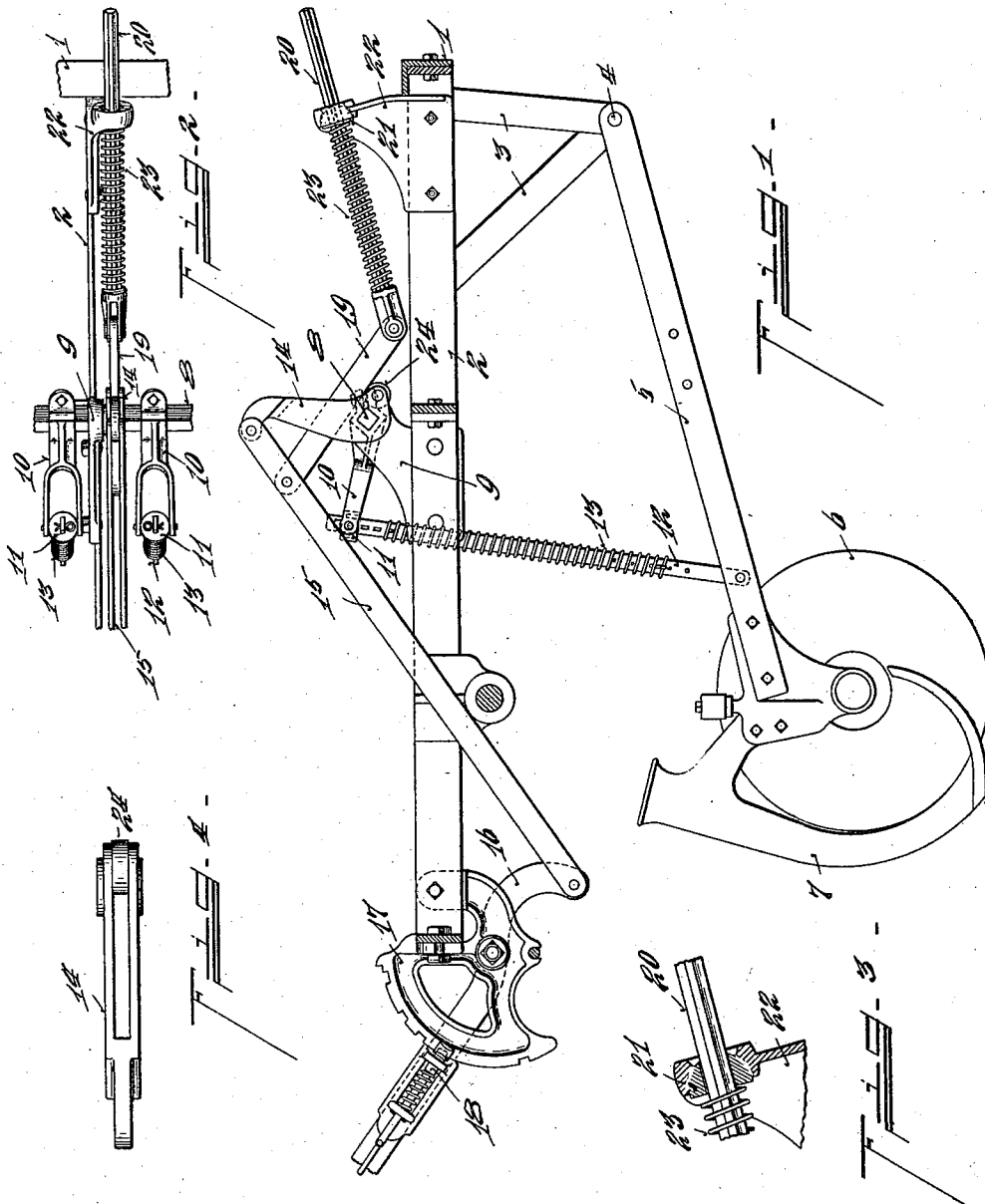


E. E. TOWLE.
SEEDING MACHINE.
APPLICATION FILED OCT. 10, 1910.

1,028,403.

Patented June 4, 1912.

2 SHEETS-SHEET 1.



Inventor

Witnesses

C. B. Foster

Emma Spencer

By

W. A. Wood

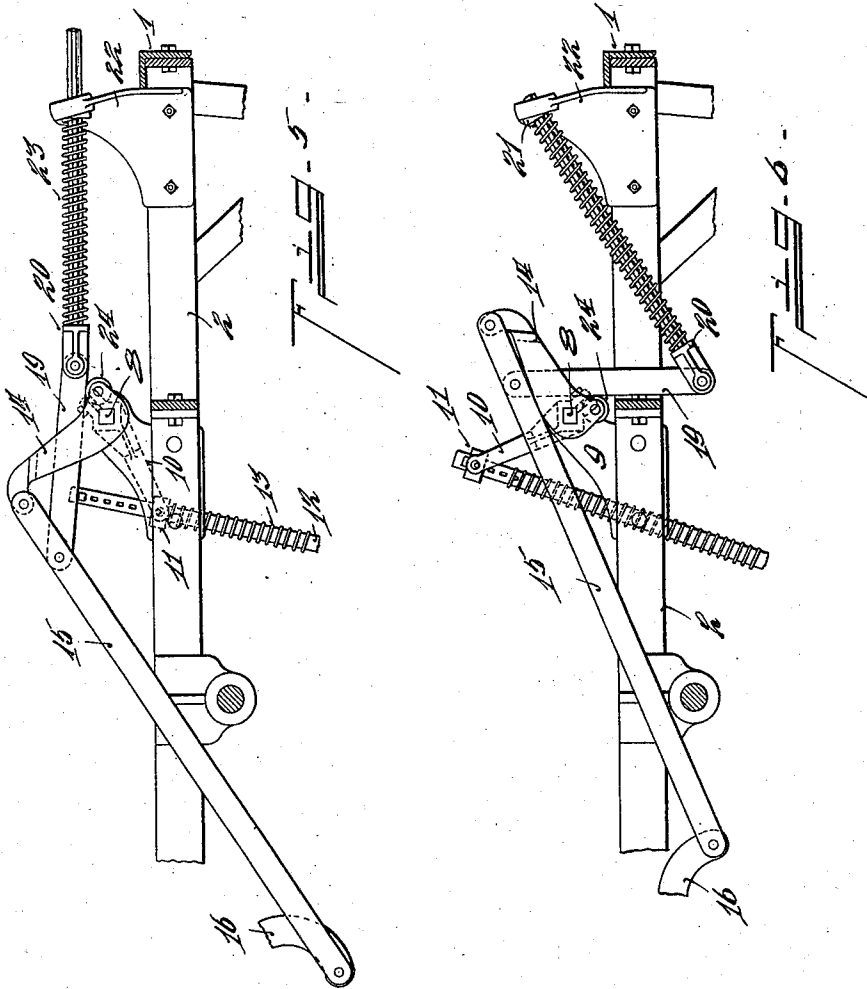
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UNITED STATES PATENT OFFICE.

ELMER E. TOWLE, OF RICHMOND, INDIANA, ASSIGNOR TO THE AMERICAN SEEDING MACHINE COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

SEEDING-MACHINE.

1,028,403.

Specification of Letters Patent.

Patented June 4, 1912.

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To all whom it may concern:

Be it known that I, ELMER E. TOWLE, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Seeding-Machines, of which the following is a specification.

My invention relates to a balanced spring lifting device for raising, for lowering and applying pressure to furrow openers of seeding machines, or other analogous implements.

The object of my invention is to provide compensating means, in connection with the lifting lever mechanism of a seeding-machine, assisting in raising the hoes, disks or furrow openers, and also assisting in applying pressure thereon when in use.

Another object of my invention is to provide a compensating lever mechanism, so arranged that the connecting element between said mechanism and device travels in an arc eccentric to the rock bar, whereby the movement of the power storage device is reduced to a minimum.

Another object of my invention is to provide compensating lever mechanism, in connection with the lifting mechanism of a seeding-machine, said compensating means being arranged to store up power during certain movements thereof, without affecting the power to be applied to the lifting mechanism. The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a side elevation of my improvement, as applied to a seeding-machine, illustrating so much of the seeding-machine as to clearly set forth the features of my invention. Fig. 2 is a top plan view of the forward portion thereof. Fig. 3 is an enlarged sectional view of the connection between compensating mechanism and the main frame of the machine. Fig. 4 is a detail elevation of the lifting lever arm on the pressure bar. Fig. 5 is a side elevation, similar to Fig. 1, but showing the parts in a position when pressure is applied upon the furrow opener. Fig. 6 is a similar view, but showing the parts in a position when the furrow openers are elevated.

It will be understood that in the machine to which my invention is to be applied, a furrow opener is to be raised or to be forcibly depressed. For this purpose, a leverage mechanism is employed, which performs these functions in its opposite directions of movement, and I combine with such leverage mechanism a compensating lever mechanism, which stores up energy during the intermediate portion of the lever movement in either direction, or at the time when it is not exerting any appreciable force, and hence the energy is stored up without much effort on the part of the operator. The organization of this leverage mechanism is such that the energy thus stored up, consisting specifically in a spring compression, is automatically released at the ends of the lever movements, or, in other words, at the time when the actual work of lifting or depressing the furrow opener is accomplished. Thus, the stored up energy is at one time an agency in lifting the furrow opener, and at another time in forcing the depression of the furrow opener, thereby minimizing the expenditure of human energy, necessary to effect a given result.

1 represents the main frame of the seeding-machine, provided with the cross supporting rails 2, the number of which is governed by the size of the machine.

3 represents depending bracket arms secured to the frame, supporting the drag bar supporting rod 4.

5 represents the drag-bar, provided with the disk 6 and seed tube 7, of conventional type. The drag bars may be equipped with other forms of furrow openers.

8 represents the pressure rock-bar, suitably journaled in the hangers or brackets 9, fixed to the cross rails 2. 10 represents a pressure arm, fixed to the rock bar 8, and preferably of bifurcated form, between the limbs of which is pivotally mounted the connecting member 11, serving as an intermediate universal connection between the pressure arm 10, and pressure rod 12, for raising or depressing the drag bar. It forms a seat for the pressure spring 13, and also serves as a guide for the pressure rod 12, which has a slidable connection therewith. The pressure rod 12 is pivotally connected to the drag bar 5. 13 represents the pres-

sure spring on the rod 12, for applying pressure to the furrow openers. This lifting and pressure mechanism may be of any conventional type, common in the arts, or otherwise, serving the functions well known.

14 represents a lifting lever arm fixed to the pressure bar, and 15 represents a connecting link, pivotally connected to said lifting lever arm 14, at one end, its opposite end being pivotally connected to the main operating lever 16, which lever in turn is pivotally mounted on the rack plate 17, secured to the frame elements 1, 2; said rack-plate is provided with suitable notches 18, to be engaged by a spring controlled detent 19, to lock the parts in their adjusted positions, and of a construction common in the art. The lifting lever mechanism, likewise, is more or less of the conventional type, to which the following compensating mechanism is applied.

19 represents a link, one end is pivotally connected to the link 15, its opposite end is pivotally connected between the bifurcated end, of the plunger 20. The plunger 20 is slidably mounted within the journal seat 21, said seat being socketed within the hanger or bracket 22, secured to the cross rail 2.

23 represents a spring on the plunger 20, bearing against the seat 21, and serving to apply pressure to said plunger. The connection between plunger and bracket plate 22, is preferably in the form of a ball and socket joint, but, it is obvious, that any universal connection may be employed, to allow the plunger 20 to operate freely.

24 represents a roller, journaled upon the lifting lever arm 14, adapted to engage the link 19, serving as a fulcrum therefor, and movable thereon, so as to change the fulcrum, to vary the leverage between the link 15 and plunger 20, in the movements of the several elements, increasing the power, in one instance, and to relieve the mechanism of strains in a second instance. Thus, the position illustrated in Fig. 1 of the drawings, is the intermediate one, in which the plunger spring 23 is compressed, the fulcrum point of link 19, is closer to the weight or spring end of the link 19, serving as a lever, leaving the longest distance between the power end and fulcrum, thereby equalizing or relieving the lifting lever 16 of the strains due to the compression of the spring 23.

In Fig. 5, the compensating lever mechanism is shown as increasing power in depressing the furrow openers, and in which the parts of the compensating mechanism are in a substantially horizontal plane. The spring 23 exerts its pressure in a direction toward the link 15 and in a direction coincident with the movement of the arm 14, thereby assisting or increasing the power of the main lever mechanism in applying the down-

ward pressure for depressing the furrow openers. In Fig. 6, the reverse conditions exist, with the compensating mechanism exerting its pressure or power in the direction coincident with the movements of the mechanism, for raising the furrow openers. In this view, it will be seen that the link or lever 19 is in a substantially vertical position and fulcrumed on the roller 24, so as to gain all the power possible in the expanding movement of spring 23. Therefore, it will be seen, that through the movements of the various elements, the fulcrum point of link 19 is changed, and a transposition takes place of the weight and power ends of said link, as a lever, to increase the leverage of the power end, thereby obtaining a maximum pressure from the expansion of the spring 23, or to relieve the main lever mechanism of any application of increased pressure in compressing the spring 23. This produces a more or less balanced condition, rendering an easier operation.

From this description it will be seen that in its last analysis, the invention comprises, essentially, these elements and organization, as follows:—the rock bar 8, the fulcrum 24, movable therewith, means for actuating the rock bar, comprising the rock arm 14, primary lever mechanism 15, etc., and the member 19, the intermediate portion of which slidably engages and rocks upon the fulcrum 24. The front end of this member is pivoted to the actuating means and the rear end has a universal spring connection 23, 20, with the frame. It is inherent in this organization that the spring 23 will be compressed during the intermediate portion of the movement of the rock bar and recoil at each end of the movement, so that the stored energy is applied to the actuating mechanism, in one instance, in raising the furrow opener, and in the other instance, to assist in forcibly depressing the furrow opener, and by reason of this compound leverage the spring is compressed, without expenditure of any appreciable human energy, greater than will be required in moving the primary lever mechanism from one position to another, and that the energy thus stored up becomes, when liberated, quite an effective agency in the actual work of lifting or depressing the furrow openers.

For the purpose of a generic disclosure of the invention, the organization of the subject matter may be considered as comprising, the rocking mechanism for operating the drag bar, the hand lever mechanism comprising link 15 for operating the rocking mechanism, and the spring actuated toggle mechanism comprising link 19 and spring plunger 20, 23 for influencing the movement of the rocking mechanism. The outer end of the arm 14 is the member of the rocking

mechanism to be influenced, and the link 19 with spring plunger 20, 23, may be broadly treated as an intermediately fulcrumed spring actuated compound leverage mechanism for influencing the movements of the rocking mechanism, the lug 24 of the rock shaft constituting an intermediate fulcrum for the link 19 at the time when this mechanism is functional toward the ends of the movements of raising and lowering the drag bar. When link 19 is brought to bear slidably upon fulcrum 24 it becomes a lever of the first class with the manual power applied on one side of the rock shaft 8 and the spring power applied upon the other side of the rock shaft. This intermediately fulcrumed spring actuated compound leverage mechanism in the position shown in Fig. 5 is exerting its maximum influence to assist the operator in depressing the drag bar, that is to say, it is thrusting toward the hand of the operator and forcing rock arm 14 in this direction thereby forcing rock arm 10 downwardly. In Fig. 6 the converse is true, that is the upper end of link 19 is thrusting rock arm 14 away from the hand of the operator, the spring thrusting the lower end of link 19 toward the operator, the link fulcrumed upon the boss 24 so that this compound spring lever is functional in raising the drag bar. This organization permits an operator to handle the considerable weights of a gang of drag bars and furrow openers with the utmost ease, and as during these movements the fulcrumed boss 24 is itself rocking in the arc of a circle while the link 19 bears against it between its ends and slides along the same, the leverage is of a differential character and compounds the spring leverage influence to assist the hand of the operator in manipulating the drag bar.

This in an invention peculiarly susceptible of embodiment by a skilled mechanic, into many different specific modifications, differing in form and arrangement but involving the novel principles of construction, mode of operation and results herein disclosed in their preferred embodiment. The details of structure, the method of attachment, the relative arrangement and incorporation into an organization of the nature shown, could be variously and specifically modified without departing from the essence of this inventive disclosure, and I do not wish to be so restricted except in claims specific in terms to preferred forms of the invention.

Having described my invention, I claim:—

1. In a seeding machine, a frame, a drag bar, a rocking member operatively connected to the drag bar, a lever mechanism operatively connected to the rocking member, and a link connected at one end to the mecha-

nism for operating the rocking member and at the other end spring connected to the frame, said link being positioned to fulcrum and slide upon a portion of the rocking member at predetermined points in its movement.

2. In a seeding machine, compound lever mechanism, compensating lever mechanism and power means therefor, said compensating lever mechanism pivotally connected to one element of said compound lever mechanism and loosely fulcrumed to a second element of the compound lever mechanism, whereby, in the movement of the various elements, the fulcrum of the compensating lever is changed to provide means for producing the greatest leverage for said compensating means to increase and balance the pressures between the compound lever mechanism and load.

3. In a seeding machine, a frame, a pivoted drag bar, a furrow opener thereon, a rock bar, link and lever mechanism connecting said rock bar and drag bar, a compound leverage mechanism for actuating said rock bar, a spring actuated lever mechanism hinged at one end to the frame, the other end being pivoted to and movable with a member of the compound leverage actuating mechanism and movable eccentrically to the rock bar, said spring actuated lever mechanism moving from a position where its pivots are aligned to a flexed position, the spring being compressed during a portion of the flexing and applying said energy at the ends of the movement, to assist in moving said furrow opener.

4. In a seeding machine, a rock bar, a rock arm, a link and lever connected to said rock arm, a fulcrum member on one of the rocking elements, a link and spring plunger pivoted together, the link being pivoted to the rock arm link, the other end of the plunger being slidably swiveled to the frame, said link slidably engaging said fulcrum member.

5. In a seeding machine, a frame, a rock bar, a rock arm, a fulcrum on one of said rocking elements, means for moving the rock arm, a member pivotally connected at one end to said actuating means and slidably engaging said fulcrum, and a spring connection between the frame and the other end of said member.

6. In a seeding machine, a frame, a rock bar, a fulcrum movable therewith, actuating means for the rock bar, a member slidably engaging said fulcrum, pivotally connected at the one end to said actuating means, and a spring connection between the other end of said member and the frame.

7. In a seeding machine, a frame, a drag-bar pivoted thereto, a furrow-opener on the drag-bar, a rock bar on the frame, link and

lever mechanism connecting said drag-bar and rock-bar, for raising and depressing the furrow opener, means for operating said rock-bar, comprising link and lever mechanism, a spring device having a pivoted end and a swinging end connected to said lever mechanism for operating the rock-bar, the pivotal point traversing an arc which is eccentric relative to the center of said lever mechanism movements, whereby the spring is compressed during the first portion of each movement of the hand operating lever, and recoils during the remaining portion of each of said hand lever movements, so as to apply the energy stored up during the first portion of each of the hand lever movements to the work of lifting or depressing the furrow opener.

8. In a seeding machine, a frame, a pivoted drag-bar, a furrow opener thereon, a rock-bar, link and lever mechanism between the rock-bar and drag-bar, hand operated lever mechanism for operating the rock-bar, a spring device connected to said lever mechanism and eccentrically movable relative to the rock-bar compressing during the first portion of its movement in either direction, and exerting pressure upon said lever mechanism during the remaining portion of each of its movements to assist in raising or forcibly depressing the furrow opener.

9. In a seeding machine, a frame, a drag bar, a furrow opener, a compound leverage mechanism, a rock bar mechanism actuated thereby and connected to the drag bar for raising and forcibly depressing the furrow opener, a spring device eccentrically movable relative to the rock-bar interposed between the frame and a member of the compound leverage mechanism, adapted to be compressed during the first portion of the leverage movement in either direction, and to apply the stored up energy during the remaining portion of the leverage movements, to assist in moving said furrow opener.

10. In a seeding machine, a frame, a pivoted drag-bar, a furrow opener, a rock-bar, link and lever connections between said drag-bar and rock-bar, a compound leverage mechanism for actuating said rock-bar, a spring device hinged at one end of the frame, the swinging end being connected to a member of the compound leverage mechanism and movable eccentrically to the rock-bar, whereby the spring is compressed during the first portion of each furrow opener movement, and said stored up energy is applied to the furrow opener at the opposite ends of its movements, to assist in moving said furrow opener.

11. In a seeding machine, a frame, a drag-bar pivoted thereto, a furrow opener on the drag-bar, a rock-bar on the frame, a connection between said rock-bar and drag-bar

for raising or lowering said drag-bar, a lever mechanism on the frame for operating said rock-bar, a spring mechanism hinged at one end, the swinging end being connected to said lever mechanism, and eccentrically movable relative to the rock-bar, whereby the spring is compressed during the first portion of said lever mechanism operation, and expands while moving toward each end of said movements.

12. In a seeding machine employing a drag bar, a rock shaft having two arms, lever mechanism connected to one of said arms, the drag bar connected to the other arm, and intermediately fulcrumed spring actuated compound leverage mechanism operatively connected to one of said arms and adapted to impart a spring leverage to the outer end of one of said arms in the operation of raising or depressing the drag bar.

13. In a seeding machine, a frame, a drag bar, a rocking member for the drag bar, means for operating the rocking member, a spring toggle member connecting said means with the frame and extending upon opposite sides of the center of movement of the rocking member, and an intermediate fulcrum for one of said toggle members.

14. In a seeding machine, a frame, a drag bar, mechanism for raising and lowering the drag bar, and an intermediately fulcrumed spring actuated leverage mechanism connecting said actuating mechanism to the frame, said fulcrum and its engaging member being relatively movable and adapted to exert maximum pressure at the ends of the drag bar movements.

15. In a seeding machine, comprising a drag-bar to be raised and lowered, a compound lever actuating mechanism, a link connected to one of said lever elements and spring connected to the frame, an independent fulcrum, and means causing said link to slidably engage said fulcrum.

16. In a seeding machine comprising a drag-bar to be raised and lowered, a compound lever actuating mechanism, a link connected to one of said lever elements and spring connected to the frame, a variable fulcrum, and means causing said link to slidably engage the variable fulcrum.

17. In a seeding machine comprising a drag-bar to be raised and lowered, a compound lever actuating mechanism therefor, a link connected to one of said lever elements, a spring connected to the link and to the frame, and means causing the spring end of said link to move in a curve eccentric to the center of the compound leverage movement.

18. In a seeding machine, a drag bar, rocking mechanism therefor, actuating means for the rocking mechanism, and intermediately fulcrumed spring actuated

compound leverage mechanism positioned to exert spring actuated leverage upon the rocking mechanism during the opposite ends of its movements to influence the raising and lowering of the drag bar, said fulcrum and its engaging member being rotatively movable.

19. In a seeding machine, a frame, a drag bar, a rock shaft having an arm connected to the drag bar, said shaft having a second rock arm, hand lever mechanism connected to said second rock arm, and an intermediately fulcrumed spring actuated compound leverage mechanism operatively positioned between the frame and said second rock arm adapted to exert maximum spring leverage upon said arm in its opposite directions of movement.

20. In a seeding machine, a frame, a drag bar, a hand lever mechanism, a rock shaft having two arms connected respectively to the drag bar and to the hand lever mechanism, a fulcrum boss near the center of the rocking mechanism movable in the arc of a circle around said center, a link and a spring plunger pivoted together, one end of the spring plunger being rockingly pivoted to the frame, the front end of the link being connected to a member of the hand lever mechanism for operating the rock shaft, an intermediate portion of said link being brought into position to slidably engage the said fulcrum at the ends of the movements of the drag bar.

21. In a seeding machine, a drag bar,

hand actuated lever mechanism for raising and lowering the same, and spring actuated lever mechanism for assisting said operating mechanism, said spring mechanism having a member adapted to become intermediately fulcrumed during the latter portions of the drag bar movement, the spring power being applied to one end of said member, the other end of said member being connected to the drag bar operating mechanism, and the spring being compressed during the intermediate portion of the drag bar movement.

22. In a seeding machine, a drag bar, hand actuated lever mechanism for raising and lowering the same, a spring actuated lever mechanism for assisting said operating mechanism, said spring mechanism having a member adapted to become intermediately fulcrumed during the latter portion of the drag bar movement and means for moving said fulcrum in the arc of a circle, the said member sliding thereon, whereby a differential leverage is applied to the drag bar operating mechanism, the maximum spring pressure being imparted thereto during the ends of the drag bar movements, the spring being compressed during the intermediate portions of said movements.

In testimony whereof, I have hereunto set my hand.

ELMER E. TOWLE.

Witnesses:

A. E. SCHIRMAYER,
EDWARD CHRISTMAN.