

No. 740,561.

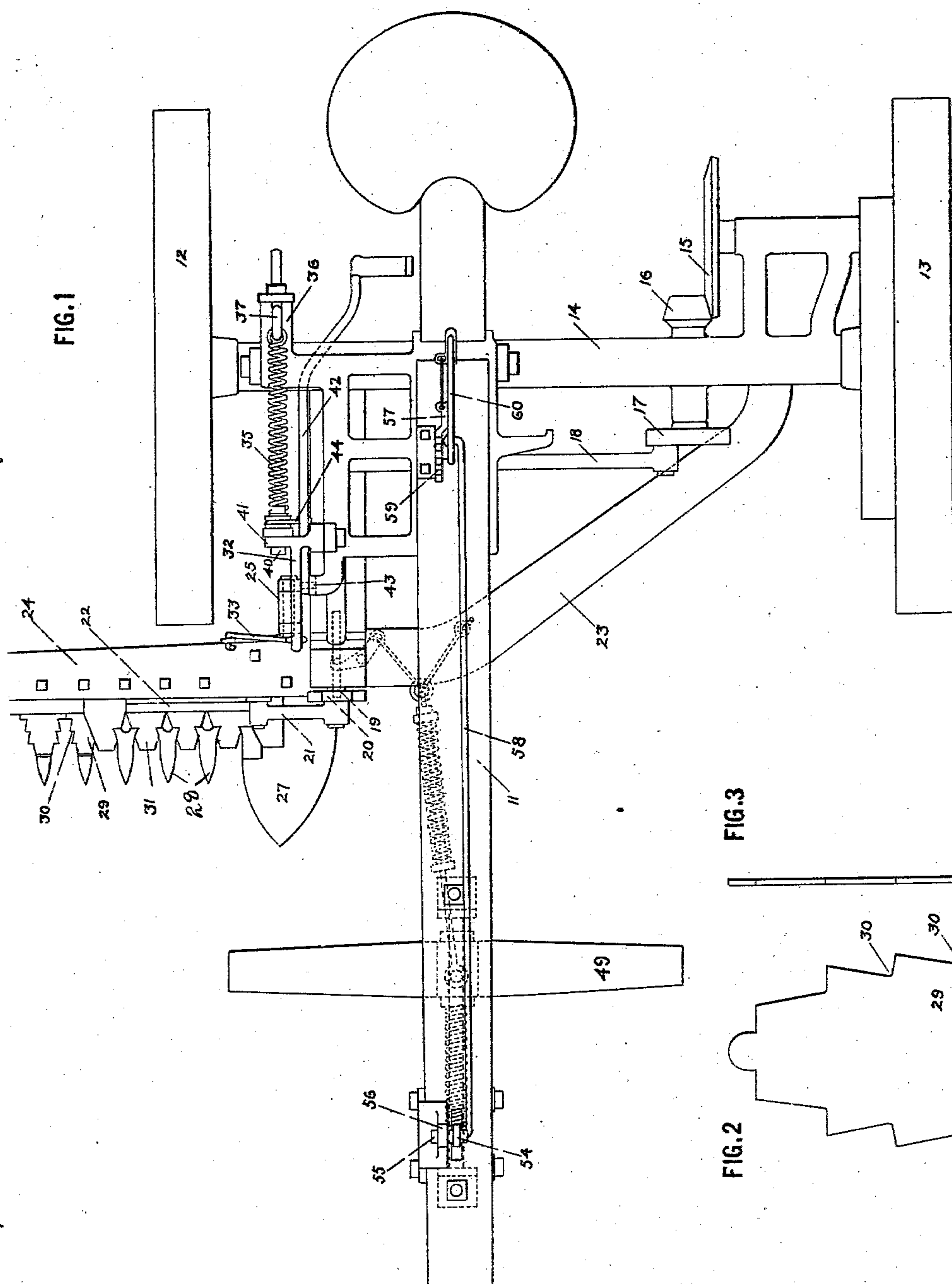
PATENTED OCT. 6, 1903.

A. HART.
MOWER.

APPLICATION FILED APR. 9, 1898.

NO MODEL.

5 SHEETS—SHEET 1.



WITNESSES:

Julia M. Bristol.
Holmes A. Alden.

INVENTOR

BY: *Alfred Hart,*
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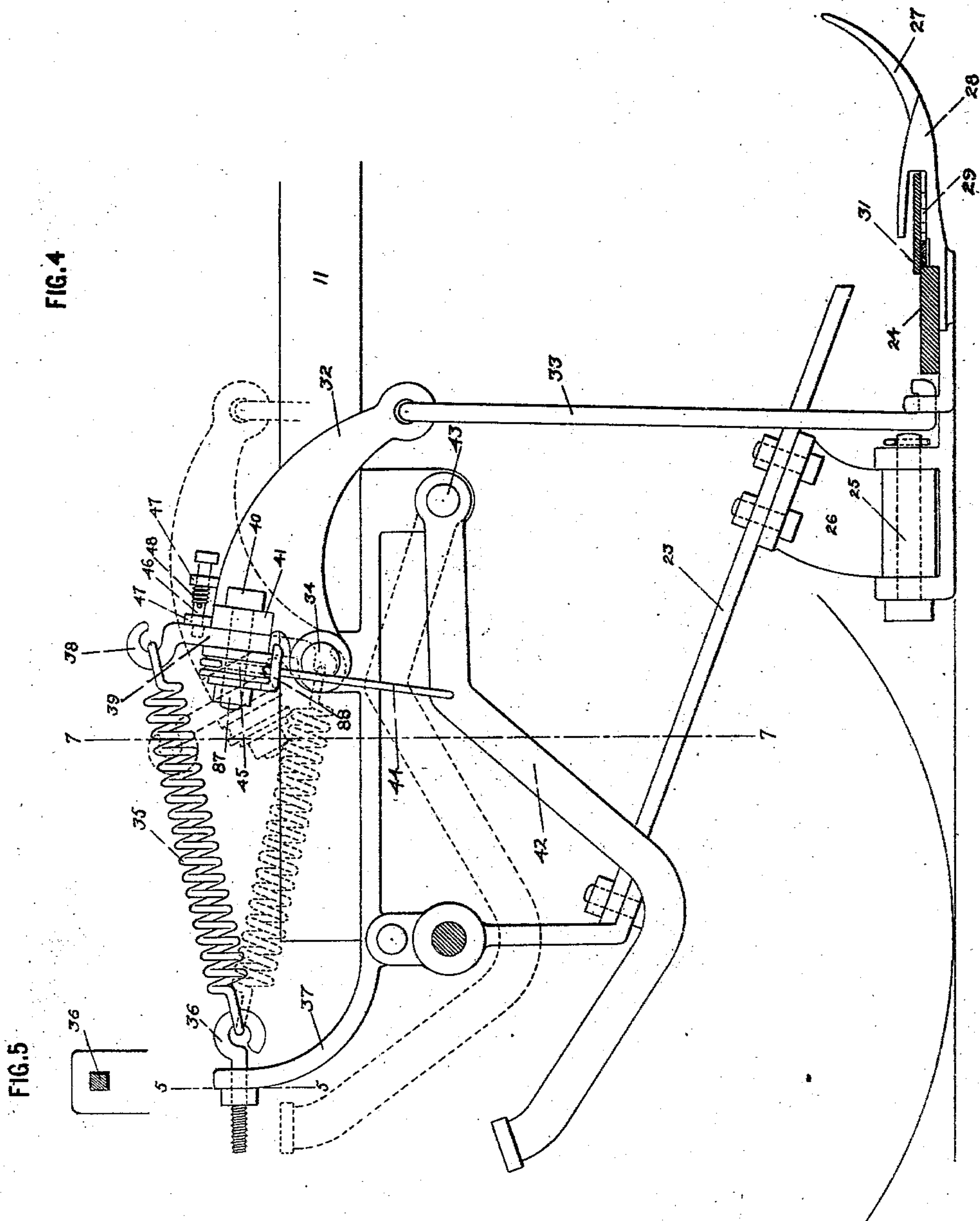
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5 SHEETS—SHEET 2.



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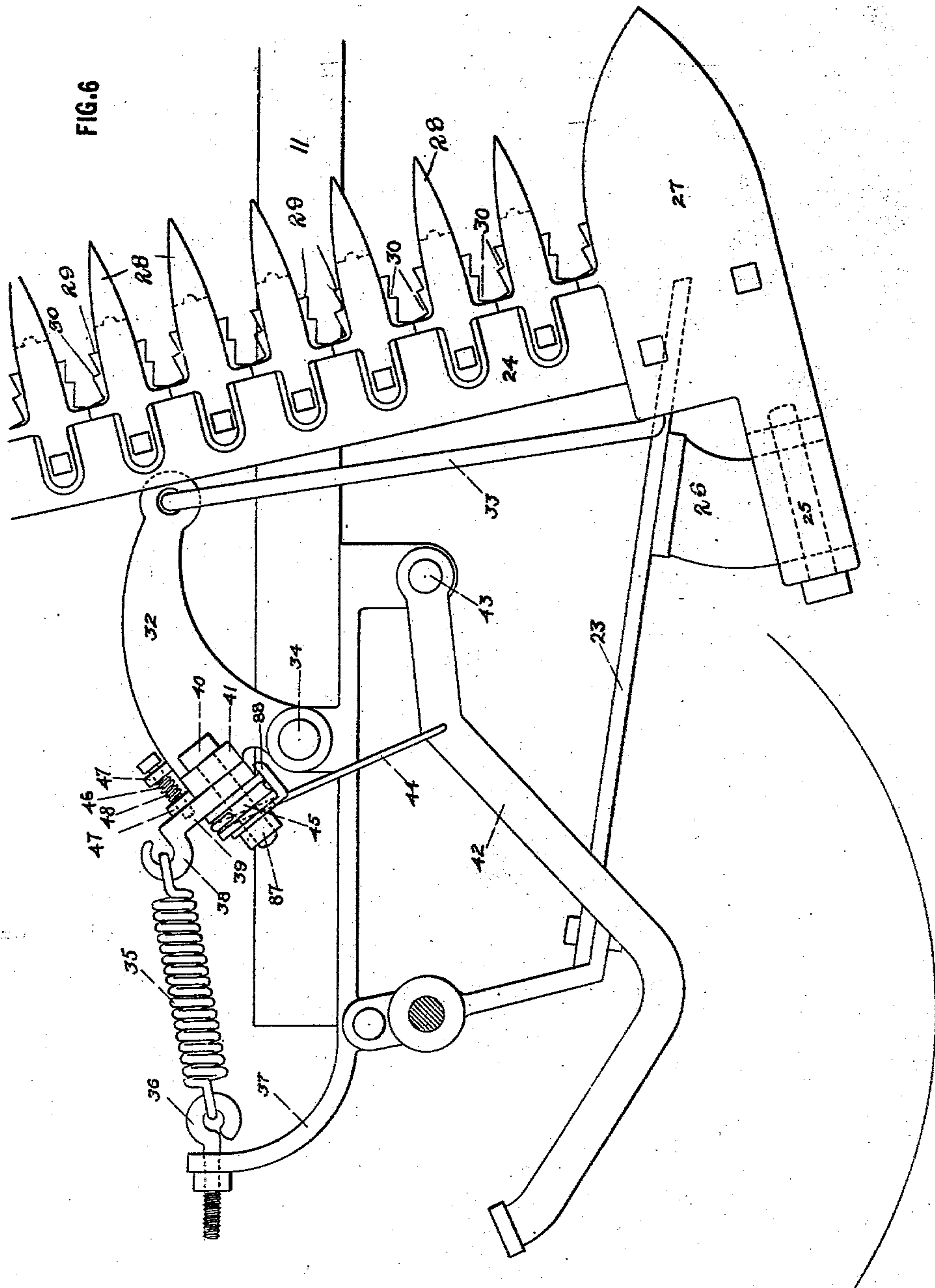
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6 SHEETS—SHEET 3.



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NO MODEL.

5 SHEETS—SHEET 4.

FIG. 7

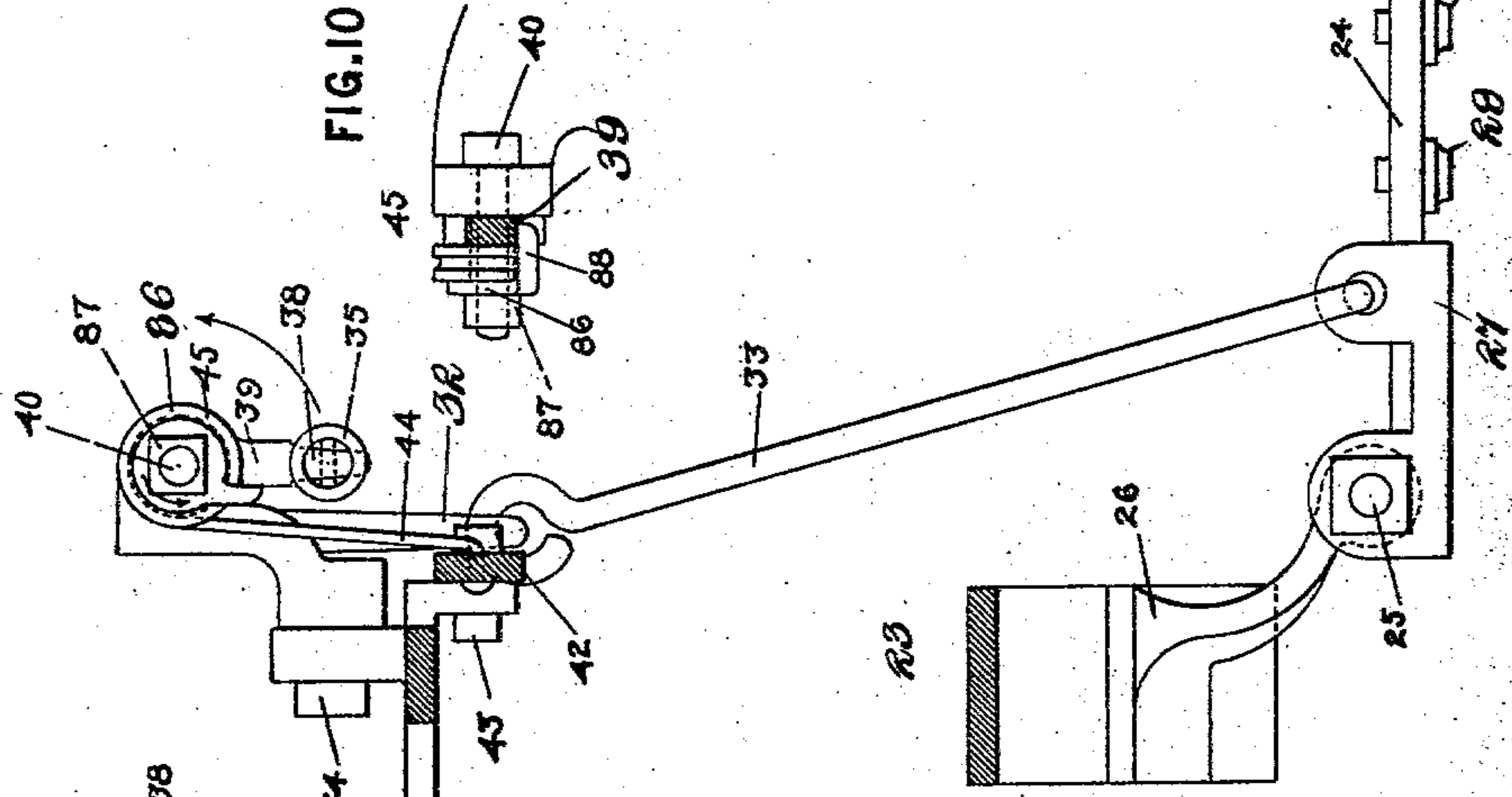


FIG. 9

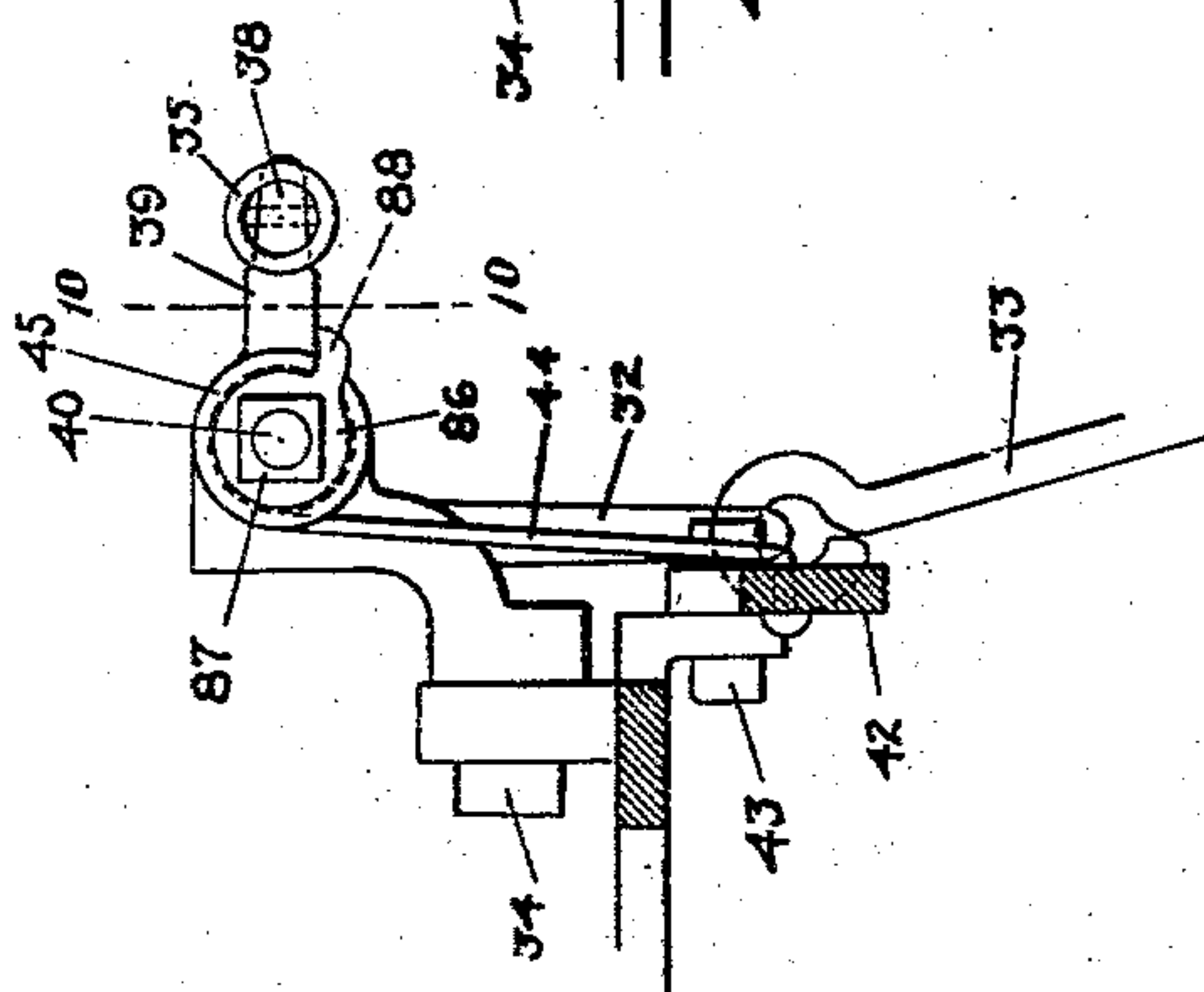
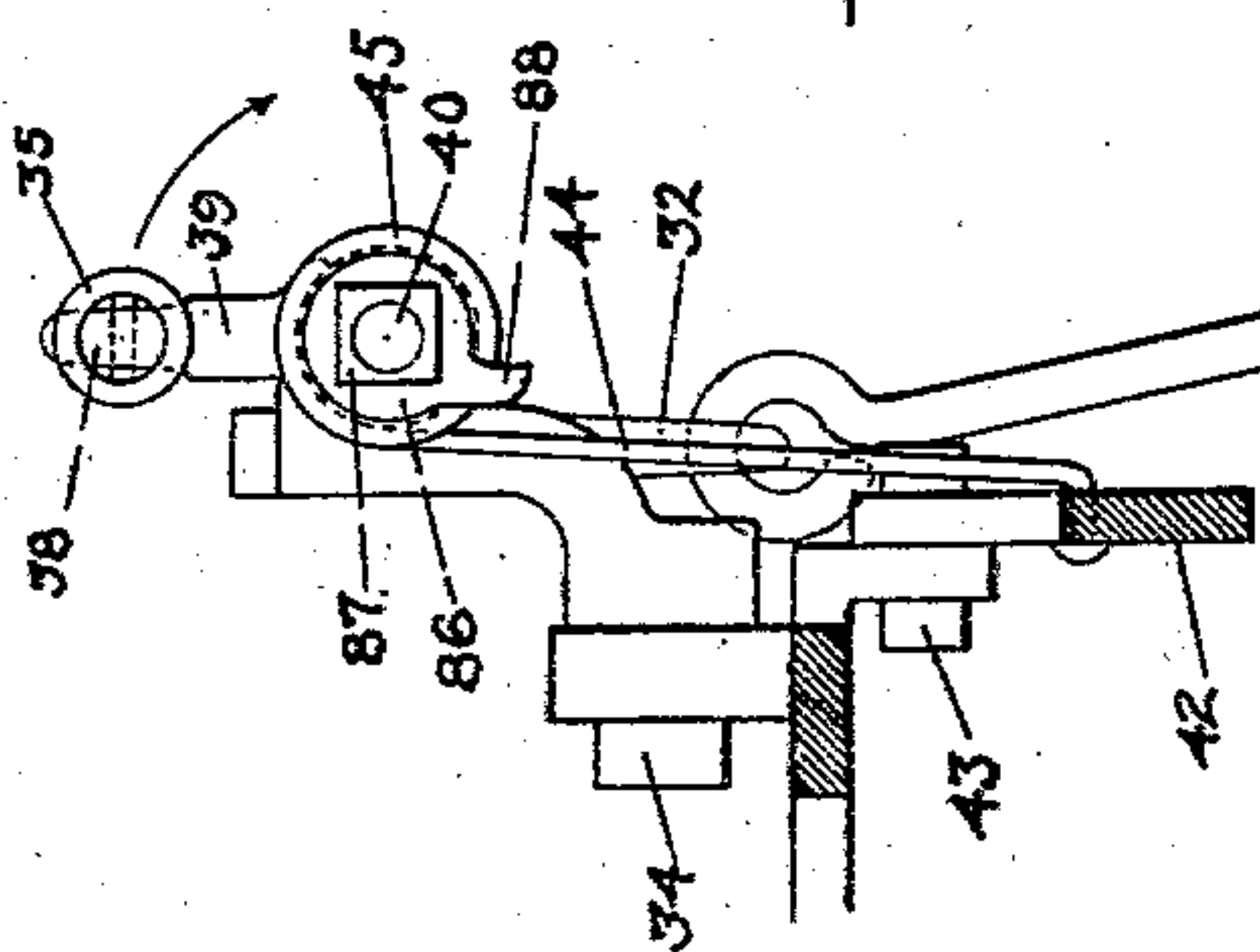


FIG. 8



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APPLICATION FILED APR. 9, 1898.

NO MODEL.

5 SHEETS—SHEET 5.

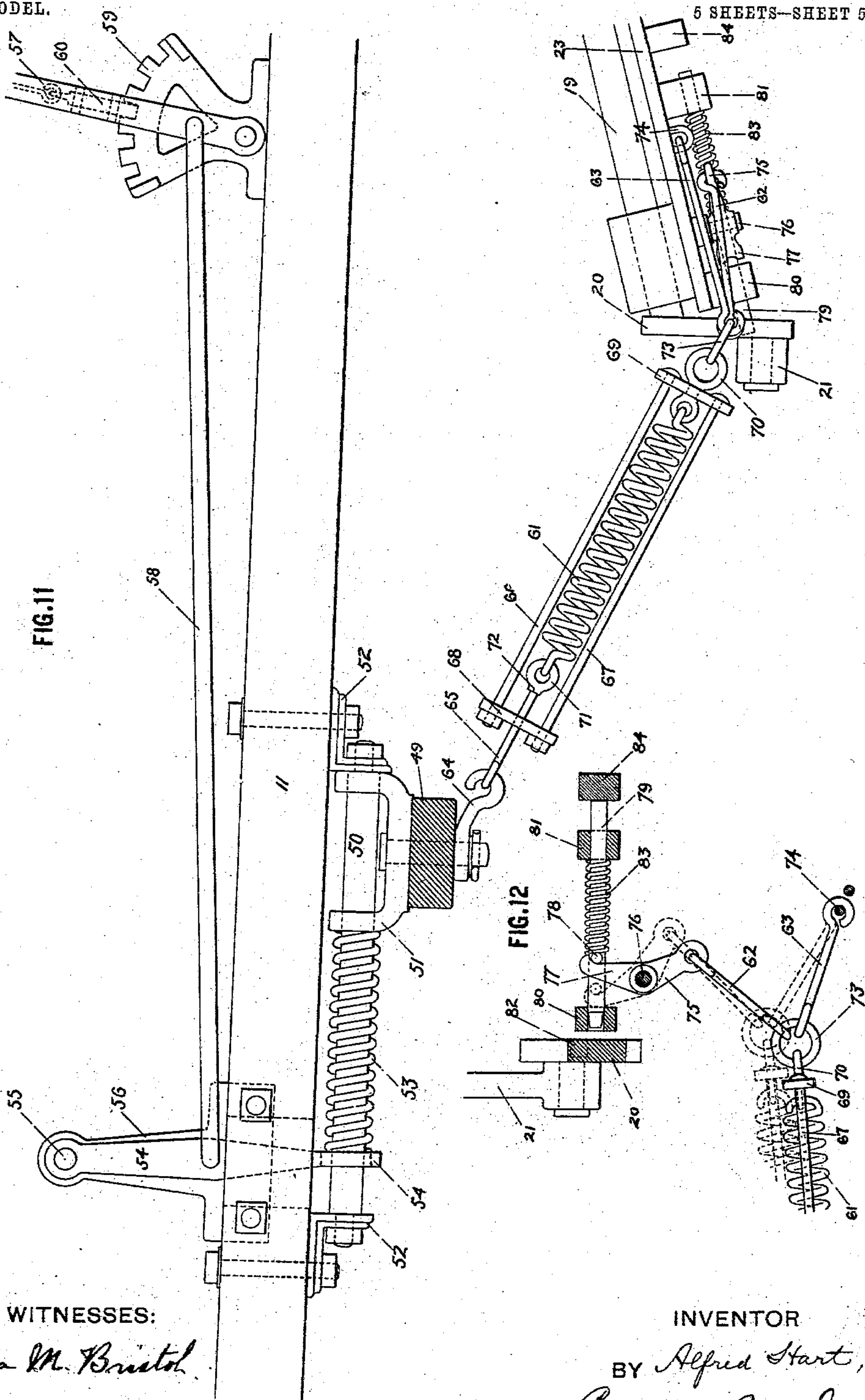


FIG. 11

FIG. 12

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UNITED STATES PATENT OFFICE.

ALFRED HART, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SAID ALFRED HART, FREDERICK E. HART, OF CHICAGO, ILLINOIS, RALPH W. HART, OF SAN FRANCISCO, CALIFORNIA, AND JOHN L. JACKSON, OF RIVER FOREST, ILLINOIS.

MOWER.

SPECIFICATION forming part of Letters Patent No. 740,561, dated October 6, 1903.

Application filed April 9, 1898. Serial No. 676,978. (No model.)

To all whom it may concern:

Be it known that I, ALFRED HART, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mowers, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to harvesting machinery, and particularly to mowers.

It has for its object to provide various improvements in machines of this character, among which may be mentioned improved folding mechanism for the finger-bar, by which the folding of the bar is effected entirely, or substantially so, by spring mechanism, thus relieving the operator of the labor of effecting this operation; also, an improved construction of folding mechanism in which the folding-spring may be adjusted so that it normally exerts no force upon the finger-bar, but is thrown into and out of operation at the pleasure of the operator; also, to provide certain improvements in the construction illustrated and described in my application Serial No. 397,912, filed June 29, 1891, in which the draft of the team is applied partly to the carriage and partly to the finger-bar-carrying frame, such improvements relating to the mechanism for adjusting the distribution of the draft between the carriage and finger-bar-carrying frame, so that such mechanism may be readily adjusted by the operator without leaving his seat; also, to provide a construction whereby the knife-bar is started abruptly with considerable power instead of gradually, as in the construction heretofore used; also, to provide means whereby the knife-bar will continue its operation slightly after the draft of the team ceases; also, to provide means whereby the bunching of the grass between the guards and knife-sections will be prevented and to provide a construction whereby the cutting will be effected when the knives are moving at their greatest speed; also, to provide means whereby the knife-sections will be stopped when the machine is at rest midway between the guards. I accomplish these objects as hereinafter described and as illustrated in the accompanying drawings.

What I regard as new will be set forth in the claims.

In the drawings, Figure 1 is a plan view, part of the finger-bar being broken off. Fig. 2 is a plan view of one of the ledger-plates. Fig. 3 is an edge view of the same. Fig. 4 is a view of the mechanism for folding the finger-bar. Fig. 5 is a section on line 5 5 of Fig. 4. Fig. 6 is a side view of the folding mechanism, showing the finger-bar in its folded position. Fig. 7 is a cross-section of the folding mechanism on line 7 7 of Fig. 4. Fig. 8 is a similar view showing the finger-bar raised. Fig. 9 is a view showing the folding mechanism in an intermediate position. Fig. 10 is a section on line 10 10 of Fig. 9. Fig. 11 is a side elevation of the tongue and the draft devices, the whiffletrees being in section. Fig. 12 is a plan view of the locking mechanism which controls the operation of the knife-bar, certain parts being in section.

Referring to the drawings, 11 indicates the tongue of the mower, 12 13 the wheels, and 14 the main frame, which carries a part of the usual driving mechanism, consisting of a bevel-gear 15, driven from the wheel 13, pinion 16, meshing with said gear 15, a crank-disk 17, rotated from the pinion 16, a pitman 18, a rock-shaft 19, rocked by the pitman 18, and a crank 20, mounted upon the lower end of the rock-shaft 19 and connected by pitman 21 to the knife-bar 22. Connected to the main frame is the finger-bar-carrying frame 23, which is adapted to be raised to a greater or less extent to vary the pressure of the finger-bar on the ground.

24 indicates the finger-bar, which is connected at its inner end by a hinge 25 to a part 26 of the finger-bar-carrying frame, by which arrangement the finger-bar may be folded up into a more or less vertical position in the usual way. The inner end of the finger-bar rests upon a shoe 27, to which it is connected, and the hinge 25 is preferably connected to a part of the shoe 27, as shown in Fig. 6, instead of directly to the finger-bar.

28 indicates guards, which are of the usual form.

29 indicates the ledger-plates, which are secured upon the guards, as usual. As shown in Fig. 2, the ledger-plates 29 are provided

with notches 30, the object of which will be hereinafter set forth.

22 indicates the knife-bar, which is of the usual form, except that the knife-sections are broader at the point than the knives heretofore used. The operating mechanism is so adjusted that the knife-sections are moved a greater distance than the space from center to center of adjoining guards, by which construction the knife-sections are in cutting position when moving at their greatest speed, thus making the cut surer and preventing clogging of the machine to a large extent. The object of the notches 30 in the ledger-plates is to prevent the grass from bunching, and thereby interfering with the cutting of the knives. The notches in the edges of the ledger-plates serve to separate the grass between the guards into comparatively small bunches, so that they do not impede the action of the knives, the inclined faces of the notches serving to prevent the small bunches from running together.

The finger-bar is folded to a more or less vertical position when not in use by means of folding mechanism acting through a rocking lever 32 and connecting-rod 33, the rod 33 being connected to the shoe 27 at a point a short distance outside or grassward of its hinge, as shown in Figs. 6 and 7. Instead of connecting the rod 33 to the shoe it may be connected directly to the finger-bar, as shown in Fig. 1. By this construction the vertical movement of the forward end of the lever 32 effects a corresponding movement of the finger-bar, the finger-bar being folded to a more or less vertical position when the forward end of the lever 32 moves upward, and vice versa. The lever 32 is mounted upon a pivot 34, suitably secured in the frame of the machine, and it is caused to rock to raise the finger-bar by the action of the spring 35, as illustrated in Fig. 6. The rear end of the spring 35 is connected to an adjustable stop 36, secured to a bracket 37, carried by the frame of the machine at a convenient point, and the forward end of the spring 35 is connected to a hook 38 or other suitable connection carried by an arm 39, which is mounted upon a pivot 40, fitted in a lug 41, carried by the lever 32 and extending at right angles to said lever, as shown in Figs. 1 and 6. The arrangement is such that the arm 39 is adapted to rock in a plane perpendicular to the plane of the lever 32, and the length of the arm 39 is such that when it is rocked to carry the hook 38 to its lowermost position said hook will be in line with or below the pivot 34 of the lever 32, whereas when the hook 38 is in its uppermost position it will lie a considerable distance above the pivot 34. The result is that the spring 35 exerts a lifting force when the hook 38 is in its upper position, whereas when said hook is in its lowermost position the spring 35 exerts no lifting force. The arm 39 is rocked to move the hook 38 to its operative

position by means of a foot-lever 42, mounted upon a pivot 43 at its forward end and connected by a cord or other flexible connection 44 to a pulley 45, also mounted on the pivot-pin 40 and connected to the arm 39. When the finger-bar is in its operative position on the ground, the foot-lever 42 is in its uppermost position, and the cord 44 is wound upon the pulley 45. When, however, the foot-lever 42 is depressed, the unwinding of the cord 44 causes the rotation of the pulley 45 in the direction indicated by the arrow in Fig. 7, thereby rocking the arm 39 in the direction indicated by the arrow in said figure and moving it to the position shown in Fig. 8, thus bringing the spring 35 into operative position. In order that the spring 35 may be adjusted to exert a greater or less lifting force on the finger-bar when in operation, an adjustable stop 86, which is mounted on the pivot 40, is secured tightly against the pulley 45 by a nut 87, as shown in Figs. 9 and 10. The stop 86 carries an arm 88, which extends across the path of the arm 39, and consequently by adjusting the stop 86 the arm 39 may be stopped at any desired point. The lifting effect of the spring 35 on the finger-bar varies with the distance of the forward end of the spring above the pivot 34, and therefore the lifting force applied to the finger-bar when in operation may be varied by adjusting the stop 86, as above described. To return the arm 39 and spring 35 into inoperative position, the spring 35 is so adjusted as to have a torsional action—that is to say, it is twisted to some extent before being put in place, the direction of the twist being such as to cause it to exert a torsional strain upon the arm 39 in the direction indicated by the arrow in Fig. 8. To retain the torsion strain in the spring 35, the hook 36 is formed with a squared shank, as shown in Fig. 5. In order to hold the arm 39 in its operative position, a locking-pin 46 is provided, which is mounted in suitable lugs 47, carried by the lever 32, and is adapted to enter a socket in the arm 39, as indicated by dotted lines in Fig. 6. A spring 48 serves to move the pin 46 into said socket.

The draft of the team is applied through whiffletrees 49, as shown in section in Fig. 11, said whiffletrees being mounted upon a rod 50 by means of a bracket 51. As shown in Fig. 11, the rod 50 is secured to the under side of the tongue 11 in brackets 52, the arrangement being such that the bracket 51, which carries the whiffletrees, is movable longitudinally upon said rod. Mounted upon the rod 50 forward of the bracket 51 is a spring 53, one end of which bears against the bracket 51, the other end thereof bearing against a lever 54, through which the rod passes, said lever being suitably slotted, as indicated by dotted lines in Fig. 11, for that purpose. The lever 54 is mounted upon a pivot 55 at its upper end, said pivot being carried by a suitable

bracket 56, so that the lower end of said lever may swing lengthwise of said rod 50 for the purpose of regulating the tension of the spring 53.

5 57 indicates an adjusting-lever, which is suitably pivoted upon the frame of the machine, preferably upon the tongue 11, and is connected by a connecting-rod 58 to the lever 54, as shown in Fig. 11, so that the position
10 of the lever 54 may be adjusted as desired by the lever 57. The latter lever is arranged to be locked in position by the usual segmental rack 59 and dog 60. By this construction the pressure of the spring 53 against the
15 whiffletree-bracket 51 may be nicely adjusted, so that I am able to regulate accurately the proportion of the draft transmitted directly to the tongue and carriage as distinguished from that portion which is transmitted to the finger-bar-carrying frame, as will
20 be hereinafter explained and as is fully described in my former application hereinbefore referred to. That portion of the draft which is transmitted from the whiffletrees 49 to the finger-bar-carrying frame is transmitted through a spring 61 and links 62 63, as
25 illustrated in Figs. 1, 11, and 12. The spring 61 is connected to the whiffletree-brackets 51 by a hook 64 and connecting-link 65. The spring 61 is mounted in a frame consisting of side rods 66 67 and end bars 68 69, said frame serving to limit the tension which may be placed upon the spring 61, and thereby
30 relieve said spring from excessive strain when the mower is in operation. To this end the lower end of the spring 61 is connected to a link 70, fixedly secured in the cross-bar 69, while the upper end of the spring 61 is connected to a ring 71, secured to the lower end
35 of the link 65, which link is movable longitudinally in the upper cross-bar 68. As shown in Fig. 11, the ring 71 is provided with a shoulder 72, which is adapted to strike the cross-bar 68 and limit further outward movement of the link 65. By this construction
40 when the spring 61 has been expanded sufficiently to permit the ring 71 to strike the cross-bar 68 further expansion thereof is prevented and the strain is transmitted to the side rods 66 and 67. As best shown in Fig. 12, the link 70 is connected by a ring 73 to the links 62 63, and the link 63 is connected to a fixed pin or staple 74, secured to the finger-bar-carrying frame 23, so that that part of the
45 draft which is transmitted through the link 63 is applied directly to said frame. The link 62 is connected to a lever 75, mounted upon a pivot 76, secured to the finger-bar-carrying frame, as shown in Fig. 12. The free arm 77 of the lever 75 engages a pin 78, carried by a
50 locking-bolt 79 moving in bearings 80 81 on the finger-bar-carrying frame, said bolt 79 being arranged to move toward and from the crank 20, by which the knife-bar is operated. As indicated in dotted lines in Fig. 12, the crank 20 is provided with a recess 82, adapted to receive the end of the bolt 79, whereby said

crank may be locked in position and the operation of the machine prevented. A spring 83, mounted upon the bolt 79, holds said bolt
70 normally in engagement with the crank 20; but said bolt may be moved out of engagement with said crank by moving the arm 77 of the lever 75 backward. This is accomplished in actual operation by the draft of
75 the team through the link 62, as will be hereinafter described. 84 indicates a stop arranged back of the bolt 79 to limit its backward movement. The socket 82 in the crank 20 is so placed with reference to the locking-
80 bolt 79 that the knife-bar will be stopped on the half-stroke, thus bringing the knife-sections between the guards, preventing the packing of the grass between the guards and minimizing the danger of clogging when the
85 machine is started. The operation of this part of my invention is as follows: When the draft is applied to the whiffletrees 49, the spring 53 is compressed, thereby transmitting part of the draft to the tongue through
90 lever 54, connecting-rod 58, lever 57, and the locking devices connected therewith. At the same time part of the draft is transmitted to the finger-bar-carrying frame through the spring 61 and its connections, thereby
95 slightly raising said frame. The spring 53 is compressed until the power transmitted to the carriage through said spring, and also through the finger-bar-carrying frame, overcomes the resistance of the machine, at which
100 time the machine begins to move. Obviously the extent to which the draft is divided between the tongue or carriage proper and the finger-bar-carrying frame depends upon the extent to which the whiffletrees 49 may move
105 forward before the spring 53 is compressed sufficiently to cause the carriage to move, since the forward movement of the whiffletrees raises the finger-bar-carrying frame to a greater or less extent, depending on the extent of the movement of the whiffletrees. It
110 follows that by regulating the tension of the spring 53 independently of the movement of the whiffletrees the extent to which said spring is put under tension by a given forward
115 movement of the whiffletrees may be varied, and as greater forward movement of the whiffletrees results in the application of a greater proportion of the draft directly to the finger-bar-carrying frame it is evident
120 that by moving the lower end of the lever 54 forward, and thereby reducing the tension of the spring 53, a greater proportion of the draft is transmitted directly to the finger-bar-carrying frame. When it is desired to direct
125 more of the draft of the team to the finger-bar-carrying frame, the lever 57 is thrown forward, throwing the lower end of the lever 54 forward and permitting the whiffletree-bracket 51 to move farther forward before
130 the spring 53 is compressed the normal amount. A greater pull is therefore delivered to the spring 61 and rods 66 67. Consequently the pull on the links 62 63 is increased

and the pressure of the finger-bar upon the ground is reduced. By moving the lever 57 in the opposite direction the greater proportion of the draft may be applied to the carriage through the tongue 11, reducing the draft upon the finger-bar-carrying frame and increasing the pressure of the finger-bar upon the ground.

When the machine is at rest, the locking-bolt 79 will be in its socket 82 in the crank 20, the machine being then locked. When the team is started, the first effect will be to expand the spring 61, owing to the forward movement of the whiffletrees upon the rod 50, said spring expanding until the ring 71 strikes the cross-bar 68, after which the draft is transmitted through the side rods 66 67. Owing to the fact that the team is usually very slow in starting, the draft will be applied slowly to the draft devices. Consequently that part of the draft which is transmitted to the lever 75 through the link 62 will not be sufficient at first to operate said lever and throw back the locking-bolt 79. As soon, however, as the team acquires headway the amount of the draft transmitted to lever 75 will cause it to rock, moving the locking-bolt 79 out of engagement with the crank 20, whereupon said crank will start abruptly under the action of the wheels, giving the cutter-bar a sudden start, thereby loosening it from any grass with which it may have become engaged and enabling it to operate properly. By thus starting the knives abruptly and with considerable power, as is the case with the construction above described, the danger of the knives clogging at the start is practically entirely avoided. The division of the draft between the finger-bar frame and the lever 75, effected by the use of the links 62 63, serves to prevent the unlocking of the crank 20 until the team gathers headway, as obviously if a great proportion of the draft were transmitted directly to the lever 75 even at starting the draft would be sufficiently great to operate said lever at once and release the knives, the advantages of my construction being thereby lost.

At no time in the motion of the harvester is the draft so slight that the machine will be locked. For instance, in traversing a downgrade or incline the grass affords sufficient resistance to make the draft hold the locking-bolt 79 out of operative or locking position.

In practice the team usually stops more or less suddenly; but in the construction herein described the spring 61, being constantly expanded during the operation of the machine, retracts as soon as the draft of the team is removed, and such retraction of the spring draws the machine slightly toward the team when their progressive movement ceases, thereby continuing the operation of the cutting mechanism slightly after the draft has been removed sufficiently to relax the tension upon the lever 75 and permit the locking-bolt 79 to move into operative position under the

action of its spring 83. Consequently as soon as the socket 82 in the crank 20 moves into proper position under the action of spring 61, as above described, the locking-bolt 79 enters it and locks the cutter-bar against further movement, so that the cutter-bar is stopped between the guards, as above described.

I have described my improvements in detail as herein illustrated; but while I consider the specific forms of my improvements as illustrated and described herein to be the best I do not wish to be limited to such specific details except as specifically claimed, as various modifications and alterations may be made without departing from my invention.

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

1. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame, and a finger-bar carried thereby, of a draft device, means for transmitting a part of the draft applied to said draft device, to said finger-bar-carrying frame, spring mechanism for transmitting a part of the draft applied to said draft device to the carriage, and a lever for adjusting said spring mechanism and thereby regulate the division of the draft between the carriage and the finger-bar frame, substantially as described.

2. The combination with a carriage, a finger-bar-carrying frame, and a finger-bar carried thereby, of a draft device, means for transmitting the draft applied to said draft device partly to the carriage and partly to the finger-bar-carrying frame, and lever mechanism adapted to be operated to regulate the division of the draft between the carriage and the finger-bar frame while the finger-bar is in operative position, substantially as described.

3. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame, and a finger-bar carried thereby, of a draft device, means for transmitting a part of the draft applied to the draft device to the finger-bar-carrying frame, spring mechanism located in front of said draft device and constructed to be compressed when the draft is applied, for transmitting a part of the draft applied to the draft device to said carriage, and a lever for adjusting said spring mechanism and regulating the division of the draft between the carriage and finger-bar frame, substantially as described.

4. In a harvesting-machine, the combination with a machine-frame, of a vertically-movable finger-bar carried thereby, a longitudinally-movable draft device, an adjustable stop for limiting the longitudinal movement of said draft device, a lever for adjusting said stop, and means for transmitting a part of the draft to the finger-bar frame when said device moves longitudinally, substantially as described.

5. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame and a finger-bar carried thereby, of a tongue, a rod 50 carried by said tongue, a draft

device supported from said rod and movable longitudinally thereupon, a spring upon said rod acting to resist the forward movement of the draft device, and a lever for adjusting said spring, substantially as described.

6. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame and a finger-bar carried thereby, of a tongue, a rod 50 carried by said tongue, a draft device supported from said rod and movable longitudinally thereupon, a spring upon said rod acting to resist the forward movement of the draft device, a lever 54 pivoted at its end and adapted to engage one end of said spring, and a lever 57 connected to said lever 54, for operating it, substantially as described.

7. In a harvesting-machine, the combination of a finger-bar frame, a draft device, an expansible spring interposed between said finger-bar frame and the draft device and constructed to sustain the initial force of the draft, a frame inclosing the spring and in operative connection with the finger-bar frame, and a stop on the spring engaging the inclosing frame when the spring expands to cause the inclosing frame to sustain the draft after the spring is extended a certain extent by the initial draft, substantially as described.

8. In a harvesting-machine, the combination with a finger-bar-carrying frame, of an inclined spring-containing frame, links connecting the lower end of the spring-containing frame with the finger-bar-carrying frame, a spring arranged in and connected with the lower end of the spring-containing frame, a shouldered link movable in the upper end of the spring-containing frame and connected with the upper end of the spring, and a draft device connected to said movable shouldered link, substantially as, and for the purposes described.

9. In a harvesting-machine, the combination with a carriage, and draft devices, of a reciprocating cutter-bar, means for operating the latter, spring mechanism which acts to advance the carriage slightly after the stopping of the team, and a locking mechanism for locking the cutter-bar when the carriage advances, substantially as described.

10. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame, and a finger-bar carried thereby, of a cutter-bar, and means for locking said cutter-bar against reciprocation while in its horizontal or operative position, substantially as described.

11. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame and a finger-bar carried thereby, of a cutter-bar, means for locking said cutter-bar against operation, and means for automatically unlocking the cutter-bar after the team has started, substantially as described.

12. In a harvesting-machine, the combination with a machine-frame, and a cutter-bar carried thereby, of means for locking the cutter-bar against operation until after the team

is started, and means operated by the forward movement of the machine for actuating the cutter-bar, substantially as described.

13. In a harvesting-machine, the combination with a machine-frame, and a cutter-bar carried thereby, of means for preventing the operation of the cutter-bar when the machine is not under way, and means for automatically releasing the cutter-bar after the team has gotten under way, substantially as described.

14. In a harvesting-machine, the combination with a machine-frame, and a cutter-bar carried thereby, of means for automatically locking the cutter-bar against operation when the machine stops, substantially as described.

15. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame and a finger-bar carried thereby, of a cutter-bar carried by said finger-bar, and means for automatically locking said cutter-bar against operation when the machine stops, said locking devices being adapted to stop the cutter-bar sections midway between adjacent guards, substantially as described.

16. In a harvesting-machine, the combination with a carriage, of draft devices, a finger-bar, a cutter-bar mounted on said finger-bar, a crank adapted to be rocked for operating said cutter-bar, a locking-bolt 79 adapted to engage and lock said crank, a lever 75 adapted to operate said locking-bolt, and means connecting said lever 75 to the draft devices, substantially as described.

17. In a harvesting-machine, the combination with a carriage, a finger-bar-carrying frame and a finger-bar carried thereby, of a cutter-bar mounted on said finger-bar, a crank 20 for operating said cutter-bar, draft devices, a locking-bolt 79 adapted to engage and lock said crank, a spring 83 adapted to move said bolt into engagement with said crank, a lever 75 for disengaging said bolt from said crank, and means connecting said lever 75 with the draft devices, substantially as described.

18. In a harvesting-machine, the combination with a machine-frame, and a finger-bar carried thereby, of folding mechanism for folding the finger-bar to inoperative position, spring mechanism for operating said folding mechanism to fold said finger-bar from operative to inoperative position, and means for moving said spring mechanism into and out of position to operate said folding mechanism, substantially as described.

19. In a harvesting-machine, the combination with a machine-frame, and a finger-bar carried thereby, of a pivoted lifting-lever adapted to be operated to fold said finger-bar from operative to inoperative position, and a spring adapted to operate said lifting-lever to fold said finger-bar from operative to inoperative position, said spring being movable into and out of position to operate said lifting-lever, substantially as described.

20. In a harvesting-machine, the combina-

tion with a machine-frame, and a foldable finger-bar carried thereby, of a pivoted lifting-lever which operates to fold said finger-bar, and a spring which operates said lifting-lever to fold said finger-bar, said spring normally exerting insufficient force on the lifting-lever to operate it and being adjustable to exert sufficient force on said lever to fold the finger-bar, and means for shifting the point at which said spring acts on said lever, with reference to the fulcrum of the lever, substantially as described.

21. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for folding said finger-bar, an arm carried by said lifting-lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, and a spring connected with said arm and with a suitable support, substantially as and for the purposes specified.

22. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for folding said finger-bar, an arm carried by said lifting-lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, and a spring connected with said arm and with a suitable support, said spring having a torsional as well as a resilient action, substantially as described.

23. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for lifting said finger-bar, an arm pivoted upon said lever and movable in a plane substantially perpendicular to that of the lifting-lever, means for rocking said arm, and a spring secured at one end to a suitable support, and at the other end to said arm, near one end, substantially as and for the purposes specified.

24. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for lifting said finger-bar, an arm pivoted upon said lever and movable in a plane substantially perpendicular to that of the lifting-lever, means for rocking said arm, and a torsion-spring secured at one end to a suitable support, and at the other end to said arm, near one end, substantially as and for the purposes specified.

25. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for folding said finger-bar, an arm pivoted upon said lever and movable in a plane substantially perpendicular to that of the lifting-lever, means for rocking said arm, a spring secured at one end to a suitable support, and at the other end to said arm near one end, and a foot-lever for rocking said arm, substantially as and for the purposes specified.

26. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for

folding said finger-bar, an arm pivoted to said lever and movable in a plane substantially perpendicular to that of said lever, a pulley 45 carried by said arm, a foot-lever, a flexible connection connecting said lever with said pulley, and a spring 35 connected at one end to a fixed support, at the other end to said arm, substantially as described.

27. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for folding said finger-bar, an arm pivoted to said lever and movable in a plane substantially perpendicular to that of said lever, a pulley 45 carried by said arm, a foot-lever, a flexible connection connecting said lever with said pulley, a spring 35 connected at one end to a fixed support, at the other end to said arm, and a lock for locking said arm in operative position, substantially as described.

28. In a harvesting-machine, the combination with a machine-frame and a finger-bar carried thereby, of a pivoted lifting-lever for folding said finger-bar, an arm pivoted to said lever and movable in a plane substantially perpendicular to that of said lever, a pulley 45 carried by said arm, a foot-lever, a flexible connection connecting said lever with said pulley, and a torsion-spring 35 connected at one end to a fixed support, and at the other end to said arm, substantially as described.

29. The combination with a pivoted lifting-lever, of an arm pivoted upon said lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, and a spring connected with said arm and to a suitable support, substantially as described.

30. The combination with a pivoted lifting-lever, of an arm pivoted upon said lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, and a torsion-spring connected with said arm and to a suitable support, substantially as described.

31. The combination with a pivoted lifting-lever, of an arm pivoted upon said lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, a spring connected with said arm and to a suitable support, and means for moving said arm about its pivot, substantially as described.

32. In a harvesting-machine, the combination with a finger-bar-carrying frame, a cutter-bar and a lock therefor, of a draft device, and means operated by the draft to unlock the cutter-bar, substantially as described.

33. In a harvesting-machine, the combination with a finger-bar-carrying frame, a cutter-bar and a lock therefor, of a lever adapted to be operated by the draft to unlock the cutter-bar, a draft device, and means for distributing the draft applied to the finger-bar-carrying frame, partly directly to said frame, and partly to said lever, substantially as described.

34. In a harvesting-machine, the combination with a finger-bar-carrying frame, a cut-

ter-bar and a lock therefor, of a lever adapted to be operated by the draft to unlock the cutter-bar, a draft device, and links 62, 63, one of said links connecting the draft device with said lever, and the other link connecting the draft device directly with the finger-bar-carrying frame, substantially as described.

35. The combination with a pivoted lifting-lever, of an arm pivoted upon said lever and movable in a path sustaining an angular relation to the plane of said lifting-lever, a spring connected with said arm and to a suitable support, and means for regulating the travel of said arm, substantially as described.

36. The combination with a lifting-lever, of a spring adapted to operate said lever, and mechanism independent of the movement of said lever upon its fulcrum for adjusting said spring to vary the distance from the fulcrum of said lever of the point at which said spring acts upon said lever, substantially as described.

37. The combination with a pivoted lifting-lever, and means connecting said lever with the object to be lifted, of a spring for operating said lever, and mechanism for varying the distance from the fulcrum of said lever of the point at which the stress of the spring is applied thereto, substantially as described.

38. The combination with a pivoted lifting-lever, of a spring normally under tensional and torsional strain, said spring being arranged to operate the lever and movable to vary the distance from the pivot of said lever of the point at which the force of the torsion-spring is applied, and an adjustable connecting device between said lever and said torsion-spring and normally held in one of its positions by the torsion of the spring, substantially as described.

39. The combination with a pivoted lifting-lever, of a spring for operating said lever, said spring being movable to vary the distance from the pivot of said lever at which the force of the spring is applied, and a stop for limiting the movement of said spring, substantially as described.

40. A lifting device, consisting of a lifting-spring connected with a suitable support, a

lifting-lever, means connecting said lever with the object to be lifted, said spring being connected with said lever for operating the same, and mechanism for varying the distance from the fulcrum of said lever to the point at which the stress of the spring is applied thereto, substantially as described.

41. A lifting device consisting of a lifting-spring normally under tensional and torsional strain, said spring being connected with a suitable support, a lever connected with said spring and with the object to be lifted, and means operated by the torsional strain of said spring for shifting the point at which said spring acts on said lever with reference to the fulcrum thereof, substantially as described.

42. The combination with a lifting-lever, of an operating-spring therefor, said spring being under tensional and torsional strain, and means operated by the torsional strain of said spring for varying the leverage of said spring on the lever, substantially as described.

43. The combination of a pivoted lifting-lever, an arm carried thereby and movable in a path sustaining an angular relation to the plane of said lever, and a spring connected with said arm and with a suitable support, substantially as described.

44. The combination of a pivoted lifting-lever, an arm carried thereby and movable in a path sustaining an angular relation to the plane of said lever, and a spring connected with said arm and with a suitable support, said spring being under tensional and torsional strain, the torsional strain acting normally to move said arm in one direction, substantially as described.

45. The combination with a carriage, a finger-bar-carrying frame, and a finger-bar carried thereby, of a draft device, means connecting said draft device with the finger-bar-carrying frame, a spring between said draft device and the carriage, and lever mechanism adapted to be operated to vary the tension of said spring, substantially as described.

ALFRED HART.

Witnesses:

JOHN L. JACKSON,
ALBERT H. ADAMS.