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2 Sheets

T. J. Tindall.

Mower.

№ 44679 Patented Oct. 11, 1864.

Fig 1

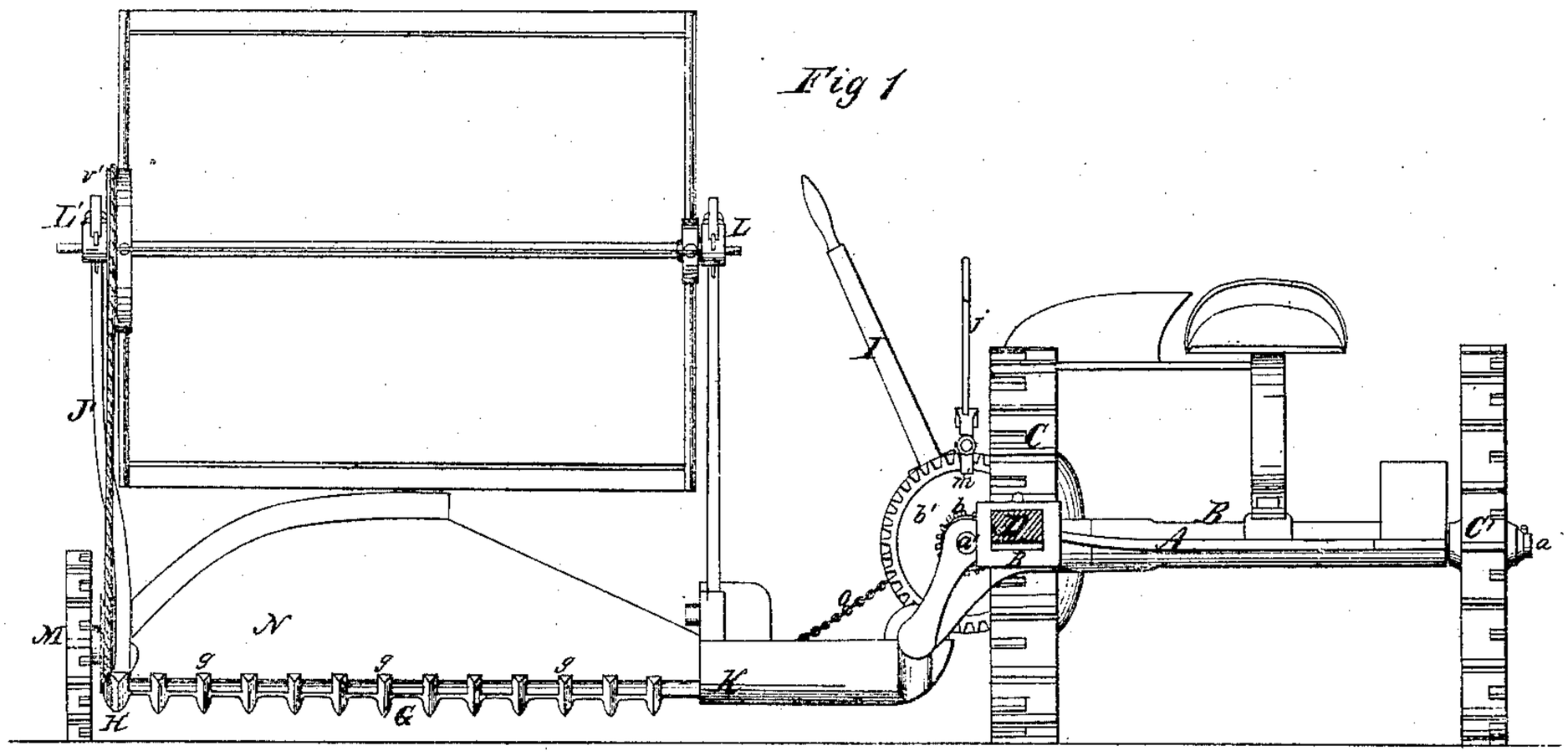
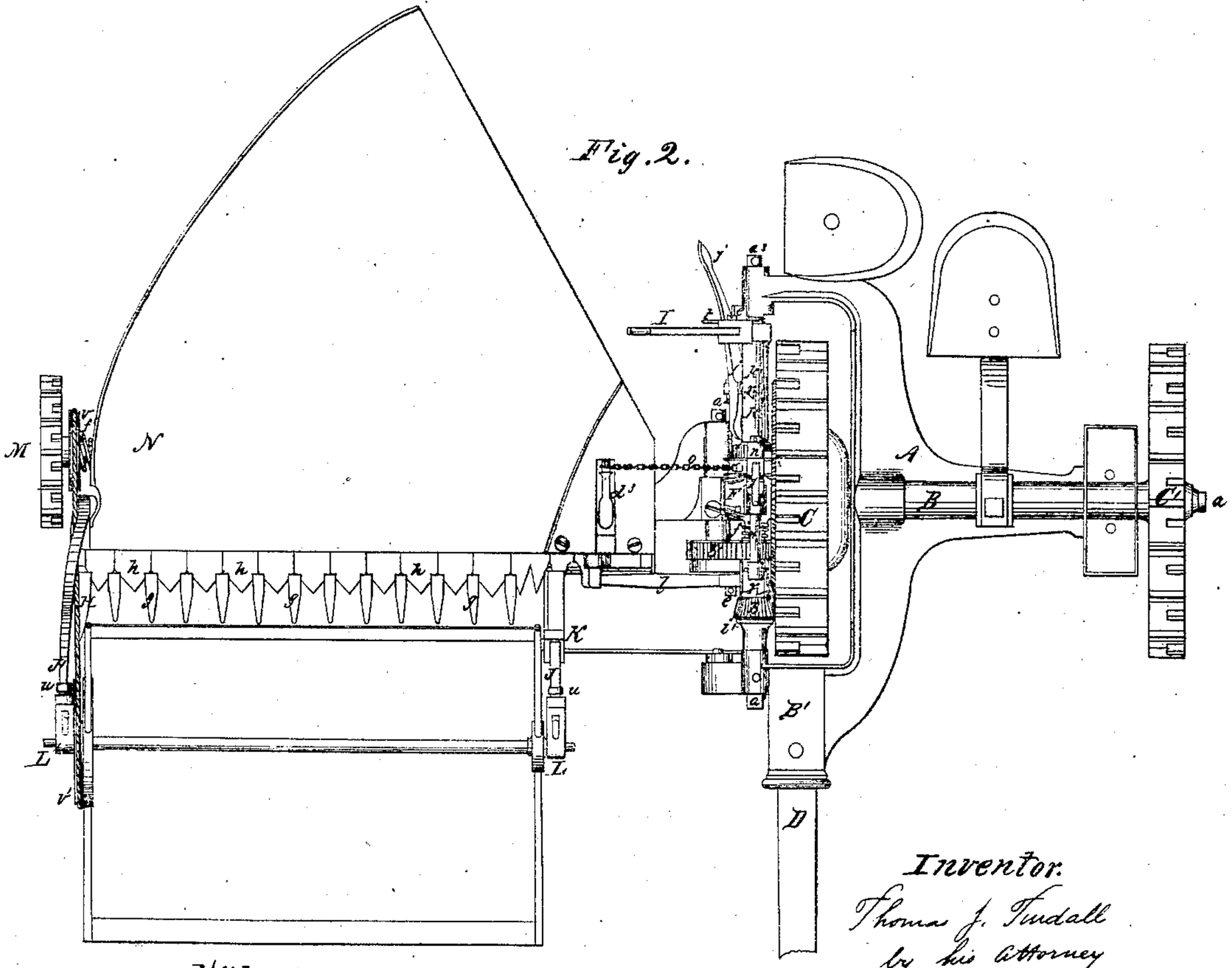


Fig. 2.



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Sheet. No. 2.
2 Sheets.

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Fig. 3.

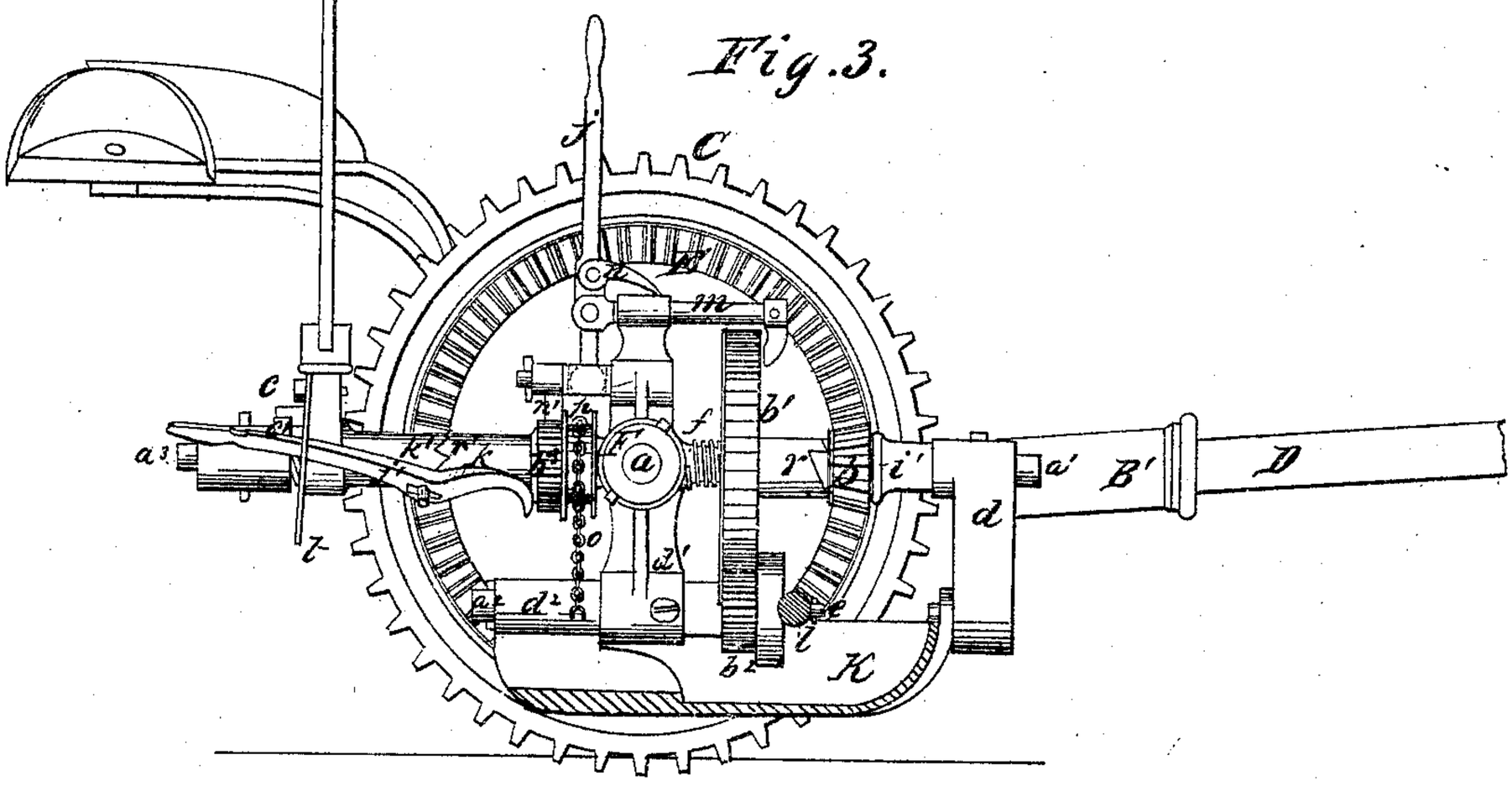


Fig. 4.

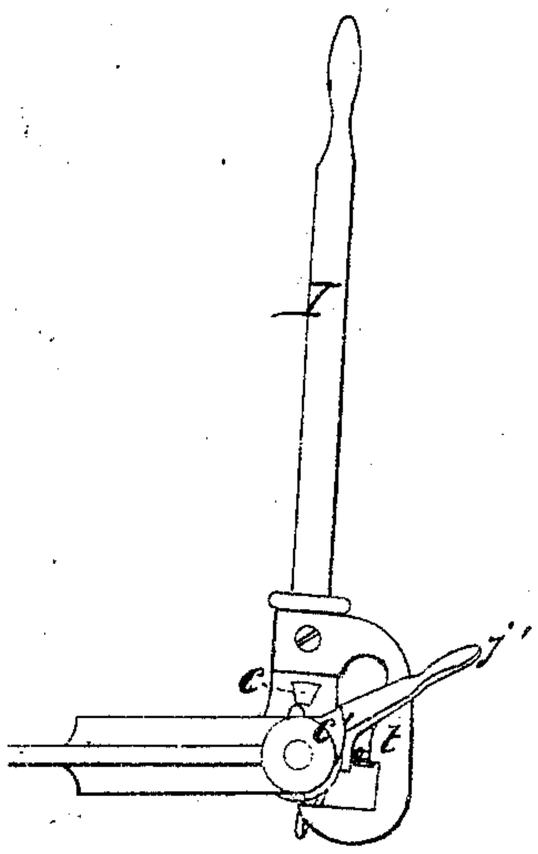


Fig. 6.

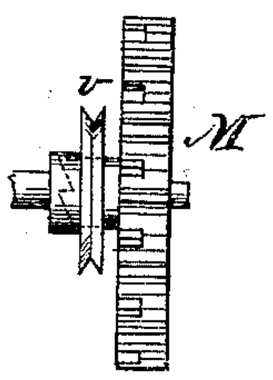


Fig. 7.

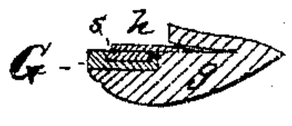
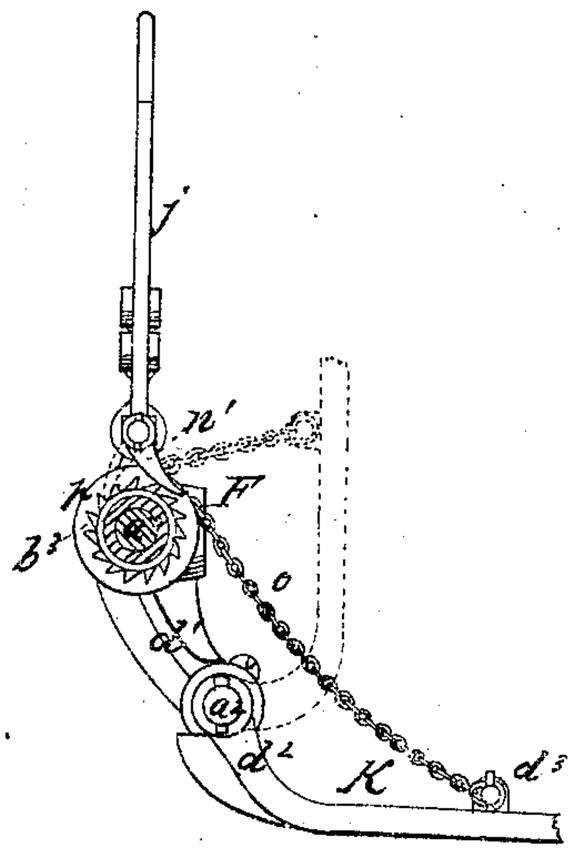


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS J. TINDALL, OF NEW YORK, N. Y.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **44,679,** dated October 11, 1864; antedated September 28, 1864.

To all whom it may concern:

Be it known that I, THOMAS J. TINDALL, of the city, county, and State of New York, have invented certain new and useful Improvements in Harvesting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of a combined machine for reaping and mowing embodying my invention. Fig. 2 represents a plan of the same. Fig. 3 represents a transverse section of the same at the line *x x* of Fig. 2, looking toward the driving-wheel; and Figs. 4, 5, 6, and 7 represent views of detached fragmentary parts of the machine.

The first and second parts of my invention have reference to the construction of the main frame of the machine. In many preceding machines it has been customary to construct pillow-blocks upon the main frame to hold the shafts of the running and cog wheels, and inasmuch as the main frame, when made of cast-iron, must be made thin for economy in construction and to render the frame light, while on the other hand it must be made rigid, it has also been customary to stiffen the frame transversely to the line of draft by casting ribs upon it.

Now, the object of the first part of my invention is to obtain the requisite transverse rigidity and lightness in the frame, and at the same time to dispense with the cost of constructing pillow-blocks for the running wheels; and it consists in constructing the main frame with a tubular socket, in which the axle of the running-wheels is secured in such manner that said tubular socket accomplishes the double purpose of the ordinary pillow-blocks to sustain the said axle and of ribs to stiffen the main frame transversely.

The object of the second part of my invention is to enable the tongue to which the horses are attached to be securely connected with the main frame, and at the same time to stiffen the frame longitudinally; and it consists in combining the tongue with the main frame by means of a socket cast in one piece with the said frame, so that the sides of the said socket form ribs which stiffen the frame longitudinally with the line of draft, while at the same time the said socket is the means of securing the tongue firmly to the main frame.

In preceding harvesting-machines it has been customary to secure the cog-wheels that impart motion to the cutter from the main cog-wheel on one of the running wheels upon shafts whose journals turn in boxes or pillow-blocks secured to the frame. The cost of constructing these boxes is considerable; and the object of the third part of my invention is to lessen the cost of constructing the machine by dispensing with the boxes. To this end this part of my invention consists in combining the cog-wheels that operate the cutter or other acting members of the harvester with silent or still shafts, which are rigidly secured in sockets upon the frame of the machine, so that the said wheels turn freely upon the said shafts, while the shafts remain stationary. By this mode of construction the cost of fitting up the bolts and caps of pillow-blocks is dispensed with, the mechanical operations required being reduced to the boring of the sockets and wheel-hubs and the turning of the shafts, which operations are the simplest that are performed with tools. Moreover, as the hubs of the wheels can be extended along the shafts, a greater amount of wearing-surface can be obtained than with the ordinary pillow-blocks.

The object of the fourth part of my invention is to enable the cutter to be thrown out of gear, either automatically by the backing of the machine or positively by the hand of the attendant. This part of my invention consists in combining two of the cog-wheels that drive the cutter with each other by means of an intermediate saw-toothed spring-clutch controlled by a lever, so that the cog-wheel nearest the cutter remains stationary by reason of the slip of the clutch when the other cog-wheel is turned backward by backing the machine, and that the clutch can be operated by means of the lever by the hand of the attendant whenever he wishes to stop the cutter.

The fifth part of my invention has reference to the construction of the hinge-joint which connects the cutter-bar and the main frame in such manner that the cutter-bar can be turned up or down to pass over obstacles. This part of my invention consists in combining the main frame and the cutter-bar together by lugs, which are traversed by one of the pinion-

shafts of the cutter-gear in such manner that the said shaft performs the double purpose of a pinion-shaft and joint-pin for the hinge, and that the cost of a special joint-pin is saved.

The sixth part of my invention has reference to the raising and securing of the cutter-bar and to the lowering of the same low enough to prevent jar. This part of my invention consists in the combination of a winch with a vibrating lever whose vibration is limited by a stop, by means of a spring saw-toothed clutch; also, in using a brake-lever in connection with the said devices in a manner that will be hereinafter more fully described.

The object of the seventh part of my invention is to retain the beveled wheels of harvesters in their proper relative positions; and it consists in combining the pair of beveled wheels with flanges which engage with each other and prevent the movement of the wheels in the directions of their axes of revolution.

The object of the eighth part of my invention is to stop the reel from revolving when the machine is backed; and it consists in the combination of the driving-pulley of the reel with the running wheel at the grain side of the machine through the intervention of a spring-clutch, so that the reel, although driven by the grain wheel, ceases to revolve when the grain-side of the machine is backed.

The object of the ninth part of my invention is to permit the reel-standards to be rigidly connected at their upper ends, so that they cannot separate nor approach each other, and that they mutually support each other, and at the same time to insure the free turning of the reel. This part of my invention consists in combining a hollow reel-shaft with a rod connecting the upper ends of the two reel-standards, so that the reel turns upon said rod as a fixed arbor.

All the parts of my invention are embodied in the combined machine represented in the annexed drawings, which is therein represented as arranged for reaping.

In this machine the main frame A is of cast-iron, cast in one piece with a tubular socket, B, extending transversely across it to stiffen it and receive the axle of the running-wheels C C′, this axle being inserted through the said socket. The anterior portion of the main frame is also stiffened longitudinally by means of the socket B′, in which the butt of the tongue D is secured by a bolt.

In the machine represented all the cog-wheels run upon silent or stationary shafts. The cog-wheels that impart motion to the cutter consists of a master-wheel, E, secured to the running wheel C of a beveled pinion, *b*, and secondary cog-wheel *b′*, and of the cutter-pinion b^2. The beveled pinion *b* and secondary cog-wheel *b′* revolve upon the same silent shaft, *a′*, which is secured at one end in a socket at the end of an arm, *d*, forming part of the main frame, and at the other in a stationary hub, F, that is carried by the prolonged extremity of the axle *a* of the running wheels. The hubs of these two wheels *b b′* are made long, so as to obtain ample surface for wear, and the two are combined by means of a saw-toothed clutch, *r*, which is formed by teeth upon the adjacent ends of the two hubs.

In order to hold the teeth of the clutch engaged when the machine is running forward, and at the same time permit them to disengage when the machine is backed, a coiled spring, *f*, is applied to the shaft *a′* between the hub F and the wheel *b′*, the spring being sufficiently strong to push the wheel *b′* along its shaft and hold the clutch-teeth engaged while the machine is moving forward, but yielding to the pressure produced by the inclined surfaces of the clutch-teeth of the pinion *b* upon those of the clutch-teeth of the wheel *b′* when the pinion *b* is turned backward by backing the machine and permitting the clutch-teeth to pass over each other.

In order to disengage the clutch-teeth by hand, a lever, *j*, is provided, with its handle within reach of the driver. This lever operates a sliding bolt, *m*, whose forward end is hooked downward to embrace the front side of the cog-wheel *b′*; hence by drawing the lever back the cog-wheel *b′* is slid back upon its shaft and the clutch-teeth are disengaged. The lever is provided with a hinged pawl, *n*, which, dropping between the lever and the guide of the sliding bolt *m* when the lever is drawn back, holds it in that position and keeps the clutch-teeth disengaged until the pawl is displaced.

The cutting apparatus of the machine represented consists of open slotted fingers *g* and a vibrating scalloped cutter, *h*. The fingers are secured to a finger-beam, G, which carries a divider, H, at its grain end. Its other end is secured to a shoe, K, which is hinged to the main frame, so that the cutting apparatus can turn up and down on this hinge to accommodate itself to the surface of the ground, and can be turned up by hand to pass over obstacles. The cutter is vibrated by a pitman, *l*, which receives motion from a crank-pin, *e*, secured to the cutter-pinion b^2. This pinion revolves on a silent shaft, a^2, which passes through a lug on the end of an arm, *d′*, projecting from the hub F, which is connected rigidly with the main frame, and also through a lug, d^2, projecting from the shoe of the cutting apparatus, thus forming the joint-pin of the hinge, as well as the shaft of the cutter-pinion. This mode of forming the joint has also the advantage of maintaining the axis of the pinion always coincident with the axis of the hinge, the same axis being in fact common to both, so that the cutter at the two extreme points of its stroke always maintains the same relation to the fingers, however much the cutting apparatus be turned up or down on its hinge.

In order to raise the cutter, a winch is provided by fitting a sleeve, *k*, carrying a chain-sheave, *p*, and ratchet-wheel b^3, upon a silent shaft, a^3, which is in line with the cog-wheel shaft *a′*. The chain-sheave *p* has a chain, *o*,

secured to it, and the other end of this chain is fastened to an arm, d^3, secured to the shoe K, so that by turning the sleeve upon its shaft the chain is wound upon the chain-sheave and the cutting apparatus is turned upon its hinge. The ratchet-wheel b^3 is provided with a swinging pawl, n', so that when this pawl is acting upon the teeth of the ratchet-wheel on the side farther from the cutting apparatus the end of the pawl, engaging with the ratchet-teeth, stops the winch from turning back and retains the cutting apparatus in any position to which it may be raised. The pawl may, however, be swung over to the side of the ratchet-wheel nearer the cutting apparatus, as shown in black lines at Fig. 5, in which case it becomes inoperative.

The winch is operated by a hand-lever, I, fitted to a sleeve, k', upon the shaft a^3 of the winch. The front end of this lever-sleeve k' is fitted with saw-toothed clutch-teeth, which engage with corresponding teeth upon the hinder end of the chain-sheave sleeve, the two sets of teeth forming a clutch, r', whose teeth are pressed together by a spiral spring at the hinder end of the lever-sleeve k'. The lever-sleeve has a snug, c, secured to it, and a stop, c', is secured to the main frame of the machine, in such position that the lever can only vibrate a certain distance toward the cutter. The operation of this combination is as follows: When the machine is to do ordinary work, the pawl n' is swung over the ratchet-wheel, so as to be inoperative, and the chain is so adjusted that when the machine is running on level ground the chain is taut when the lever is about vertical. Hence when the ground inclines downward from the hinge-joint of the cutter, the latter can turn down on its hinge to follow the inclination of the ground, as there is space enough between the snug c and stop c' to permit the turning of the lever and the winch to which it is clutched. The cutter can also turn upon its hinge to follow upward inclinations. When an obstacle is to be passed over, the attendant, applying his hand to the lever I, winds the chain on its sleeve and draws up the cutter, so that it can pass over the obstacle. When, however, the attendant wishes to raise the cutter and hold it in its raised position, as is expedient when going to and from the field, the pawl n' is swung over, as shown in red lines at Fig. 5, so as to operate upon the teeth of the ratchet-wheel b^3, and the attendant, by moving the lever-handle I to and fro, can wind up the chain, and thereby turn up the cutting apparatus until it is in nearly a vertical position, as shown by the position of the fragment of the shoe drawn in red lines in Fig. 5, where it is held securely by the pawl-and-ratchet wheel. In order to lower the cutter from this vertical position, the attendant may operate the lever I for that purpose, disengaging the pawl n' and re-engaging it at each vibration; but the same operation may be effected more quickly by means of a disengaging brake-lever, j', which is pivoted to the lever-sleeve k'. The forward end of this brake-lever is rounded and fitted to bear against the hinder face of the ratchet-wheel. It is also of such length that when the hinder end of the lever is depressed its forward rounded end, rising, bears against the ratchet-wheel and forces the lever-sleeve k' backward sufficiently to disengage the teeth of the clutch r; but at the same time that this disengagement is effected the pressure of the brake-lever against the ratchet-wheel is sufficient to prevent the winch from turning rapidly backward to unwind the chain and permit the cutter to turn down violently. The brake-lever thus acts not only to disengage the clutch-teeth, but also as a friction-brake to prevent the too rapid descent of the cutter. In using it the lever I is first moved sufficiently to enable the pawl n' to be disengaged and swung over. Then the disengagement of the clutch r' and the lowering of the cutter are effected by operating the brake-lever. This brake-lever is fitted with a spring-guard, t, having a notch, in which the lever can be engaged when necessary.

It is expedient that the teeth of the beveled wheels should engage truly. In order to insure this result, the rim of the beveled wheel E, carried by the running wheel C, is fitted with a V-formed flange, i, and a corresponding flange, i', is formed upon the sleeve of the beveled pinion b in such a position relatively to the teeth thereof that the rim of the flange i upon the beveled-wheel E is embraced between the butts of the pinion-teeth and the pinion-flange i', so that the teeth of the pinion b, which is free to play endwise within certain limits, are maintained in their proper position relatively to the teeth of the wheel E by the action of the flanges.

It is necessary to hold the sickle of a harvester down upon the fingers, and this is generally done by means of caps which overlap the upper surface of the sickle. In my machine the holding down of the sickle h is effected by making its stock s, Fig. 7, broader as it recedes from the under surface of the sickle-blades, and by making the grooves in the finger-beam, in which the stock is received, of corresponding form, the transverse section of the two being what is generally termed of a "dovetail" form. By this construction the sickle is held down from beneath instead of from above, and the upper surface of the sickle is free from any prominence. It is not essential that the section of the sickle stock and groove should be precisely of the form represented in the drawings, as it is evident that the holding down of the sickle from beneath can be effected by making some part of the stock or the equivalent thereof to hook under a projection on the finger-beam and prevent the rising of the sickle.

In the machine represented the reel has a tubular shaft, P, which is arranged to turn freely upon a rod, z, which is supported by two brackets, L L′, which slide upon standards J J′, that project up from the divider H and

shoe K. These brackets are fitted with holes, in which the ends of the rod *z* are received and secured by pins; and the rod *z* can be shifted to a forward or to a hinder hole to change the position of the reel horizontally. Its position vertically is changed by sliding the brackets up or down on their standards, and they may be secured in any desired position by means of the jam-screws *u*. The rod *z*, thus arranged, connects the upper ends of the two reel-standards firmly, so that they cannot separate nor approach each other, and that they afford each other mutual support, while at the same time the reel turns freely upon said rod as a fixed arbor. The reel is driven from the grain-wheel M, which is fitted to revolve on an arm secured to the platform N. A sleeve carrying a pulley, *v*, is fitted to revolve upon the same arm, and the hub of the grain-wheel and the pulley-sleeve are fitted with saw-toothed teeth, forming a clutch. These teeth are within the pulley-sleeve, as shown in dotted lines at Fig. 6, the teeth of one part of the clutch being overlapped by a tubular sleeve connected with the other part of the clutch, so that the teeth are protected from dirt, and they are held engaged when the machine is moved forward by a spiral spring, *f'*, Fig. 2. When, however, the machine is backed, the spring, yielding to the thrust produced by the action of the inclined faces of the clutch-teeth upon each other, permits the clutch-teeth to disengage, so that the pulley is not then rotated. The reel-shaft is fitted with a pulley, *v'*, which receives a band leading from the pulley *v* on the sleeve at the grain-wheel, so that the reel is operated when the machine is moved forward and remains inoperative when the machine is backed.

As before stated, one reel-standard, J, is secured to the shoe K, to which the finger-beam is made fast, and the other reel-standand, J', is secured to the divider end of the finger-beam. The shoe K forms part of the hinge-joint that connects the finger-beam with the main frame in such manner that it can vibrate to accommodate itself to inequalities of the ground, and the two reel-standards are therefore both on the stubble side or stubble division of the hinge-joint, so that they and the reel carried by them move with the finger-beam as it moves. The reel and finger-beam are thus combined together, so that they maintain the same relationship however the finger-beam may change its position to the main frame by vibrating on its hinge-joint.

When the machine is used to mow, the platform, with the grain-wheel M, is removed, and also the reel and reel-standards. A track-clearer is then pivoted to the divider to clear the track for the running wheel when cutting the succeeding swath.

The machine represented is designed to have the grain raked from the platform by a raker, who sits upon a seat, R, secured to the main frame; but the machine is suited to the employment of an automatic rake, if it be deemed expedient to apply one.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A main frame of a harvesting-machine, constructed with a tubular socket for the axle of the running wheels, in such manner that the said socket performs the double function of sustaining the said axle and of stiffening the frame transversely, substantially as set forth.

2. A main frame of a harvesting-machine constructed with a socket for the tongue in such manner that the said socket performs the double function of sustaining the tongue upon all of its sides and stiffening the frame longitudinally, substantially as set forth.

3. The combination of the cog-wheels of a harvesting-machine with still or silent shafts which are rigidly secured to the frame of the machine, substantially as set forth.

4. The combination of two of the cog-wheels that impart motion to the cutter with each other by means of a saw-toothed spring-clutch, so that the cog-wheel nearer the cutter remains stationary when the machine is backed, and that the clutch may be operated by a lever to stop the cutter, substantially as set forth.

5. The combination of the finger-beam with the main frame by means of lugs, and one of the shafts of the cutter-gear, in such manner that the said shaft performs the double function of pinion-shaft and joint-pin for the hinge-joint, substantially as set forth.

6. The mechanism for raising and lowering the cutter-bar, consisting, substantially, of a wrench, vibrating lever, and saw-toothed clutch, combined together and operating substantially as set forth.

7. The combination of the beveled wheels together by means of flanges, which engage with each other and prevent the separation of the teeth of the wheels by movement in the direction of the axes of the wheels, substantially as set forth.

8. The combination of the driving-pulley of the reel with the grain-wheel by means of a spring-clutch, in such manner that the revolution of the reel stops whenever the said grain-wheel runs backward, substantially as set forth.

9. The combination of a hollow reel-shaft with a rod that connects the upper ends of the reel-standards, so that the reel turns upon the said rod, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. TINDALL.

Witnesses:

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W. L. BENNEM.