(No Model.)

5 Sheets—Sheet 1

J. S. DAVIS.

HARVESTER.

No. 271,430. Patented Jan. 30, 1883.

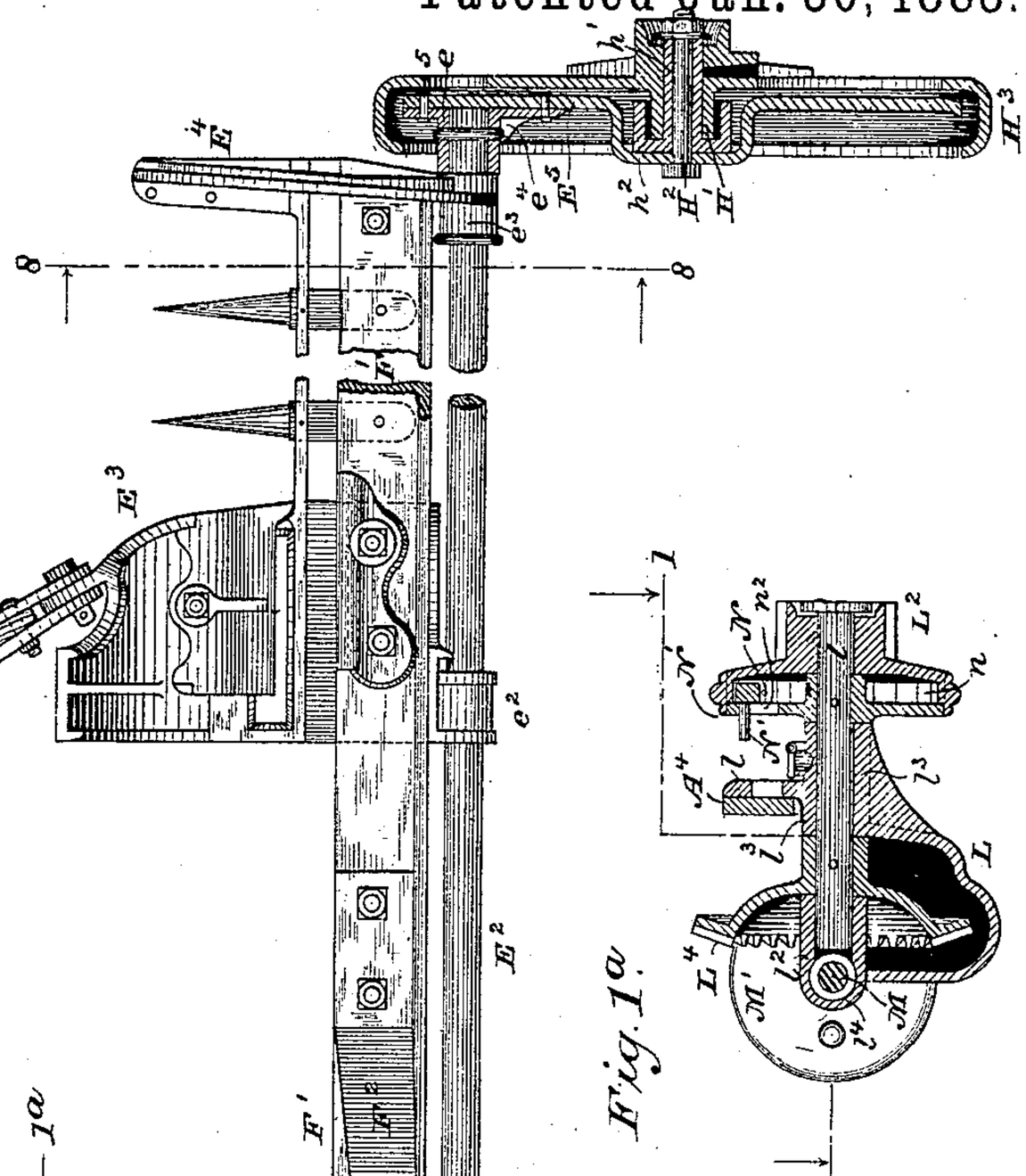
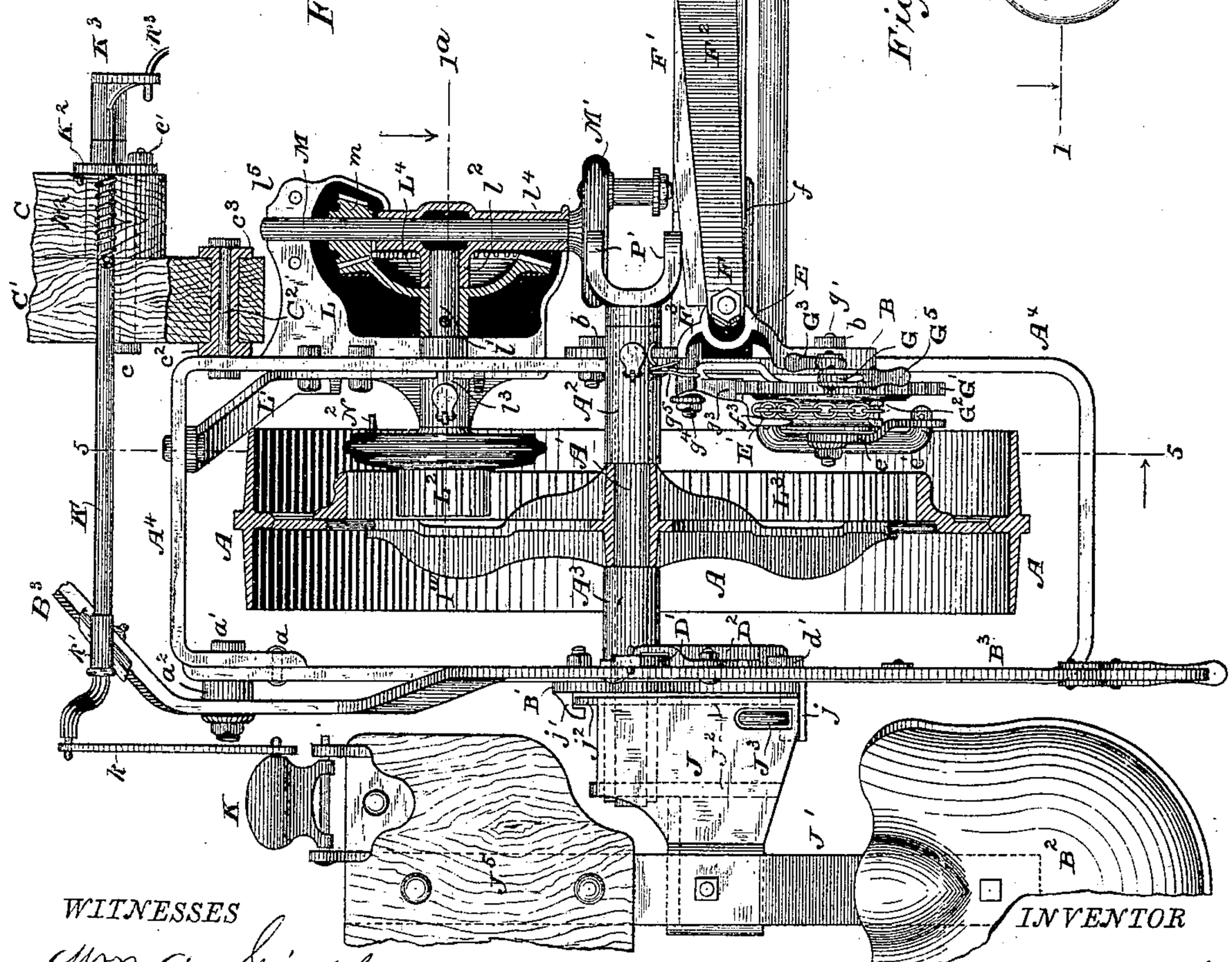


Fig. 1.

Fig. 1a.



WITNESSES

Wm A. Skinkle.

H. W. Elmore.

INVENTOR

John S Davis.

By his Attorneys,

Baldwin, Hopkins & Peyton.

(No Model.) 5 Sheets—Sheet 2.

J. S. DAVIS.

HARVESTER.

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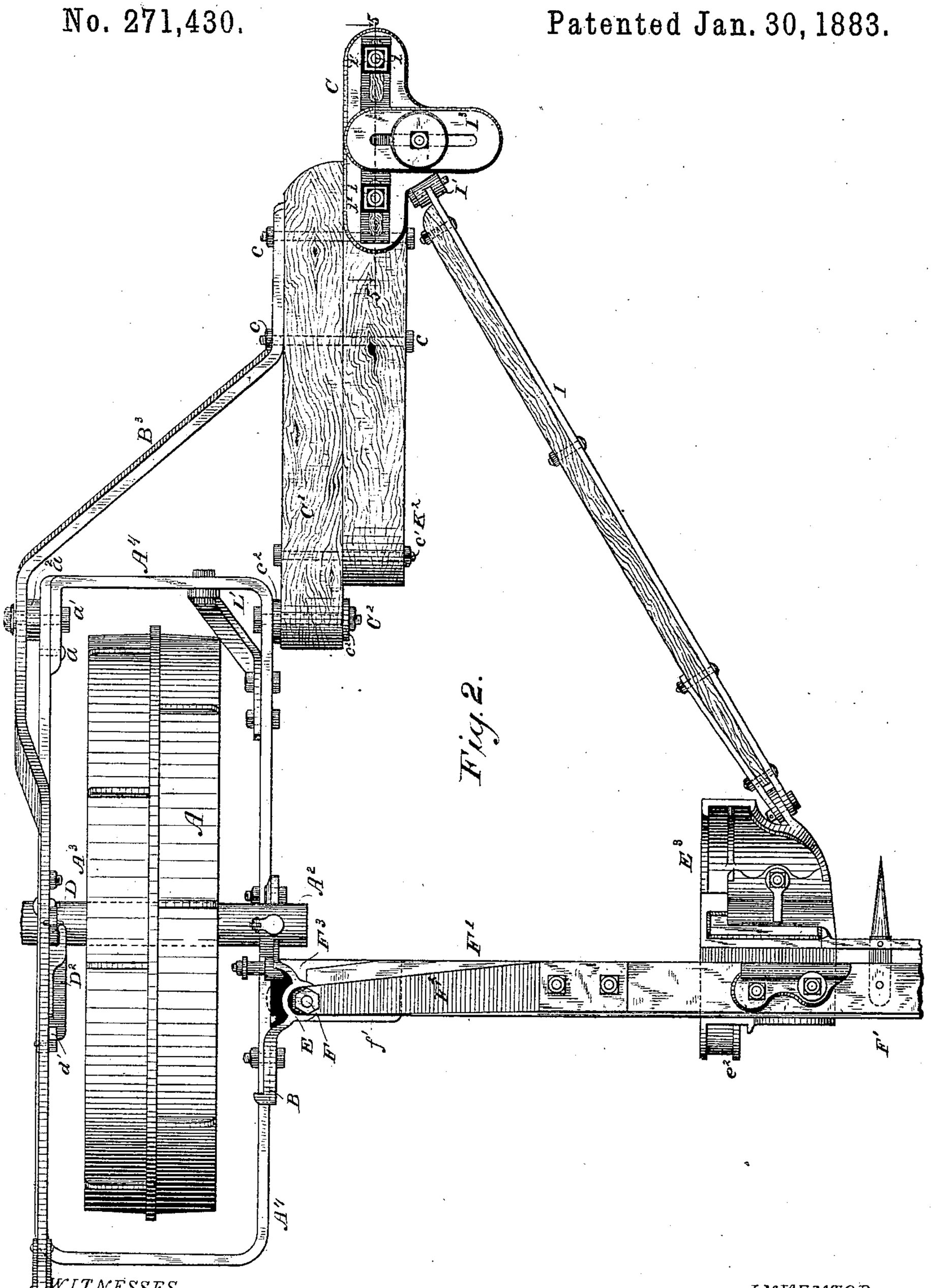

Fig. 2.

WITNESSES

Wm. A. Skinkle.

H. W. Elmore.

INVENTOR

John. S. Davis.

By his Attorneys,

Baldwin, Hopkins & Peyton.

(No Model.)

5 Sheets—Sheet 3.

J. S. DAVIS.

HARVESTER.

No. 271,430.

Patented Jan. 30, 1883.

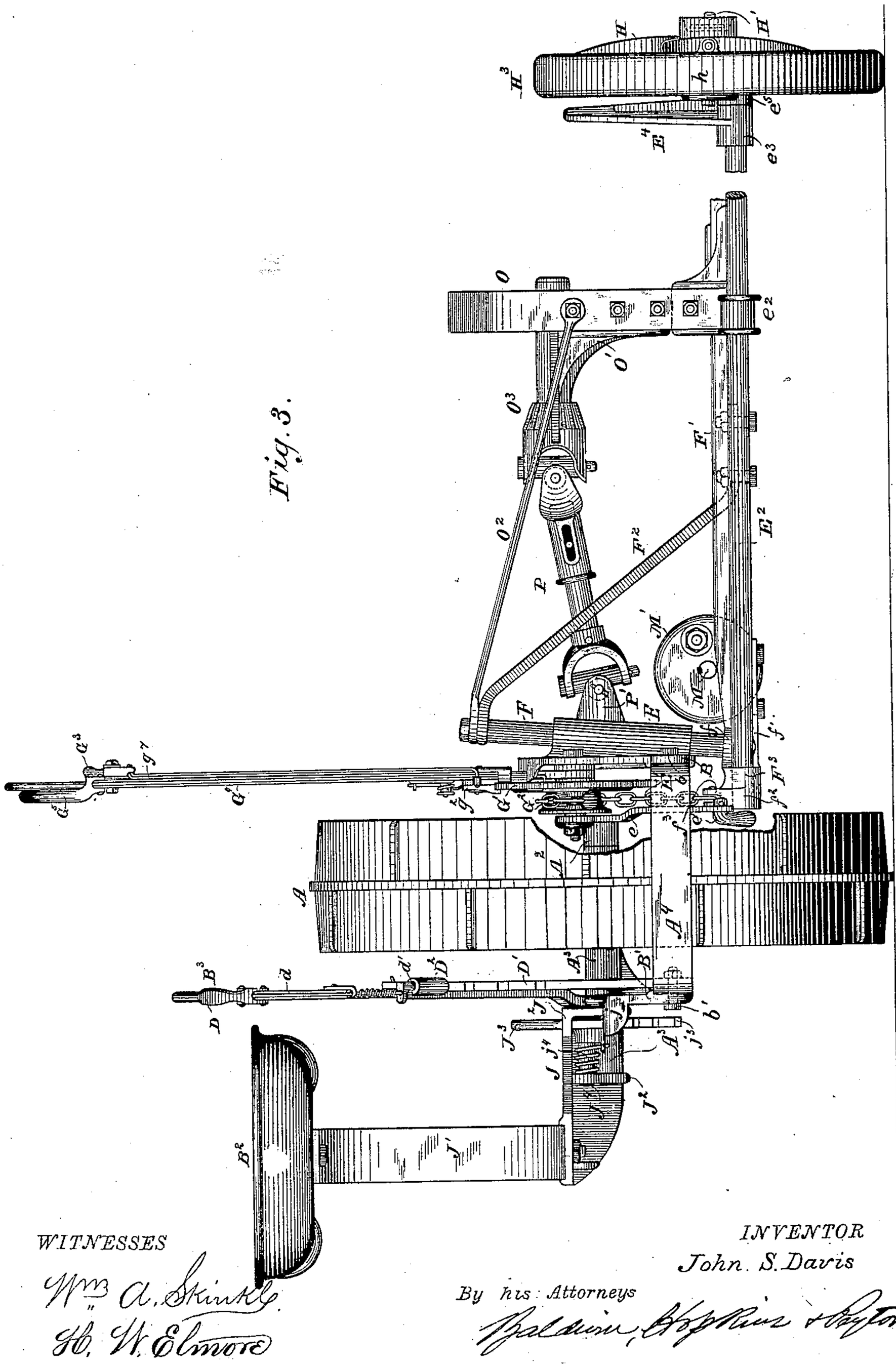

Fig. 3.

WITNESSES

Wm. A. Skinkle.

H. W. Elmore

INVENTOR

John. S. Davis

By his Attorneys

Baldwin, Hopkins & Peyton.

(No Model.)

5 Sheets—Sheet 4.

J. S. DAVIS.

HARVESTER.

No. 271,430. Patented Jan. 30, 1883.

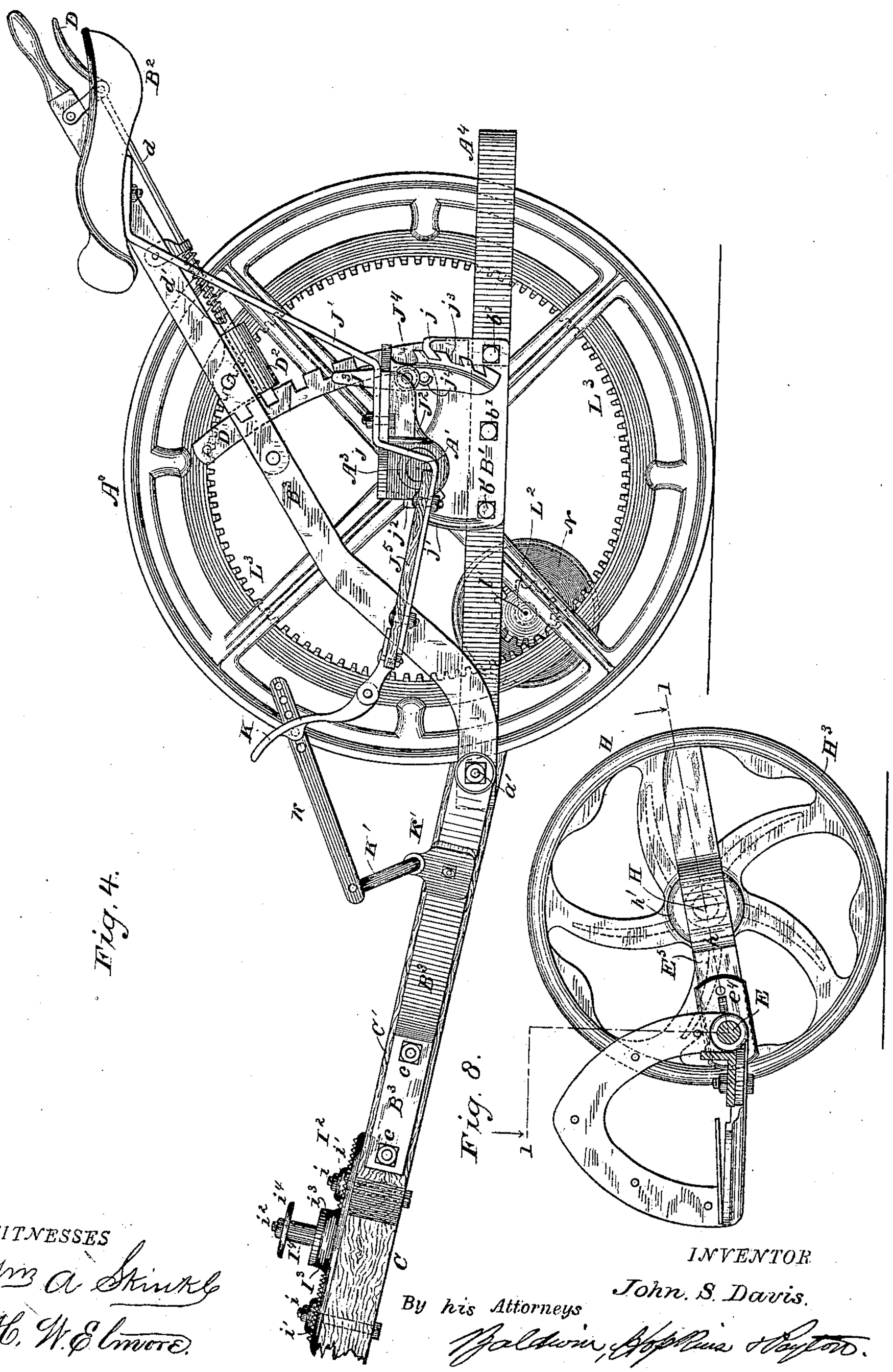

Fig. 4.

Fig. 8.

WITNESSES

Wm A Skinkle

H. W. Elmore.

INVENTOR

John. S. Davis.

By his Attorneys

Baldwin, Hopkins & Peyton.

(No Model.)

5 Sheets—Sheet 5.

J. S. DAVIS.

HARVESTER.

No. 271,430. Patented Jan. 30, 1883.

Fig. 5.

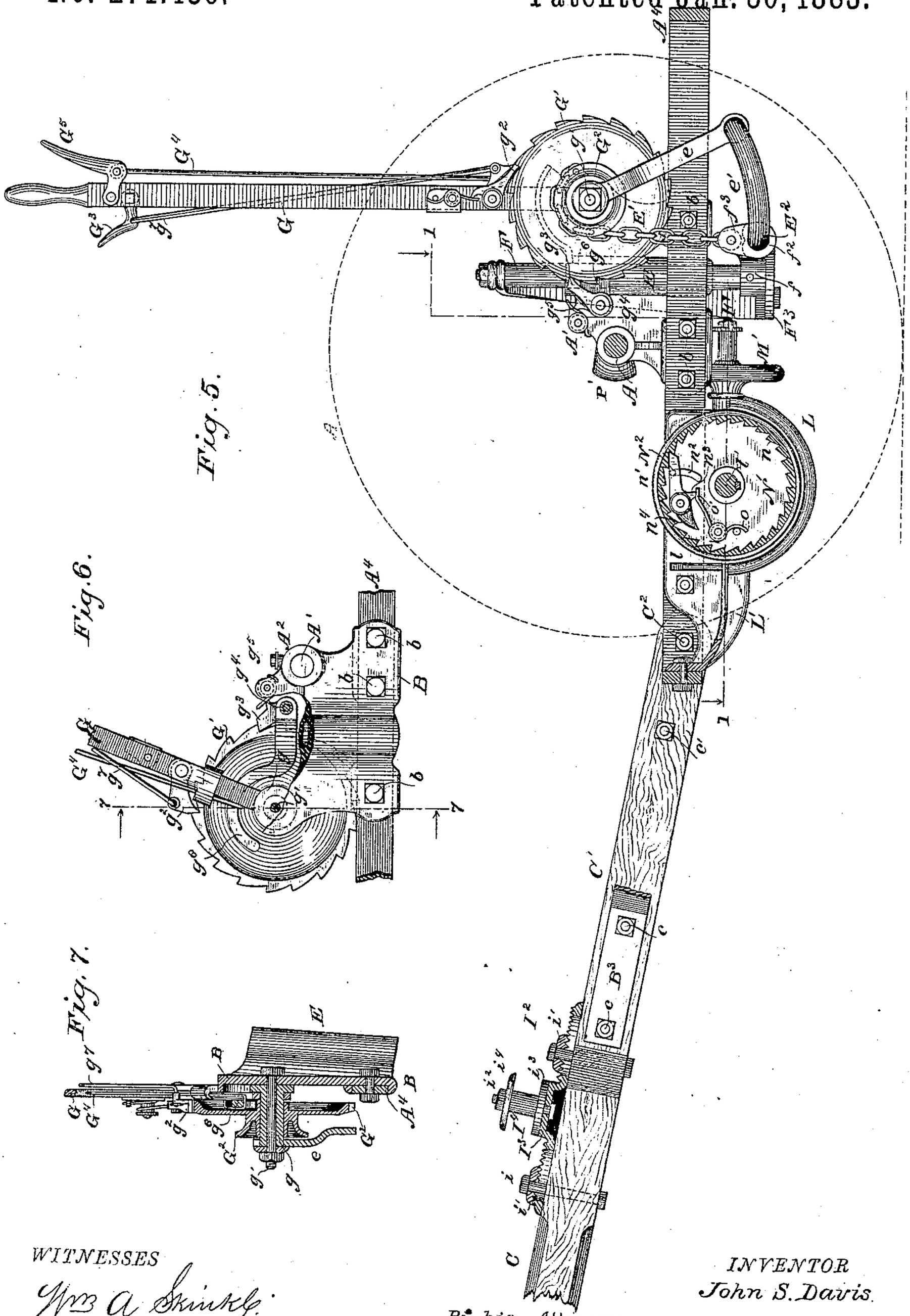

Fig. 6.

Fig. 7.

WITNESSES

Wm A Skinkle.

H. W. Elmore

INVENTOR

John S. Davis.

By his Attorneys,

Baldwin, Hopkins & Peyton.

UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF TOLEDO, OHIO, ASSIGNOR TO THE TOLEDO MOWER AND REAPER COMPANY, OF SAME PLACE.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 271,430, dated January 30, 1883.

Application filed September 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Harvesters, of which the following is a specification.

My invention relates to improvements in harvesters, applicable chiefly to the class known as "one-wheeled machines," especially such machines of this class as have hinged tongues.

My improvements, as will hereinafter be distinctly claimed, pertain to certain novel features of construction and combinations of devices, among which may be mentioned means for connecting the tongue and main frame, means for rocking or tilting the finger-beam, means for connecting the main frame and its axle, means for connecting the finger-beam and main frame, mechanism for raising and lowering the finger-beam, means for mounting the grain-wheel and protecting its journal, means for attaching and supporting the driver's seat, an improved organization of gearing, and means for supporting and protecting it.

The accompanying drawings represent a suitable application of my improvements. Such old features of a fully-organized machine as are neither illustrated by the annexed drawings nor in detail described herein may be of any desired and proper construction to complete the machine in all respects, and some of my improvements may be used without the others, and in machines differing in some respects from that shown by the drawings and particularly described.

Figure 1 is a view partly in plan and partly in section, the platform and some other features being omitted and parts broken away. Fig. 2 is a partial plan view. Fig. 3 is a rear elevation. Fig. 4 is a side elevation. Fig. 5 is a partial side elevation. Fig. 6 is a detached view, showing lifting devices. Fig. 7 is a sectional view of the devices shown in Fig. 6. Fig. 8 is a view showing the grain-wheel and its connections. Fig. 1ª is a detached view of devices for driving the cutter.

A driving and main supporting wheel, A, is keyed fast to the main axle A′, which is loosely mounted, near its ends, in boxes A^2 A^3, secured to the main frame A^4, which is thus suspended from the axle. The main frame encompasses the driving-wheel, and is substantially rectangular in shape. As shown, it is made of a single flat piece of wrought-iron formed into shape, the ends of the bar being brought together and lapped at the outer front corner of the frame, and secured by a rivet, *a*, and a bolt, *a′*, to be again referred to farther on.

The respective main-frame boxes A^2 A^3 for the axle are formed with castings B and B′, respectively. These castings are formed as hereinafter to be fully explained, and are bolted in place. The casting B is attached to the frame by bolts *b*, and the casting B′ secured in place by bolts *b′*. The bolts pass through the vertical or plate portions of the castings, as plainly shown by the drawings.

A seat, B^2, for the driver is mounted outside the drive-wheel in manner farther on to be explained.

A tongue, C, has hinged connection at its heel with the main frame, for a well-known purpose. Instead of being directly jointed to the inner front corner of the main frame, the tongue is shown as rigidly connected to a heel-piece or tongue-stump, C′, by bolts *c c c′*, and this heel-piece is pivoted to the main frame by means of a bolt, C^2, which passes through the main-frame bar and through a headed sleeve or thimble, C^3, fitted in the tongue-stump. By means of a washer, c^3, bearing against the end of the thimble opposite that which has the head c^2, injurious binding of the parts is prevented, as will fully appear from inspection of Fig. 1, and the frame is adapted to be vibrated about the tongue as rocked about the axle to tilt the finger-beam, &c.

A lever, B^3, serves to tilt or vibrate the main frame about the tongue, and also as a bracing connection between the tongue in advance of its pivot and the main frame. This combined tilting-lever and tongue-brace is pivoted to the outer front corner of the frame by the before-mentioned bolt *a′*, which passes through a thimble or sleeve fitted loosely in the pivot-hole of the lever, and having the head a^2 between the frame and lever.

The construction of the parts by which the lever is pivoted to the frame so as to rock freely will readily be understood from inspec-

tion of the before-described devices for pivoting the tongue.

The lever B^3 extends diagonally forward from its pivotal connection with the frame to the tongue-stump C′, to which it is secured by the bolts *c c*, thus forming a strong brace, and the rearward and upward extension of the lever from its pivot locates the lever-handle within convenient reach of the driver when in the seat B^2. The lever and tongue pivots are located directly in line with each other, for an obvious purpose.

Suitable detent devices for holding the lever B^3 in its adjusted position are provided, and, as shown, consist of an ordinary spring-actuated slide-rod, *d*, jointed at one end to the crank-handle D, pivoted on the lever and actuating the plug or slide *d′*, which engages with one or other of the spaces between the teeth of the curved bar D′, which is bolted to the main frame at its lower end. The slide *d′* works in a guide-socket formed with a casting, D^2, bolted to the lever B^3 and constituting a guideway for the detent-rack D′.

The casting B, with which the main-frame box A^2 for the axle is made, is also formed with a sleeve, E, constituting a guide and support for a nearly-upright post, F, on the heel of the finger-beam F′. The post F is rigidly attached to the finger-beam, and is slightly inclined away from the main frame from its bottom upward. The sleeve E is inclined to correspond with the inclination of the slightly-overhanging post. By the inclination of the finger-beam post and its supporting-sleeve on the main frame interference with the proper centering of the knives in the guards is prevented in raising and lowering the finger-beam by guarding against any material variation in the distance between the crank-shaft center and a given point of the cutting apparatus—say the center of the first guard-finger—as will readily be understood when it is observed that the finger-beam is located at a lower level than the crank-shaft, and would therefore, if raised and lowered vertically instead of on an incline, constantly and injuriously vary the distance between the crank-shaft and the guard-fingers of the cutting apparatus.

The finger-beam heel-post is supported by the diagonal brace F^2, and is secured in place by being fitted in and fastened to a short tube or socket, *f*, in a socket-iron or heel-casting, F^3, securely bolted to the finger-beam, and having a vertical flange, *f′*, against which the rear edge of the beam bears.

The heel-casting F^3, in addition to serving as a means of attaching the post F to the finger-beam, also serves for connecting a lifting-chain, E′, and a grain-wheel-supporting rod, E^2, with the heel of the finger-beam, the casting being formed with a rearwardly-extended perforated portion or bearing-arm, f^2, through which the rod E^2 passes, and with two lugs, f^3 f^3, for the attachment of the chain by passing a pin through them and through a link of the chain. The finger-beam is suspended by this chain, and raised or lowered correspondingly at its inner and outer ends by mechanism constructed and operating as will next be described.

A lever, G^2, and a ratchet-wheel, G′, and a grooved pulley or sheave, G, are mounted to turn about a support shown as formed by a flanged thimble, *g*, a headed bolt, *g′*, and its nut and washer. (See Figs. 6, 7, and 8.) The support for the ratchet and the sheave formed therewith, and for the rocking lifting-lever, is secured, as clearly shown, to the casting B in rear of the axle-box A^2 and tubular guide for the finger-beam post. A link, *e*, is also pivoted at one end to swing about the thimble *g*. This link is jointed at its opposite or lower end to a crank-arm, *e′*, at the inner end of the rod E^2, with which the grain-wheel is connected, as hereinafter to be explained. A pawl, g^2, acted upon by a spring to hold it normally engaged with the ratchet, is mounted upon the lifting-lever and controlled by a trip-handle, G^3, and rod g^7 in well-known way. Another pawl, g^3, is mounted upon a thimble secured to the casting B by a bolt, g^4, and its nut and washer in manner such as already described in connection with other parts. A spring, g^5, acts upon this pawl with a tendency to force it toward the ratchet when not in contact therewith, and to hold it in its normal position of engagement with the ratchet-teeth. A controller or trip-arm, g^6, serves to connect this pawl with the rod G^4 and trip-handle G^5 of the lifting-lever. The arm g^6 extends from the pivot g^4 of the pawl crosswise of and close to the face of the ratchet-plate G′ opposite that from which the sheave projects, and is curved to pass around the ratchet-hub concentrically with the axis of rotation of the ratchet and with the pivot of the lever, and projects between the lever and ratchet. The lower end of the rod G^4 is looped or otherwise suitably formed to loosely engage the pawl-controlling arm g^6, so that when the lifting-lever is being moved in one direction to raise the finger-beam, &c., by winding the chain E′ about the sheave G^2, to which it is attached, the pawl g^3 is not disturbed by the movement of the lever and ratchet further than to slip over the ratchet-teeth against the force of its spring g^5, and during the rocking of the lever the trip-rod loop slides along the controller-arm of the pawl. When it is desired to reverse the movement of the lever and ratchet to unwind the chain from the sheave G^2 to lower the finger-beam, the pawl g^3 is rocked to withdraw it from the ratchet by actuating the trip-handle G^5, and after the desired amount of oscillations is given the ratchet by the lever and pawl g^2 the trip-handle is released and the detent-pawl g^3 holds the parts as adjusted. By these means the use of usually-employed curved racks, slotted detents, &c., is dispensed with, while space is economized. Besides this, the lever and its pawl may be worked to the

best advantage to suit different drivers, as by turning the ratchet step by step or giving it the desired adjustment at one swing, after which the lever may be returned to the position most convenient to the hand of the driver for subsequent adjustment.

The cranked rod E^2, in addition to being supported in the casting F^3 at the finger-beam heel, so as to be capable of rolling or turning therein as the finger-beam is raised and lowered, is also elsewhere suitably connected with and supported by the finger-beam. In this instance the grain-wheel-sustaining rod is shown as journaled at the rear of the finger-beam in tubular lug-bearings e^2 e^3, provided at the heels of the inner and outer shoes, E^3 E^4, respectively.

It will be seen that as the finger-beam is raised and lowered the end of the crank e', which is jointed to the link e, is maintained practically at an unvarying altitude, the very slight swing of the link toward or away from the finger-beam, as it rises or falls, making but a trifling difference in the height of the crank end relatively to the main frame.

The grain-wheel H is journaled, as presently to be described, in a supporting-arm, E^5, rigidly attached to the rod E^2, and so as to revolve about an axis in line with the link end of the crank e', or at a distance in rear of the rod substantially corresponding with the length of the crank e'. It will be seen that the altitude of the grain-wheel axis relatively to that of the link end of the crank-arm never changes in the adjustments of the finger-beam, and cramping of parts is thus prevented.

The full torsional strength of the rod E^2 is availed of in maintaining the parts against injury by strains. In some cases the end of the crank-arm e' might be supported in a suitably-curved slot in a bracket fastened to the main frame, and the link e be dispensed with; but the construction shown is preferable, a considerable advantage attending the use of the link being that it affords material support to the outer end of the thimble or tubular stud-support g, upon which great strain is exerted, this link being constantly acted upon by a thrusting force, owing to the torsional strain upon the rod E^2, resulting from the weight of the outer end of the cutting apparatus, &c. The casting B is thus partially relieved from the strain produced by the weight of the inner end of the cutting apparatus.

The grain-wheel-supporting arm E^5 is rigidly attached to the outer end of the rod E^2 by means of a socket-casting consisting of a plate portion, e^4, bolted or riveted to the arm, and a sleeve-socket, e^5, fitting upon the rod and keyed fast thereto. This grain-wheel arm (see Figs. 1 and 9) is made of plate metal, preferably spring-steel, and of a length but slightly less than the diameter of the wheel crosswise, and inside of which it extends. The outer end of the rod E^2 terminates within the tread of the flanged grain-wheel, and the arm E^5 is secured thereto within the tread of the wheel, and is formed with the central inward bend or bulge, h, thus providing a hub seat or recess for the attachment of the grain-wheel, as presently to be described, and overcoming the main objection to the employment of a stud-shaft in the ordinary way as a journal-support, which objection is due to the overhanging or projection for its entire bearing-length of the ordinarily-employed stud-shaft. I provide a long as well as a central bearing instead of the usual overhanging one by mounting the grain-wheel hub H′ partly in the hub-seat in the supporting-arm. The hub is thus caused to project inside as well as outside of the vertical plane in which the socket-casting plate e^4 is located, and unequal torsional or twisting strains on this arm E^5 and its attaching device e^4 e^5 are avoided.

The grain-wheel is secured to its arm by a headed thimble, h', through which, as well as through the arm, passes a bolt, H^2. A washer, bearing against the end of the thimble, and a nut serve to hold the parts in place. The head of the thimble h', instead of being formed like the heads of the thimbles for pivoting the tongue and lifting and tilting levers hereinbefore described, is formed with an overhanging annular flange, h^2, between which and the tube or body portion of the thimble is provided a cavity into which the hub of the grain-wheel projects. The recessed head of the thimble thus serves to protect the joint at the inner end of the hub from dirt, &c.

It will readily be understood from inspection of Fig. 1 that the stud-support for the grain-wheel may be firmly secured in place without clamping the grain-wheel and preventing its free revolution. By recessing the outer end of the grain-wheel hub H′, and using the washer therein on the bolt H^2, protection is afforded against the passage of dirt to the bearing from the outer end of the hub.

The grain-wheel is dish-shaped, being provided with the inwardly-projecting flanged tread H^3, and has curved spokes outside the supporting-arm E^5. The rear end of this arm terminates close to the tread and near the spokes, and is slightly curved vertically, so as to give it somewhat the shape of the mold-board of a plow. It is also made sharp at its lower edge. The arm thus serves to clear the wheel of dirt or clogging matter and keep it clean. Lumps of sod or pieces of turf, which are liable to be carried up by the wheel, are severed by a draw cut when brought against the end of the arm E^5 by the action therewith of the spokes of the wheel, and the fragments discharged in part outside between the spokes of the wheel and partly inside at its open face.

The finger-beam, &c., are connected with the tongue C by a diagonal brace or draw-bar, I, pin-jointed at its rear end to a lug at the front of the shoe E^3, and pivoted at its front end to a downwardly-projecting slotted lug, I′, of a casting, I^2, serving as a means not only for

adjustably connecting the brace to the tongue, but also for attaching and adjusting a double-tree. This casting is attached to the tongue, so as to be adjustable lengthwise thereof, by means of bolts *i i*, passing through the tongue and through slots made in and extending longitudinally of the casting, and nuts bearing on serrated washers *i' i'*, engaging with corresponding serrations at the sides of the slots to secure the parts together in well-known way. The finger-beam may readily be secured at the proper angle to the main frame by adjusting the combined double-tree and brace-casting.

The double-tree is to be attached by means of the bolt i^2, adjustable in the transverse slot of the raised portion I^3 of the casting, and having the thimble I^4, with its head or flange i^3, and the washer i^4 and nut. The head of the bolt i^2 projects into the space above the tongue provided by the recess under the raised transversely-extending portion of the casting. The draft may, by the means just described, be quickly adjusted as desired for an obvious purpose.

A seat-support for the attachment of a seat-standard or spring, as soon to be described, is detachably and adjustably secured upon the outer main-frame box, A^3, and casting B', with which said box is formed. The plate portion of this casting B' at its top rear corner is formed with a hooked side lug or lateral projection having a stop-lug, *j*, and with a flanged side lug or ribbed lip, *j'*, at its top front corner to form a guideway, for a purpose presently to be explained. The seat-support J is formed of a casting mounted so that it may be rocked vertically on the box A^3 of the casting B', and be secured by suitable devices, such as presently to be described, in any desired position to adjust and hold the seat B^2, the spring-standard J' of which is bolted to the support J. As shown, the seat-support J has two downwardly-projecting ribs, J^2 J^2, by bearing-openings in which the support is fitted upon that portion of the box A^3 which projects outside of the main frame.

A short projection or lug, j^2, on the support, at the front end of its inner bearing-rib, J^2, fits in the guideway *j'* and prevents accidental displacement of the support by movement endwise of the box A^3, while allowing of the free rocking movement of the support in adjusting it. A swinging detent-arm is formed with a series of curved teeth, j^3, and correspondingly-shaped intervening spaces for engagement by the stop-lug *j*. This detent is provided with a lever projection or handle, J^3, and is mounted upon a pivot-pin, J^4, supported in the ribs J^2 J^2. The detent-lever passes up through a slot in the support. A spring, J^4, acts upon the detent with a tendency to hold it engaged with the stop-lug *j*, or else to move it toward said lug when moved away from it by operating the lever j^3. The teeth of the detent are curved concentrically with the pivot J^4. By so curving the teeth j^3 and using a sufficiently strong spring, j^4, the seat-support is held against accidental upward movement, as well as against downward movement at its rear end. In adjusting the seat-support to its position upon the axle-box and its casting the support, after being partially slipped into place on the axle-box, is elevated at its rear end to depress its guide-lip j^2 beneath the guideway *j'*, so that it may be slipped home. The elevation of the front end of the support by rocking on the axle-box next brings the lip into the guideway.

With the aid of Figs. 1, 4, and 5 of the drawings it will be readily understood that the seat B^2 can be quickly adjusted up or down by rocking the seat-support and firmly secured in place, and that the seat-support and seat may readily be removed to enable the machine to pass through narrower openings or gateways than it could were the seat in place.

The spring-standard J' of the seat is bent and extends forward of the support J, as clearly shown in Fig. 5, and has a foot-board, J^5, bolted to it in advance of the axle-box A^3. A treadle, K, is mounted upon the foot-board. This treadle is adjustably jointed to a link, *k*, connecting with the crank end of a rock-shaft, K'.

By properly adjusting the pivotal connection of the treadle with the link, by securing the treadle pivot-pin in the desired one of the holes in the link, that part of the treadle against which the toe or ball of the driver's foot bears may be located nearer to or farther from the seat B^2 to suit the convenience of the driver, and variations in the relative position of the treadle or foot-board and the link or rock-shaft, arising from adjustments of the seat-support, may be compensated by adjusting the treadle-connection with the link.

The rock-shaft K' is mounted near its inner or link-connected end in a bearing, *k'*, secured to the tongue-bracing portion of the tilting-lever B^3, and at or near its opposite end the rock-shaft is supported in a bracket-bearing, K^2, bolted in place on the tongue C.

A crank-arm, K^3, is sleeved upon the rock-shaft and fixed thereon by a key or otherwise.

A spring, k^2, acts upon the rock-shaft so as to hold it in its normal position and return it to such position after its actuation by the treadle.

A link, k^3, jointed to the crank K^3, and suitable connecting mechanism serve to actuate rake-controlling devices; but these features form no part of this invention, being elsewhere claimed by me.

A hollow gear block or support and partial casing, L, for the cutter-actuating gearing is cast in one piece of the form shown in Figs. 1, 1^a, and 5. This gear-block is attached to the main frame A^4 in advance of the axle, and projects from the frame, to which it is bolted securely by its vertical flange 1. A diagonal arm, L', of the gear-block L serves, as clearly shown, not only to strengthen the attachment of the gear-block to the frame, but to brace

the inner front corner of the frame, where it is subjected to great strain by the attachment of the tongue.

The shaft l', upon which is loosely secured the pinion L^2, actuated by the internal gear, L^3, of the drive-wheel, is mounted in the gear-block bearings l^2 l^3. The bevel-gear L^4 is fastened on this shaft l' by a detachable cross-pin or otherwise in such manner as to admit of readily unfastening the parts when it is desired to separate them and of fastening them together after slipping the shaft into the gear-hub while it is held in position. In this way the pinion L^2 may be first slipped upon its shaft until it comes against the enlarged end or head thereof, and the shaft be then inserted first through the bearing l^3, then through the bevel-gear, and finally brought to rest in the bearing l^2. The fastening of the bevel-gear secures the parts in place, the hub of this gear extending from bearing to bearing and preventing end movement of the shaft.

The cutter-actuating crank-shaft M is mounted for the greater portion of its length in a pipe-box or long bearing, l^4, in the gear-block, and is also supported at its front end in a bearing, l^5, formed partly in said block and partly in a detachable cap, which is not shown.

At the juncture of the bearings l^4 and l^2 there is formed a chamber to facilitate boring. A bevel-pinion, m, on the crank-shaft is driven by the bevel-gear L^4, and the cutters are actuated by a pitman connected with the wrist-pin of the wheel M′ on the crank-shaft, as well understood. The pinion m is detachably fastened to its shaft after the latter is slipped in place. The crank-wheel may be fastened to its shaft in any suitable way. A suitable secured cover of the gear-block protects the gearing by completing its inclosure.

It will be seen that by mounting the gearing and shafting in the gear-block, as above explained, space is economized and great strength and durability secured.

It should be noticed that both bevel-gear L^4 and pinion m, instead of overhanging or being mounted on shafts supported at one side of them only, are firmly supported by shafts which are sustained at both sides of them.

To enable the cutter-actuating gearing to be rendered inoperative, so that the machine may be moved from place to place without unnecessary wear of parts, and to provide for automatically throwing the cutters out of action when the machine is backed, clutch mechanism, by which both these objects are attained, is employed, as next to be described. I do not herein claim this clutch mechanism, such mechanism being elsewhere claimed by me.

The drive-wheel-actuated pinion L^2 is formed with a circular plate, N, having a peripheral flange provided with internal ratchet-teeth, n. The pinion and its circumferentially-flanged ratchet-toothed plate are cast in one piece, the pinion being loosely mounted on the shaft l', as already explained. A hubbed plate or disk-wheel, N′, is keyed fast to the shaft l' inside the pinion, the hub of this plate extending from the pinion to the bearing l^3, to prevent displacement of the parts. The plate N′ is keyed in place before the shaft l' is slid into position. It carries a spring-pawl, n', which is pivoted to rock within the toothed flange of the ratchet-plate. An abutment, n^4, against which the pawl bears, relieves the pawl-pivot from strain. The pawl-plate is made circular and of a diameter such as to fit within a shouldered recess in the flanged ratchet-plate, as clearly shown in Fig. 2. In this way the pawl-and-ratchet mechanism is completely protected. The pawl-carrying plate is provided with a curved slot, n^2, as shown in Fig. 6. A pin, N^2, on the pawl, near its nose, projects laterally therefrom and passes through the slot. A lug, n^3, projects inwardly from the pawl very slightly in advance of the pivot by which the pawl is mounted on the pawl-carrier N′.

A spring, o, mounted on the pawl-carrier, bears against the pawl-lug n^3, and is formed with the bend or curve o' near its free end. The action of the spring normally is to hold the pawl-nose engaged with the ratchet, the spring bearing near its free end and beyond its shoulder or angle formed by the end upon the pawl-lug. The pinion L^2 is thus clutched with its shaft, and the cutter-driving gearing is operated while the machine is at work and advancing. In backing the machine the pawl "clicks" or slips out from the ratchet-teeth, the spring o yielding and the rocking movement of the pawl being insufficient to cause the lug n^3 to bear against or be presented to the spring inside of its angle or shoulder. When by moving the pawl by means of the pin N^2, so as to rock its nose inward until the lug n^3 has been caused to pass over the angle or curve o', and the spring thus caused to bear inside of its bent end upon the lug, the spring acts to hold the pawl out of engagement with the ratchet. The nose of the pawl is thus held out of the ratchet-teeth or in the position assumed when rocked inward to the extent of the movement allowed by the pin and slot, and the machine may be set in motion without driving the gearing, as the pinion L^2 revolves without rotating its shaft when thus unconnected therewith by the clutch mechanism.

The rake-stand O O′, brace O^2, tumbling-shaft P, and pinion O^3 form no part of this invention, being elsewhere claimed by me.

I claim as my invention—

1. The combination of the main frame, the hinged tongue, and the combined tilting-lever and diagonal bracing-connection between the tongue and main frame, substantially as and for the purpose hereinbefore set forth.

2. The combination of the main frame, the tongue having hinged connection at its heel with the inner front corner of the main frame, and the combined tilting-lever and bracing-connection between the tongue and main frame, pivoted to the outer front corner of the

frame in line with the hinged connection of the tongue with the inner front corner of the frame, substantially as hereinbefore set forth.

3. The box-casting B, having the sleeve E for the finger-beam heel-post formed therewith, substantially as hereinbefore set forth.

4. The finger-beam heel-casting F^3, provided with the post-socket *f* and the rearwardly-extending perforated portion or bearing-arm f^2 for the grain-wheel-supporting rod, as hereinbefore set forth.

5. The combination of the rocking lifting-lever, the ratchet, the pivotal support for said lever and ratchet, the pawl mounted on the lever and yieldingly engaging the ratchet-teeth, the pawl-controlling devices, the detent-pawl, and its controlling devices actuated by the lever-supported trip-handle, substantially as and for the purpose hereinbefore set forth.

6. The combination, substantially as hereinbefore set forth, of the main frame, the finger-beam having vertically-adjustable connection at its heel end with the frame, the lifting lever having connection with the finger-beam, the ratchet-wheel, the pivotal support for said lever and ratchet, the ratchet-actuating pawl mounted on the lifting-lever, the pawl-controlling devices, the detent-pawl, the controller or trip-arm of said pawl, and the trip-rod loosely engaging said trip-arm, for the purpose described.

7. The combination of the rocking lifting-lever, the ratchet, the sheave, the pivotal support for said lever, ratchet, and sheave, the chain secured to the sheave, the ratchet-actuating pawl mounted on the lever, the trip-handle connected with said pawl, the detent-pawl, its curved arm, the loop-ended trip-rod, and the trip-handle with which it is connected, substantially as and for the purpose hereinbefore set forth.

8. The combination of the grain-wheel, its supporting-arm, the rod to which said arm is rigidly attached, the bearings in which said rod is journaled in rear of the finger-beam, the crank at the inner end of said rod, and the supporting-link connected at one end of said crank, and at its other end to the pivotal support about which the finger-beam raising and lowering devices rock, substantially as and for the purpose hereinbefore set forth.

9. The box-casting B, having the rearward extension by which the finger-beam raising and lowering devices are pivotally supported, as described.

10. The combination of the grain-wheel and the supporting-arm provided with the curved and sharpened rear end, substantially as and for the purpose hereinbefore set forth.

11. The grain-wheel-supporting arm formed with the inwardly bent or bulged central portion and the curved and sharpened rear end, substantially as and for the purpose hereinbefore set forth.

12. The combination of the grain-wheel provided with the flanged tread, and the supporting-arm located within the tread of the grain-wheel and provided with the hub-seat, substantially as and for the purpose hereinbefore set forth.

13. The combination of the grain-wheel provided with the flanged tread, the cranked rod E^2, projecting at its outer end within the tread of the grain-wheel, and the supporting-arm secured to the cranked rod within the tread of the grain-wheel and having the hub-seat, substantially as and for the purpose hereinbefore set forth.

14. The combination of the grain-wheel provided with the flanged tread, and the supporting-arm extending crosswise of the wheel close to its spokes and terminating at its rear end near the tread of the wheel, substantially as and for the purpose hereinbefore set forth.

15. The combination of the flanged grain-wheel, the rod E^2, the arm E^5, rigidly attached to the rod within the tread of the grain-wheel and provided with the hub-seat, and means for securing the grain-wheel with its hub projecting into the seat in the arm, substantially as and for the purpose hereinbefore set forth.

16. The combination of the grain-wheel, its supporting-arm provided with the hub-seat, the thimble having the annularly-flanged head h^2 interposed between the supporting-arm and hub of the grain-wheel, and into the cavity formed by which the grain-wheel hub projects, and the securing-bolt, as and for the purpose hereinbefore set forth.

17. The combination of the main frame, the tongue, the finger-beam, the diagonal brace having jointed connection at its rear end with the finger-beam, and the longitudinally-adjustable casting secured to the tongue, and to which the front end of the brace is jointed, substantially as and for the purpose hereinbefore set forth.

18. The casting I^2, formed with the longitudinal slots, and having the raised portion I^3, with the transverse slot, substantially as and for the purpose hereinbefore set forth.

19. The combination of the tongue, the casting secured thereto and having the transverse slot, and the thimble for attachment of the double-tree, adjustable in said slot, substantially as and for the purpose hereinbefore set forth.

20. The box-casting B′, having the hooked side lug at its top rear corner and the flanged side lug at its front upper corner, substantially as and for the purpose hereinbefore set forth.

21. The combination of the main-frame box for the outer end of the axle, the seat-support casting provided with bearings by which it is fitted to rock on that portion of said box which projects outside of the main frame, while prevented from accidental movement endwise thereof, the swinging spring-actuated detent, and the fixed hook or stop-lug engaging therewith, substantially as and for the purpose hereinbefore set forth.

22. The rocking seat-support J, provided with the bearing-openings on its under side, the guide-lug at its front end, and the swinging spring-actuated detent pivoted beneath it and provided with the lever or handle passing up through its slot, substantially as hereinbefore set forth.

23. The combination of the main frame, the axle, the outer box for the axle, projecting outside of the main frame, the stop-lug *j* in rear of the box, the flanged side lug or guideway, *j'*, in front of the box, the rocking seat-support fitted on the box, the lug on the support fitting in the guideway, and the swing-detent provided with the spring and lever-handle and engaging the stop-lug, substantially as and for the purpose hereinbefore set forth.

24. The combination of the detachably-mounted rocking seat-support, the seat-standard secured thereto and bent and extended forward thereof, the foot-board secured to said extended portion of the seat-standard, the treadle pivoted to the foot-board, and the rock-shaft with which said treadle is adjustably connected, substantially as and for the purpose hereinbefore set forth.

25. The combination of the main frame, the hinged tongue, the bracing connection between the tongue and outer front corner of the frame, the rock-shaft, and its bearings respectively secured to said bracing connection and the tongue, substantially as and for the purpose hereinbefore set forth.

26. The hollow gear-block provided with the flange and diagonal arm, by which to bolt it to the main frame, substantially as described.

27. The hollow gear-block provided with the bearings l^2 l^3 and the pipe-box bearing, as and for the purpose described.

28. The combination of the shaft l', its bearings l^2 l^3, the bevel-gear detachably fastened on said shaft between the bearings thereof, the crank-shaft, its pipe-box bearing, and the bevel-pinion thereon, substantially as and for the purpose hereinbefore set forth.

29. The combination of the crank-shaft, the gear-block provided with the pipe-box bearing l^4 and the bearing l^5, and the pinion secured on the crank-shaft between said bearings, substantially as and for the purpose hereinbefore set forth.

In testimony whereof I have hereunto subscribed my name.

JOHN S. DAVIS.

Witnesses:
GEORGE W. HUMPHREY,
WILLIE HUMPHREY.