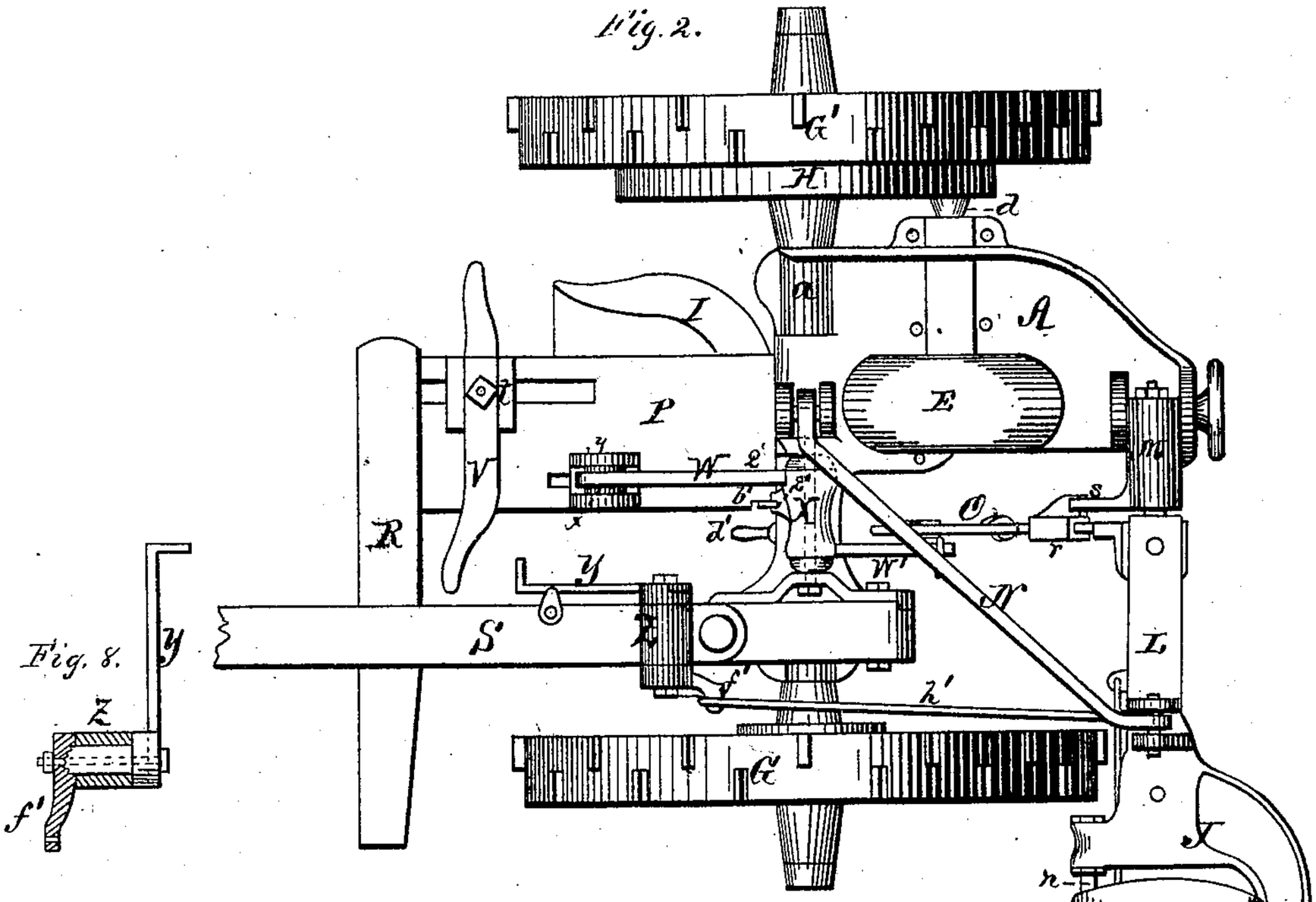


Fig. 8.

Fig. 3.

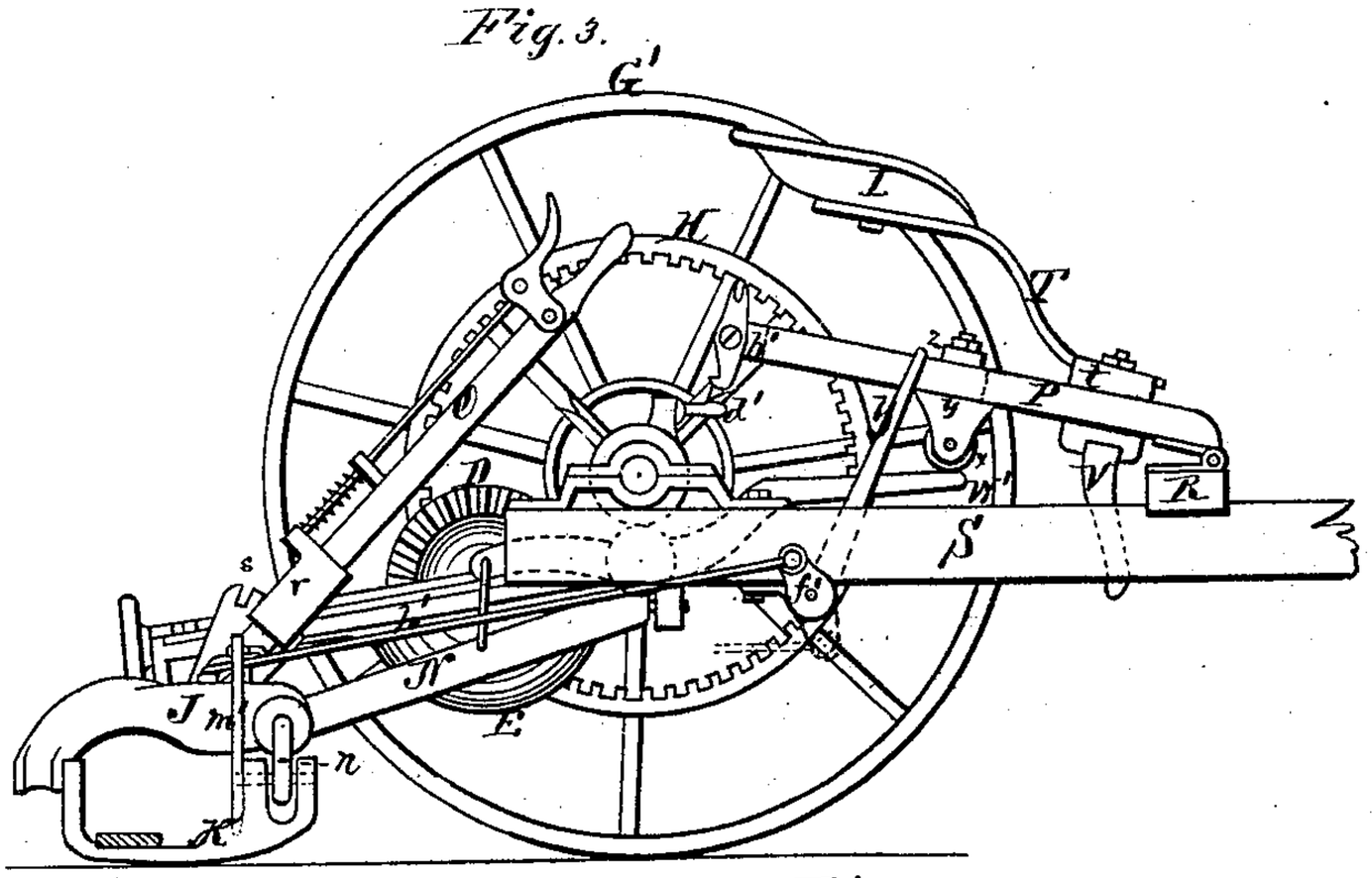
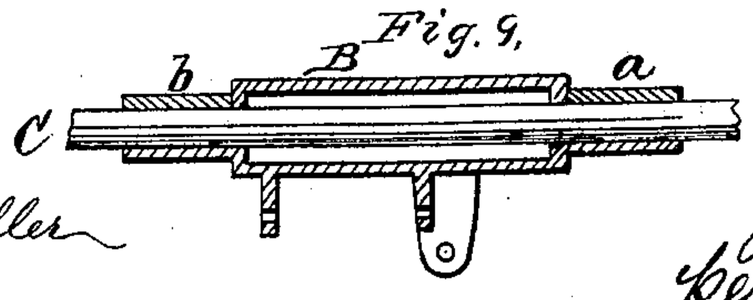


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF TOLEDO, OHIO.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **139,122**, dated May 20, 1873; application filed March 12, 1873.

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, of Toledo, in the county of Lucas and in the State of Ohio, have invented certain new and useful Improvements in Harvesters; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of certain devices connecting the driver's seat with the cutter-bar of a harvester; and also in the devices for connecting the cutter-bar with the frame of the machine, all of which will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing in which—

Figure 1 is a plan view, Fig. 2 is a bottom view, and Fig. 3 a side elevation, of my entire machine. Figs. 4, 5, 6, 7, 8 and 9 show detached views of certain parts of the same.

A represents the main frame, the forward end of which forms a pipe, B, that extends from side to side of the machine, and through which the main shaft or axle C passes. This pipe B is chambered, as shown in Fig. 9, the bearings *a* and *b* being bored to fit the main shaft. In the rear of the axle C the main frame A supports the counter-shaft *d* and crank-shaft *e*, and is scalloped out so as to form a pit or space, E, for the bevel-gear D, so that said gear can be perfectly incased. The shafts *d* and *e* are placed in pipe-boxes, which are bored or milled throughout their entire length, and the shafts turned to fit them, thus making a bearing the whole length of the shaft, the pipe-bearings being then firmly bolted to the main frame, as shown in Fig. 1. The driving-wheel G is bored out and fits loose on the end of the axle nearest to the cutter-bar, and by means of a spring-pawl, *f*, engages with a ratchet-wheel, *h*, in the ordinary way, said ratchet-wheel being keyed fast to the axle, which enables the drive-wheel to give motion to said axle when moving forward, and out of gear when backing. The drive-wheel G′ on the opposite side of the axle is arranged in the same way, the internal gear H being keyed on the axle, and having the ratchet-wheel formed on the outer end of its hub. I represents the driver's seat, showing the location of the driver on the machine. It will be seen that the entire weight of the driver and the gearing, together with almost the entire weight of the main frame, rests upon the axle on the left side of the center of the machine, being supported by the bearing *a* of the main frame, thus counteracting side draft by giving a greater resistance to the drive-wheel G′ to move forward than to the drive-wheel G, even though a self-rake be mounted on the shoe, thus rendering the machine better adapted for self-rake than machines usually are. The counter-shaft *d* is located on the main frame A in the rear of the axle C, so that when the machine is moved forward the internal gear H engages with the spur-pinion *i* on the end of said counter-shaft, and acts to lift the main frame at this point; and the greater the resistance is to the cutters, the greater the tendency for the gear H to lift upward on the main frame, thus relieving the bearing *a* when the machine is in motion of most of the weight that is brought upon it, which diminishes the friction on said bearing by conveying the weight to the drive-wheel G′ through the medium of the gear-wheel H, said gear-wheel being keyed fast to the main shaft, and revolves together with both the shaft and the wheel G′. The reverse of this would be the result if the counter-shaft *d* were located in front of the axle, which would be detrimental, as it would increase the friction on the bearing *a* instead of diminishing it. In order to prevent the counter-shaft *d* from being cramped by being lifted at its spur-pinion end, I arrange the bevel-pinion *m*, which is attached on the front end of the crank-shaft *e*, in front of the center of the bevel-wheel D, so that the resistance of said bevel-pinion causes the bevel-gear end of the counter-shaft to bear upward also, so that the shaft remains in line throughout its entire length. As all gears have a tendency to get out of mesh when at work, so has the internal gear H a tendency to force the spur-pinion *i*

in the direction of the arrow 1 in Fig. 1; but the arrangement of the bevel-gear D is such that the bevel-pinion *m* forces the bevel-gear in the opposite direction, indicated by the arrow 2. Thus the friction that would be created on the shaft by the internal gear H is counteracted and taken up by the bevel-gear D. J represents the shoe-support, cast in the shape shown, and to which the shoe K is flexibly attached directly at the rear end and at the front end, through the medium of a wrought-iron piece, *n*, said piece passing through the front end of the shoe-support J, and kept to its place by a nut on each side of the support.

By the use of these nuts it will be seen that the piece *n* can be adjusted in the line of its length, so that when, by constant wear of the hinge-pins of the shoe K, the point of the cutter-bar falls back, it can be readily brought forward again in line with the connecting-rod.

The shoe-support J is cast with a recess in its upper surface for the reception of the coupling arm or support L, where they are rigidly bolted or riveted together. This arm L is attached to the rear end of the main frame A in the manner shown in Fig. 7. About eight inches of the end of the arm L that is attached to the main frame is made round, and passes through a sleeve, *p*, which, in turn, passes through a pipe, M, and the arm L is secured, by a nut, to the sleeve in such a manner that both the arm and the sleeve are retained in the pipe M, so that the arm L can revolve around an axis in the line of its length to admit of the guards on the cutter-bar to be elevated or depressed. The end of the pipe M is flexibly connected to the extreme rear of the main frame by means of lugs and a hinge-pin, the axis of which pin is parallel with the crank-shaft *e*, so that the outer end of the arm L, with the shoe-support J, can rise and fall independent of the main frame, as well as to roll around its own axis. N represents the drag-bar or brace, which is hinged, at its upper end, to lugs projecting from the main frame A, the axis of this hinge-pin coinciding or being on a line with the hinge-pin of the pipe M; and the lower end of the drag-bar is flexibly connected to the shoe-support J by lugs projecting down from said support and a pin passing through, the axis of said hinge-pin being on a line, or nearly so, with the center of the pipe M, so that the rotary movement of the arm L will be uniform.

It is intended to make two sizes of this machine, one forty-inch wheel and another thirty-inch wheel, and on this small machine I will use a drag-bar running directly forward, as represented by the dotted lines N′ in Fig. 1. This form of drag-bar is not so well adapted to large wheels, as its front end would have to be suspended so far below the axle to prevent too much sweeping back of the bar on being elevated that it would look awkward, and be difficult to give it sufficient strength.

The rotary movement of the arm L, or elevating and depressing of the points of the guards, is produced by a lever, O, which is fastened at its lower end to the bar L, and is provided with a spring-catch, *r*, that moves up and down on the lever and engages with a ratchet-plate, *s*, the same being cast with and forming part of the pipe M. This enables the driver, without leaving his seat, to change the angle of the cut as desired; and, by holding the bar in its angle position with pipe and ratchet-plate, (these being supported by the main frame,) it enables me to use the drag-bar N′ for small machines without the objection common to all such drag-bars—viz., of the front end of the guards inclining downward when the heel of the bar is elevated or raised from the ground. P represents the seat-support, made of hard wood, of suitable dimensions, and hinged at its front end to a cross-piece, R, which is bolted to and supported by the tongue S. The seat I is attached and supported by a spring-bar, T, bolted to a slide, *t*, which moves in a slot in the seat-support P, by which means the seat can be adjusted back and forth so as to balance the machine when changed from a mower to a reaper, and vice versa. V V are foot-rests, which are also adjusted with the seat, they being attached to the under side of the slide *t*. These foot-rests, being suspended beneath the machine, admit of the driver's seat being located very low on the machine, at a point below the top of the drive-wheels, which produces less lateral throw or jerking of the driver when the machine is passing an obstruction. The foot-rests also enable the driver to mount and dismount the machine very easy through the open space between the drive-wheel G′ and the end of the cross-piece R, besides allowing an easy position when occupying the seat. The rear end of the seat-support P is supported by the balancing lever or beam W W′. X represents a casting with a hole cored through its entire length, through which to pass a bolt; it also has a recess cut or cast in each end for the reception of the wrought-iron levers W W′, said levers, as well as the clamp-washers *w w*, having bolt-holes through them. After the levers W W′ are put to their place the clamp-washers *w w* are applied and a bolt passed through them and drawn up, all of which are firmly held together, as shown in Fig. 6. It will also be seen that the washers *w* form trunnions or pivots to admit of the device being suspended and oscillate in lugs projecting downward from the pipe B of the main frame A. This device being suspended directly beneath the axle, as shown, the lever or arm W′ projects to the rear of the axle, and is connected to the drag-bar N by one or more links, and the lever W projects to the front of the machine, and upon which rests the seat arrangement through the medium of the roller *x* and its stand *y*. There is a projection on the upper side of the stand *y* that fits loosely in a slot in the seat-board P; the

pointer or washer *z* also has a downward projection fitting in the same slot, which acts as a guide to keep them from turning when being adjusted from the front to the rear of the lever W, the stand *y* and pointer *z* being fastened together by a bolt passing through the same. It will be seen that this arrangement admits of a large variation in weight with a small space of adjustment back and forth on the lever W. For instance, when the fulcrum *z y x* is adjusted forward it increases the leverage of the driver on the seat-board P, as well as on the lever W′, thus admitting the use of a short beam, W, and allowing a boy of fifty pounds weight to operate it as well as a man of three hundred pounds, as indicated by the scale *a′* on the upper side of the seat-board P. As almost everybody knows his own weight, the weight of the heel of the bar or inner shoe can be taken up with great precision and conveyed to the machine in such a manner that the drive-wheel G′ sustains a portion of it, which results in the advantage, first, of avoiding friction of the shoe on the ground by throwing its weight on the drive-wheels, which lessens side draft, diminishing direct draft, and increasing the power of the drive-wheels; secondly, by causing the inner shoe to bear as lightly on the ground as the outer shoe, it will allow the longest end of the bar to keep to the ground when passing over an ant-hill or other like obstruction, whether it be the outer or inner end of the cutter-bar. It will be seen that the upward and downward movement of the inner shoe or heel of the cutter-bar is practically unlimited, as it is not suspended by a lifting-chain, which is most usually the case, but is elevated and controlled exclusively through the medium of the seat, which gives much more freedom than can be obtained by the necessarily limited slackness in a chain upon which they have to depend for elevating-bar, a lift-chain having but little slack, for the reason that it would otherwise require more sweep in lift-lever than could be obtained. *b′* is a hook or button held to the rear end of the seat-board P by a bolt passing through the same, so that the hook can oscillate around said bolt. *d′* is a handle fastened by one of its ends to a projecting lug on the pipe B of the main frame within easy reach of the driver, so that by taking hold of said handle the driver can aid by his own weight to depress the rear end of the seat-board P so that the hook *b′* will engage or hook onto a projection, *e′*, from beneath the pipe B of the main frame, thus elevating the heel of the bar and holding it in that position. The heel of the bar can again be let down by the operator taking hold of the handle *d′* and disengaging the hook *b′* with his thumb, thus dispensing with a lever for this purpose. The tongue S is made adjustable by the means shown in Fig. 5, so that the rear end of the main frame may be held at different elevations, thus better adapting it for reaping high, or mowing with the bar on the ground. Y is a lever, to be used either as a foot or hand lever, with which to raise the outer end of the cutter-bar independent of the inner end. The lever Y is fastened to a pipe-casting, Z, that passes through a bearing beneath the tongue S where the crank *f′* is attached. A rod, *h′*, is connected to this crank, and passes down and engages with an elbow-lever, *i*, the other end of said elbow-lever being by a rod, *k*, connected with an upright lever, *m′*, which is fastened at its lower end to the front end of the shoe K in such a manner that when its upper end is moved to the left or toward the machine the outer end of the cutter-bar is raised, the said movement of the lever *m′* being caused by depressing the foot-lever Y, drawing the rod *h′* forward, and actuating the elbow-lever *i′*. The pipe-casting Z has a hole cored through it to receive a bolt, and at one end is a recess to receive the lever Y, and the other end is corrugated to correspond with corrugations on the crank *f′*, as shown in Fig. 8, the whole being firmly held together by the bolt passing through. By means of the corrugations the crank *f′* may be held in any position required. It can be reversed, as shown by dotted lines in Fig. 3, which necessarily reverses the motion of the lever Y, so that the operator can use his hand if he wishes and pull the lever Y toward him to raise the point of the bar, or vice versa, using either his hand or his foot. The crank *f′* can also be adjusted at such an angle that the elevation of the outer end of the cutter-bar can be increased or diminished at will. By diminishing, it of course requires less power to raise it, and in this way can be made easy for a boy to operate it; at the same time the crank can be set so that the rod *h′* is made to pass its center, thus holding the bar in its elevated position.

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

1. The combination of the seat I, hinged seat-support P, levers W W′, and drag-bar N, substantially in the manner and for the purposes herein set forth.

2. The adjustable fulcrum *y*, in combination with a hinged seat-support and lever, W W′, for the purpose of regulating the pressure of the inner shoe upon the ground by the weight of the driver, substantially as herein set forth.

3. In combination with a driver's seat adjustably connected to the frame of the machine, the scale *a′* and adjustable pointer, so that the driver can readily adapt his weight to the proper balancing of the heel of the cutter-bar, substantially in the manner described.

4. The pivot clamp-washers *w w*, the hollow casting X, and the levers W W′, constructed, arranged, and combined substantially in the manner and for the purposes herein set forth.

5. The handle *d′*, hook *b′*, and projection *e′*,

in combination with the hinged seat-support P, arranged substantially in the manner and for the purposes herein set forth.

6. The adjustable foot-hangers V V, placed under the main frame, in combination with the adjustable seat I, for the purposes set forth.

7. The combination of the bar L, lever O, pipe M, hinged to the gear-frame, and ratchet-plate *s* cast thereon, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of February, 1873.

JOHN S. DAVIS.

Witnesses:

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E. H. POTTER.