(No Model.) 2 Sheets—Sheet 1.

J. H. ELWARD.

MOWER.

No. 551,925. Patented Dec. 24, 1895.

FIG. 3.

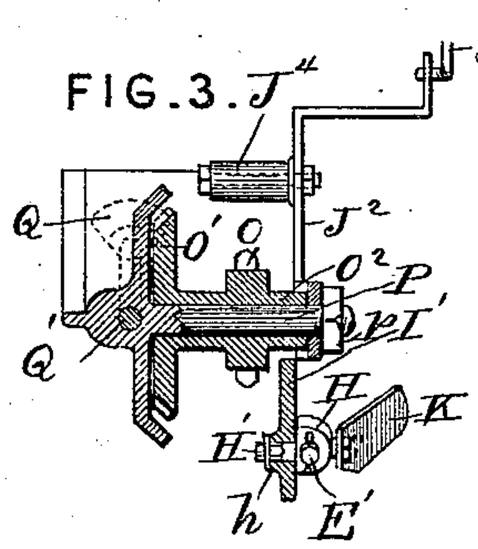
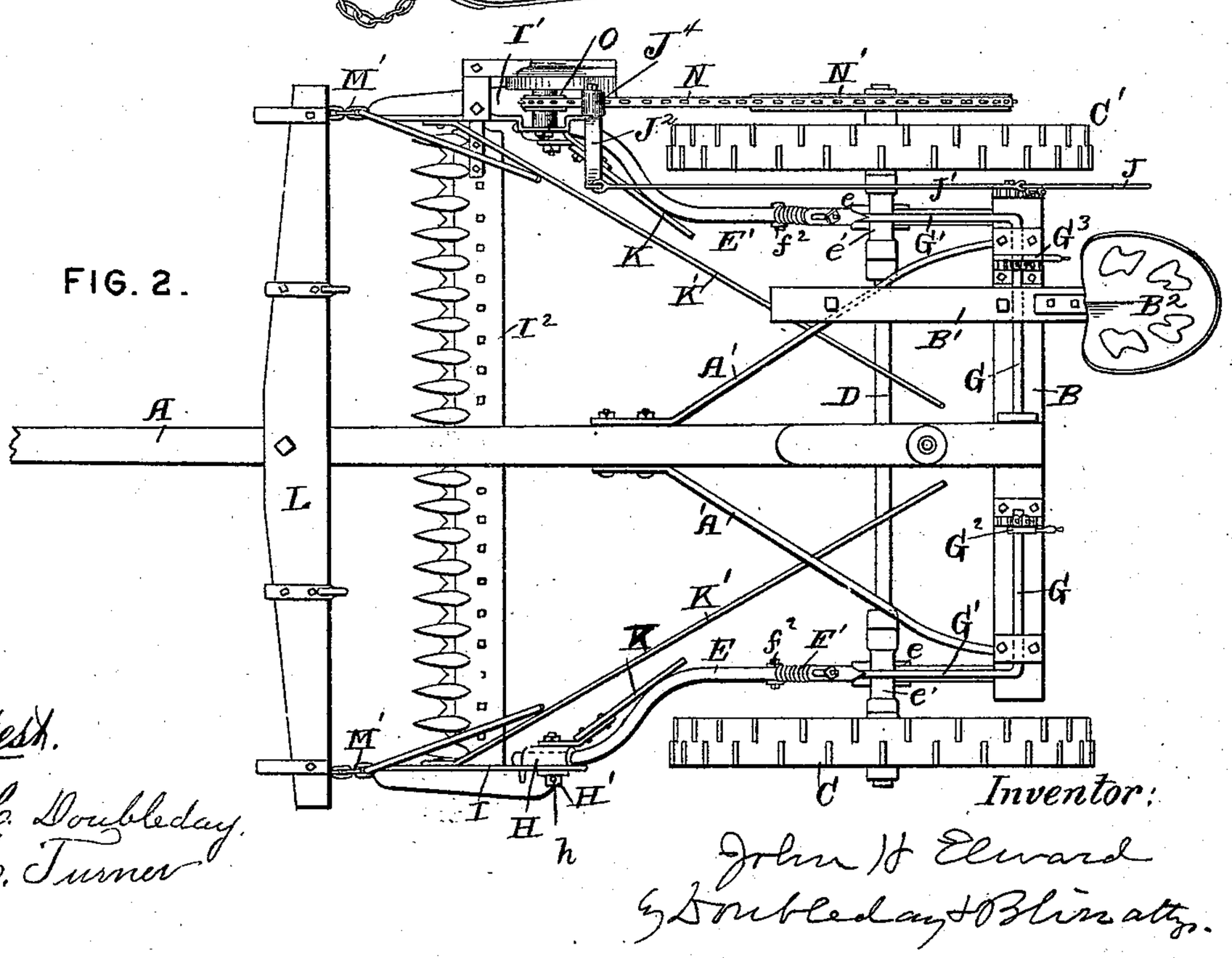


FIG. 1.

FIG. 2.



Attest.

F. L. Doubleday.
J. C. Turner

Inventor:

John H. Elward
by Doubleday & Blinn attys.

(No Model.) 2 Sheets—Sheet 2.

J. H. ELWARD.

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Fig. 4

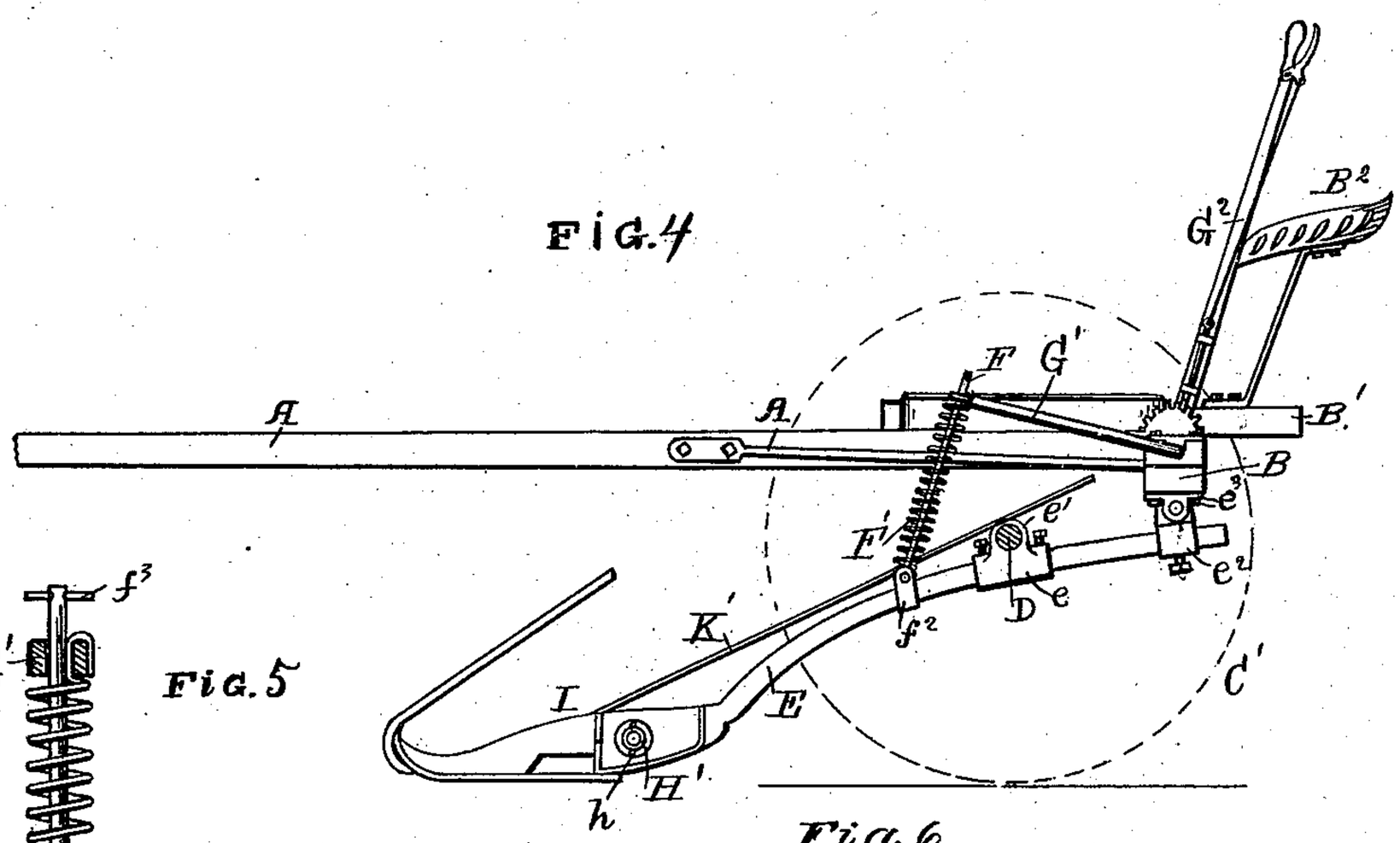


Fig. 5

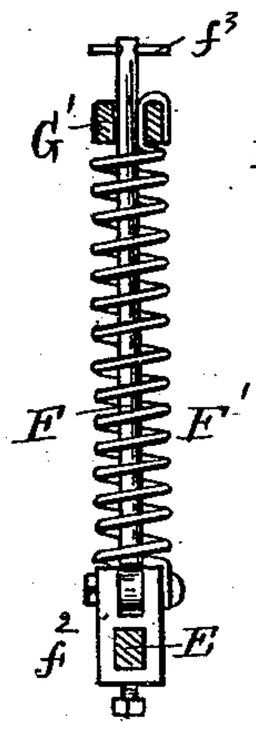


Fig. 6

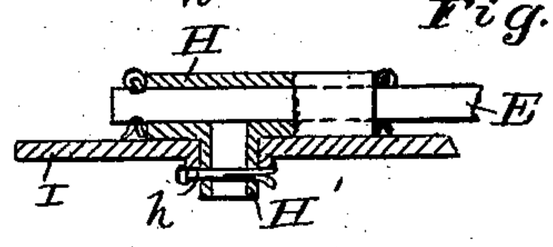
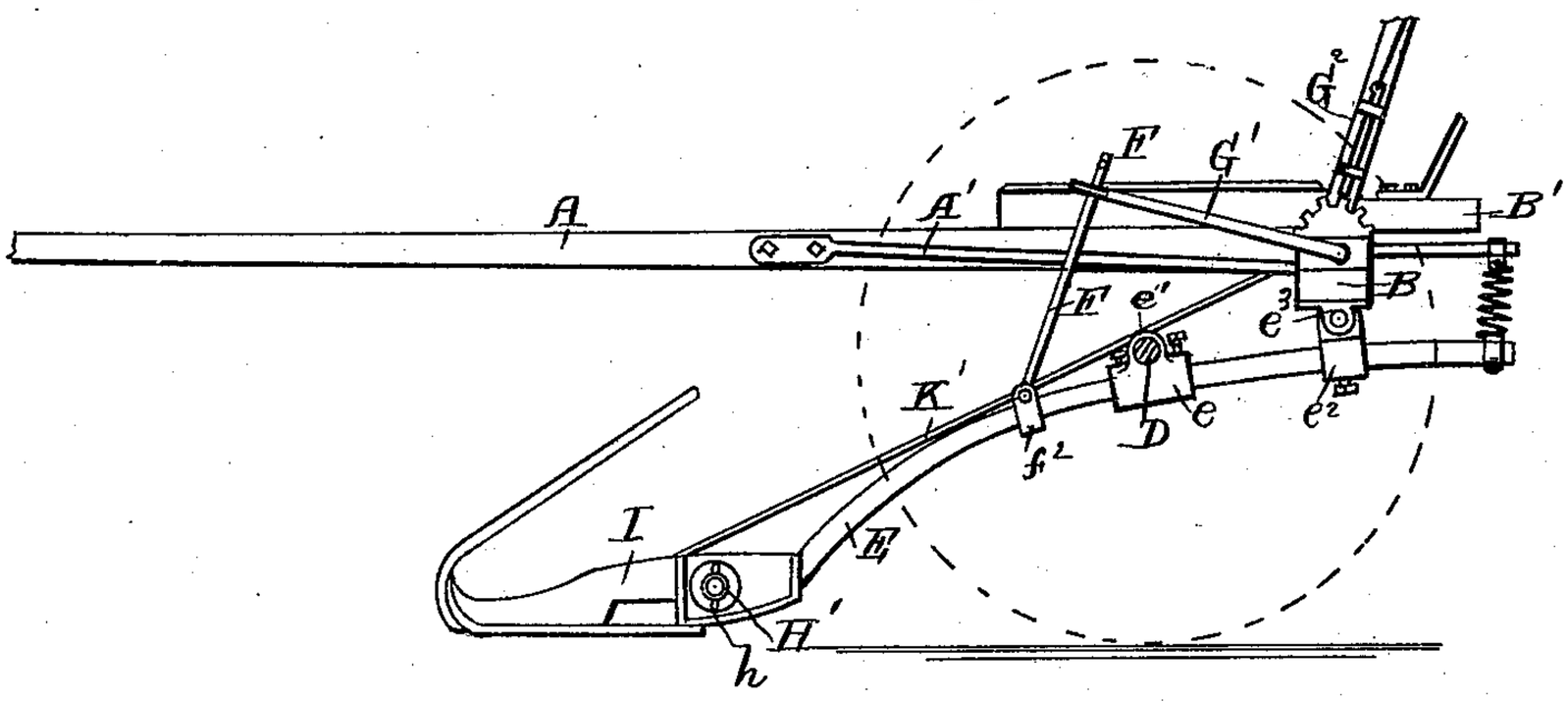


Fig. 7.



Attest.
J. C. Turner
J. L. Doubleday.

Inventor.
John H. Elward
by Doubleday & Bliss
attys.

UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF WHITE WATER, WISCONSIN, ASSIGNOR OF ONE-HALF TO THE WINCHESTER & PARTRIDGE MANUFACTURING COMPANY, OF SAME PLACE.

MOWER.

SPECIFICATION forming part of Letters Patent No. 551,925, dated December 24, 1895.

Application filed February 21, 1887. Serial No. 228,406. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, a citizen of the United States, residing at White Water, in the county of Walworth and State of Wisconsin, have invented certain new and useful Improvements in Mowers, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a perspective of a mowing-machine embodying my improvements. Fig. 2 is a top plan view. Fig. 3 is a section through the shoe which carries the gearing, some of the latter being also shown. Fig. 4 is a side elevation showing the relations of the frames. Figs. 5 and 6 show details. Fig. 7 is a side view of a modification.

The main frame, as shown, consists of the rear cross-bar B, rigidly secured to the rear end of the tongue A, there being braces A′ between the tongue and the cross-bar, and a comparatively short bar B′ at one side of the machine for supporting the driver's seat B^2. The axle is represented at D, upon which are the driving and carrying wheels C C′. The latter are provided with a backing ratchet mechanism of any suitable kind. The main frame is supported upon the axle by the following devices.

E E′ represent metal bars situated transversely of and preferably below the axle. Upon the axle are mounted sleeved sockets *e e′*, the socket part being preferably angular in section, and transverse to the sleeve part *e′*, which latter is fitted around the axle and held in place thereon by a set-collar, as shown. These bars E E′ project to points beyond or in rear of the axle, and are passed through and secured in socket-pieces at e^2, which are hinged to the aforesaid cross-bar B. By means of set-screws these bars can be clamped tightly in place in the sockets $e\,e^2$, and it will be seen that the bars can be adjusted longitudinally, as desired. The socket-pieces e^2 are united by hinged joints with the parts bolted to the bar. When the parts are thus constructed and arranged, it will be seen that the forward ends of the bars E E′ can be drawn up, inasmuch as they are loosely mounted by the sleeves *e′* on the axle, and united by the hinged joints to the main frame, as above described.

F F represent rods pivotally connected to the bars E E′ at f^2 in front of the axle. These bars F extend upward and are loosely connected to the crank-arms G′ of the lifting devices, which latter comprise rock-shafts G mounted upon the transverse part of the frame, and levers G^2 G^3, rigidly connected to the said rock-shafts, that at G^2 on one side of the machine being shorter than that at G^3 on the other side of the machine for a purpose to be hereinafter described.

F′ F′ represent coiled springs respectively placed around the rods F F, each having its lower end permanently fastened to a bar E or E′ and its upper end secured to a crank-rod G′. The rods F can move to and fro relatively to the crank-rods G, the latter having eyes or guides for them, their up movement being limited by pins f^3. With this construction it will be seen that the lifting-levers G^2 G^3 can be so set and fastened by their toothed plates (of the usual character) that the greater part of the weight at the front ends of the bars E E′ shall be supported upon the said springs. Hence I do away with the friction of the cutting apparatus upon the ground, and utilize the weight of the said apparatus to increase the traction power of the wheels to such an extent that the machine as a whole can be much lighter than those ordinarily made, and yet insure the proper driving of the mechanism which operates the cutters. The cutting apparatus is supported directly upon the axle and the wheels, and the weight of all of the forward parts is brought to bear in the form of downward pressure upon the wheels. At the same time the said forward parts are carried with a yielding support, so that there is sufficient flexibility to allow them to be adjusted to reach any required point. It will be set forth below that the cutting mechanism is supported entirely upon these bars E E′, the latter being connected respectively to the ends of the former, and inasmuch as they are both suspended on a resilient support the cutting mechanism will readily be lifted automatically when the

guards come in contact with obstructions of the ordinary character, such as inclinations in the surface of the soil, rocks, &c., the lifting being of the character of a bound, and after passing such obstruction the cutting mechanism will again automatically come to working position.

The hinge connection between the main frame and the bars E E′ being in rear of the axle, the weight of the main frame, supplemented by that of the driver when in the seat, acts to counterbalance the forward parts of the machine carried by the said bars. As a result of this, first, I can more easily attain the end above set forth—namely, at all times and under all adjustments have the weight of all the parts bearing upon the axle and the wheels; secondly, I can employ lighter springs in connection with the suspending devices for the bars E E′; thirdly, I can apply the lifting leverage to much greater advantage, the parts operating as the fulcrum directly moving toward the parts which are being lifted as the weight, and, fourthly, can attain all these ends without materially varying the relations of the draft-frame to the horses, or increasing the weight in respect to them. Again, it will be seen that the line of this hinge connection between the cutter-carrying frame and the draft-frame is not only behind the axle but above it, and as a result the forward pull upon the draft-frame tends to hold the parts in front of the axle down, my construction in this respect being distinguished from those in which the draft-frame is so hinged to the cutter-carrying frame that the forward pull on the former tends to lift the latter.

At the front ends of the bars E E′ there are universal-joint pieces H H′, each of these letters indicating a tubular piece, both of which are preferably cast together. Through the part H passes the end of the bar E or E′, the latter being rounded to provide a journal, and having a pin in front of the bearing-piece H and a pin or shoulder behind the same. The part H′ is at right angles to the part H and is mounted in an aperture in the shoe, the latter preferably having a boss to prolong the bearing. This part H′ may be solid, but I prefer to have it tubular, as the same strength can be preserved when thus made and the weight lessened. The shoe is held in place by a pin at *h*. The bars E E′ being thus connected with the shoes it will be seen that the finger-bar can rise or fall at either end or at both ends simultaneously without any cramping or binding, such motion being permitted by means of the bearing-sockets H H′, and also that the cutting apparatus can be rocked or tilted about the axes of the parts H′, the shoes being constructed in such way as to permit such tilting. The tilting is effected by means of a lever J mounted upon the main frame and having a link J′ extending down forwardly and pivoted to an upright bar J^2. The latter is bolted to one of the shoes, and when the lever J is drawn backward the cutting devices will be thrown up at the front edge, they moving about the axis of the parts H′, as aforesaid. On the upright bar J^2 is adjustably secured a roller J^4, which serves as a tightener for the chain N, and also takes up the slack in the said chain when the cutting mechanism is tilted.

I I′ represent generally the shoes, they having secured to them the ends of the finger-bar I^2, which latter bar together with the shoes may be of any preferred construction.

K K represent the gather-boards, which at their front ends are secured to the bearing-pieces H by means of metal strap-plates, and which have their inner ends arranged to converge in the ordinary way, they acting to so dispose of the cut grass or grain as to clear the track for the machine-wheels.

K′ are the rods by which the tops of the grain or grass are gathered or thrown inward, these rods, as shown, having their front ends pivoted to the shoes and their rear ends resting upon the axle.

I have devised and have herein shown improved devices for applying the draft to machines of this character, and so construct a part of the devices employed for this purpose as that they shall operate to open more or less of a way through matted or tangled grass or grain to prepare it for the action of the cutters.

L represents the whiffletree or evener, which, so far as its general construction is concerned, may be of any preferred kind. From it there are loosely-suspended metal bars M, one in front of each shoe. These bars are provided with series of perforations *m*.

M′ is a chain connecting a shoe with a bar M, it having a hook *m*′ by which it can be engaged with one or another of the holes of the said series. The chain is united, preferably, to the toe of the shoe, and is of such length that draft will be exerted upon the shoe when the bar M is pulled forward from about a vertical line. The singletrees M^2 are adapted to be attached to the said bars M, the apertures *m* being so constructed that the clevis of singletree can be inserted therein.

When the horses are hitched, the draft is not exerted directly upon the whiffletree L, but is so exerted upon the bar M, from which it is transmitted partly to the evener and partly to the shoes I I′. As a result I accomplish several important ends. The draft is applied so as to lift upon the cutting apparatus, and hence the pull exerted by the horses can be utilized to elevate said apparatus under many circumstances—as, for instance, when the machine is being used upon rough ground. Especially is this manner of attaching the draft of great advantage when the machine meets with a positive obstruction. With mowing and reaping machines as heretofore constructed, particularly with front-cut machines, there is great danger of tearing the machine to pieces or tipping it over,

and of harm to the driver from the fact that all of the draft is exerted upon a line comparatively high from the ground and above the cutting apparatus, so that when the latter comes against such a positive obstruction the higher and rear parts of the machine tend to be drawn forward over the cutting apparatus. I obviate these serious objections by so applying the draft that at the instant an obstruction is met the draft is applied to the shoes and they and the cutting mechanism will receive what forward pull there may be, the upper and rear parts of the machine being relieved to a proportionate extent.

The bars M are so constructed as to operate as openers of matted and tangled grass or grain, and for this purpose I prefer to make them flat and with comparatively sharp forward edges. They act to open a way for the shoes and the following devices. I have also shown an improved mechanism for transmitting the power from the drive-wheel to the cutting apparatus.

N represents an endless chain engaging with a sprocket-wheel N′, concentric with the drive-wheel and keyed to the axle D. This chain engages with and drives a sprocket-pinion O. Pinion O is cast integral with a bevel-wheel O′ and with a sleeve O^2. This sleeve is mounted upon a stud-shaft P, cast integral with a part of the boxing or housing which incloses the gear. This shaft is carried through the wall of the shoe and is fastened in place by a nut *p*. At the point where it passes through the shoe the latter is formed with a hollow boss adapted to receive the end of the sleeve O^2 and provide a bearing for it. The bevel-wheel O′ meshes with a bevel-pinion Q, the shaft Q′ of which is inclined downward and forward and carries the crank-head. The latter is formed with a wrist-pin by which it is connected to the pitman R, which in turn is pivoted to the sickle-bar.

In many respects there can be variations from the construction shown without departing from the essential parts of the invention. It will be seen that so far as the frames are concerned they consist of three, principally. These are a draft-frame comprising, in the construction shown, a tongue, together with a cross-bar and braces, a wheel-frame comprising the axle and the wheels, and a cutter-carrying frame consisting mainly of the two longitudinal bars E E′, and as various structures will readily suggest themselves to those acquainted with the art to serve the purposes of one or all of these frames I do not limit myself to the details shown. The various adjustments of these frames and their relations at different times with respect to each other will be readily understood. The lifting mechanisms also may be modified, they in this construction being utilized, together with the above-described springs, to assist in supporting the cutter-carrying frame. So, too, in respect to the cutter-driving gearing modifications can be made. Thus the sprocket-wheel may be formed separately from the sleeve and bevel-wheel, other styles of gearing can be employed, and these parts can be more or less varied in position.

In Fig. 7 springs are shown as being interposed between the cutter-carrying frame and the others at points behind the axle, there being a hinged lifting connection in front.

As above said, the lever G^3 is longer than the lever G^2. The parts at the right-hand end of the cutting mechanism are of such sort as to make that side of the machine considerably heavier than is the other side. To lift these heavier parts the lever G^3 is constructed in the way described, so that a more powerful leverage can be brought to bear when it is desired to elevate the right-hand end of the cutter-carrying frame.

I am aware of the fact that a number of the parts which I have shown, when considered by themselves, have been used in earlier machines; and I am also aware that use has been made of a U-shaped bar or frame connected to the ends of the cutting mechanism and having a single hinge connection with the axle. My machine is distinguished therefrom in that the cutter-carrying frame comprises two entirely independent parts, here shown and described as being bars, which are joined to the ends respectively of the cutting mechanism and extend back therefrom and are hinged independently of each other to the axle. Consequently either end of the cutting mechanism can rise or fall without exerting any strain or twist or otherwise affecting the other end. The tilting mechanism and the two independent sets of lifting devices are independent of each other, although the parts of either can be so set that they shall be substantially rigid in respect to the other. Thus the lifting devices controlled by the levers G^2 G^3 can be used to fix the cutting mechanism in the desired position, and afterward the tilting mechanism can be used to rock the cutters to the desired angle.

Springs and other forms of flexible connections have been heretofore used in thrust-cut harvesters for joining the lifting devices to the cutter-carrying frame; but I do not know of any earlier machine in which the parts were in this respect constructed and arranged in the way I have devised, and by which I connect each end of the cutter-bar, independently of the other, flexibly to the axle and flexibly to the draft-frame, there being no direct connection between the draft-frame and the axle, and then flexibly connect the lifting devices with the cutter-carrying bars, the whole being so arranged that the weight of the draft-frame, and of the driver if desired, can be utilized to equilibrate as closely as is desired the weight of the cutting mechanism.

I am also aware of the fact that heretofore side-cut harvesters have been made with the doubletree situated below the pole in combination with a chain or other flexible draft device engaging with parts connected to the

cutter-bar, but at a point remote from said bar, for the purpose of applying a forward pull to the cutters and their contiguous parts; but I believe myself to be the first to have so applied the draft to the pole and to the cutting mechanism of a thrust-cut harvester that the well-known danger to the driver incident to these machines is entirely overcome. One of the serious objections to these machines as heretofore made has been the fact that when the machine is advancing there is a tendency for the driver to be thrown forward every time an obstruction is met, as at such times the cutters and their carrying parts form a fulcrum about which the upper parts of the machine tend to swing forward. I apply some of the draft power directly to the toes of the shoes at both ends of the cutting mechanism, and the instant any obstruction is met the parts at M M′ not only act to limit or prevent the separation of the tongue and the cutting mechanism, but also act to lift the latter uniformly from end to end. The result is, with small obstructions, such as hillocks or undulations in the ground, that the cutter-bar is instantly lifted away from their surface and carried readily over them. If a larger obstruction, such as a stump, should be accidentally struck, the whole machine is positively stopped, and without danger of throwing the driver into the cutters.

Another matter of which I am aware is that chains have been used in various ways for the transmission of power from the drive-wheel to the cutting mechanism; but I believe myself to be the first to have combined with the cutting apparatus, when arranged to vibrate freely independently of the draft-frame, a set of cutter-driving gearing held in a position fixed in relation to the cutting mechanism—as, for instance, on one of the rising and falling shoes—and to have carried power thereto by a transmitting mechanism actuated by the drive-wheel, such as a sprocket-chain or its equivalent, arranged to preserve the proper working relation no matter what position the cutting mechanism may be adjusted to. In this respect my machine is materially different from those having a sprocket-wheel and large driving bevel-wheel on a shaft mounted on the draft-frame and actuated by a chain from the drive-wheel, the driven pinion and the crank-shaft being adapted to vibrate around the axis of the said shaft on the draft-frame.

What I claim is—

1. In a thrust cut harvester the combination with the axle of a draft frame, adapted to extend behind the axle, and a cutter carrying frame adjustable forward and back relatively to the axle and hinged to the draft frame, substantially as described.

2. In a thrust cut harvester, the combination of the axle, a draft frame extending back of the axle, and a cutter carrying frame supported upon the axle and adjustable transversely thereto, said cutter carrying frame being also adjustably connected to the draft frame on a line above and behind the axle, substantially as set forth.

3. In a thrust cut harvester the combination with the axle of a draft frame adapted to extend behind the axle, and a cutter carrying frame adjustable forward and back relatively to both the axle and the draft frame, substantially as set forth.

4. In a thrust cut harvester the combination of the axle the draft frame extending behind the axle, the cutting mechanism, and the bars E E′ hinged independently of each other to the cutting mechanism at the ends, the holders for said bars hinged to the axle independently of each other, and an independent hinged connection joining said bars to the draft frame on lines in rear of and above the axle, substantially as described.

5. In a thrust cut harvester the combination of the axle, the draft frame extending behind the axle, and a cutter carrying frame having bars transverse to the axle, and supported adjustably thereon by a hinge connection, and adjustably joined to the draft frame by hinged connection on lines behind and above the axle, substantially as described.

6. In a thrust cut harvester the combination of the axle, a draft frame extending behind the axle, a cutter carrying frame united to the axle by a hinge connection and having bars extending backward from the axle and adjustably connected with the draft frame, said bars being independent of each other both in respect to the axle and the draft frame, and a driver's seat supported on the draft frame substantially as described.

7. In a thrust cut harvester the combination of the axle, a draft frame, extending behind the axle on lines above it and transverse thereto, and a cutter carrying frame hinged to the axle and having rearwardly extending parts joined to the draft frame by two independent hinged connections on lines above the axle and adjustable relatively thereto, substantially as set forth.

8. In a thrust cut harvester the combination of the axle the sockets hinged to the axle, the draft frame, the sockets hinged to the draft frame behind the axle and the cutter carrying frame having rearwardly projecting arms which pass through the sockets on the axle and extend continuously therefrom to the sockets on the draft frame and are adjustable forward and back through the sockets on the axle, substantially as set forth.

9. In a thrust cut harvester the combination of the axle, a draft frame, extending behind the axle and a cutter carrying frame supported by the axle and longitudinally adjustable upon it being also hinged to the draft frame behind the axle, and united to the cutting mechanism by universal joints, substantially as set forth.

10. In a thrust cut harvester the combination of the axle, the draft frame, and the cutter carrying frame having bars angular in

cross section secured to the draft frame, and the angular sockets hinged to the axle having the said angular bars adjustably fitted to and fastened therein, whereby said bars are prevented from turning laterally and are adjustable longitudinally, substantially as set forth.

11. In a thrust cut harvester, the combination of the axle, the cutting mechanism directly in front of the axle, the frame for the cutting mechanism having rearwardly extending bars hinged to the axle and to the ends of the cutting mechanism independently of each other, the draft frame above the axle and adjustable forward and back relatively to the cutter carrying frame, and connected thereto on lines above and behind the axle, substantially as set forth.

12. In a thrust cut harvester, the combination of the axle, the cutting mechanism in front of the axle, the bars hinged at their ends to the cutting mechanism and extending rearwardly therefrom, and hinged independently of each other to the axle, the draft frame connected to the said bars on one side of the axle and the two lifting levers one connected to one of the said bars, and the other connected to the other bar on the side of the axle opposite to that on which the draft frame is connected to the said bars, substantially as set forth.

13. In a thrust cut harvester, the combination of the axle, the cutting mechanism in front of the axle, the bars hinged to the cutting mechanism and extending rearwardly therefrom, and hinged independently of each other to the axle, the draft frame connected to the said bars and resting thereon at points in rear of the axle and the two independent lifting levers each having a crank joined by a flexible connection to one of the said bars, substantially as described.

14. In a thrust cut harvester, the combination of the axle, the cutting mechanism in front of the axle, the bars hinged to the cutting mechanism and extending rearwardly therefrom and hinged independently of each other to the axle, the draft frame connected to the said bars, on one side of the axle, and the two independent springs respectively interposed between the two aforesaid bars and the draft frame, and situated on the other side of the axle, substantially as set forth.

15. In a thrust cut harvester, the combination of the axle, the draft frame having the tongue A and a cross bar B, the cutting mechanism, the bars E E′ hinged to the ends respectively of the cutting mechanism and extending continuously therefrom to and directly hinged to the axle, and also hinged to the draft frame behind the axle, the two rock shafts G on the transverse bar B, the levers connected to said rock shafts and the flexible connections which unite the bars E E′ independently of each other to the rock shafts whereby each of said bars and the end of the cutting mechanism to which it is attached can be lifted without affecting the other, substantially as set forth.

16. The combination of the axle, the cutting mechanism in front of the axle, the bar E hinged to the cutting mechanism and extending back therefrom to a point in rear of the axle, and hinged to the latter, the bar E′ hinged to the other end of the cutting mechanism, and hinged to the axle, independently of the bar E, and also extending to a point in rear of the axle, the draft frame lying above and extending to the rear of the axle and connected to and resting upon the bars E E′ behind the axle and the springs F′ respectively interposed between the bars E E′ and the draft frame whereby each side of the cutting mechanism is flexibly supported independently of the other side, substantially as set forth.

17. In a thrust cut harvester the combination of the axle, the draft frame, the cutting mechanism in front of the axle, the bars hinged independently of each other to the axle and to the cutting mechanism, the two sets of independent lifting mechanisms one for each end of the cutting mechanism, the tilting lever, and devices connecting it with the cutting mechanism for tilting the latter independently of the lifting mechanism, substantially as set forth.

18. In a thrust cut harvester, the combination of the axle, the draft frame, the cutting mechanism, the shoes at the ends of the cutting mechanism, the bars E E′ hinged to the axle, to the draft frame and to the shoes respectively independently of each other, means for vertically adjusting the position of the cutter frame around the hinges which connect the bars to the axle, and means for tilting or rocking the cutting mechanism on a horizontal axis parallel to but independently of the said axle hinges, substantially as described.

19. In a thrust cut harvester, the combination of the axle, the cutting mechanism in front of the axle, the supporting bars extending back from the cutting mechanism to the axle and joined to the cutting mechanism by connecting devices each having two axes of vibration at an angle to each other, the tilting lever, and the link connecting said lever with the cutting mechanism, substantially as set forth.

20. In a thrust cut harvester, the combination of the axle, the draft frame, the cutters in front of the axle, the bars or frames which support the cutters from the axle and are hinged to the latter, whereby the cutters vibrate around the axle, the gear wheels mounted in a position fixed in relation to the cutters said gearing comprising a driver and also a driven pinion both adapted to vibrate bodily around the axle independently of the draft frame, the drive wheel, and power transmitter which connect the aforesaid gearing with the drive wheel, substantially as described.

21. In a thrust cut harvester, the combina-

tion of the axle the draft frame, the cutting mechanism in front of the axle, the shoe I′ means connecting the said shoe with the axle, substantially as described, whereby it can vibrate around it, the pitman, the crank shaft, the driving gear-wheel O′, the driven pinion Q on the crank shaft all supported on the shoe independently of the draft frame, wheel O, and power transmitter N, substantially as described.

22. The combination with the cutter carrying frame, composed of bars hinged independently of each other to the axle the finger beam, and the shoes, of the universal couplings interposed between the cutter carrying frame and the shoes, substantially as set forth.

23. The combination of the axle, the draft frame, the cutters, the cutter carrying frame comprising bars hinged independently of each other to the axle, the shoes and the couplings or joints H H′ pivotally connected to the shoe whereby the latter is adapted to vibrate around an axis and also pivotally connected to the cutter carrying frame whereby the shoe is adapted to vibrate around another axis at an angle to that aforesaid, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. ELWARD.

Witnesses:
H. H. BLISS,
J. C. TURNER.