

E. M. HEYLMAN, L. V. KINGSBURY AND L. W. STICKLEY.

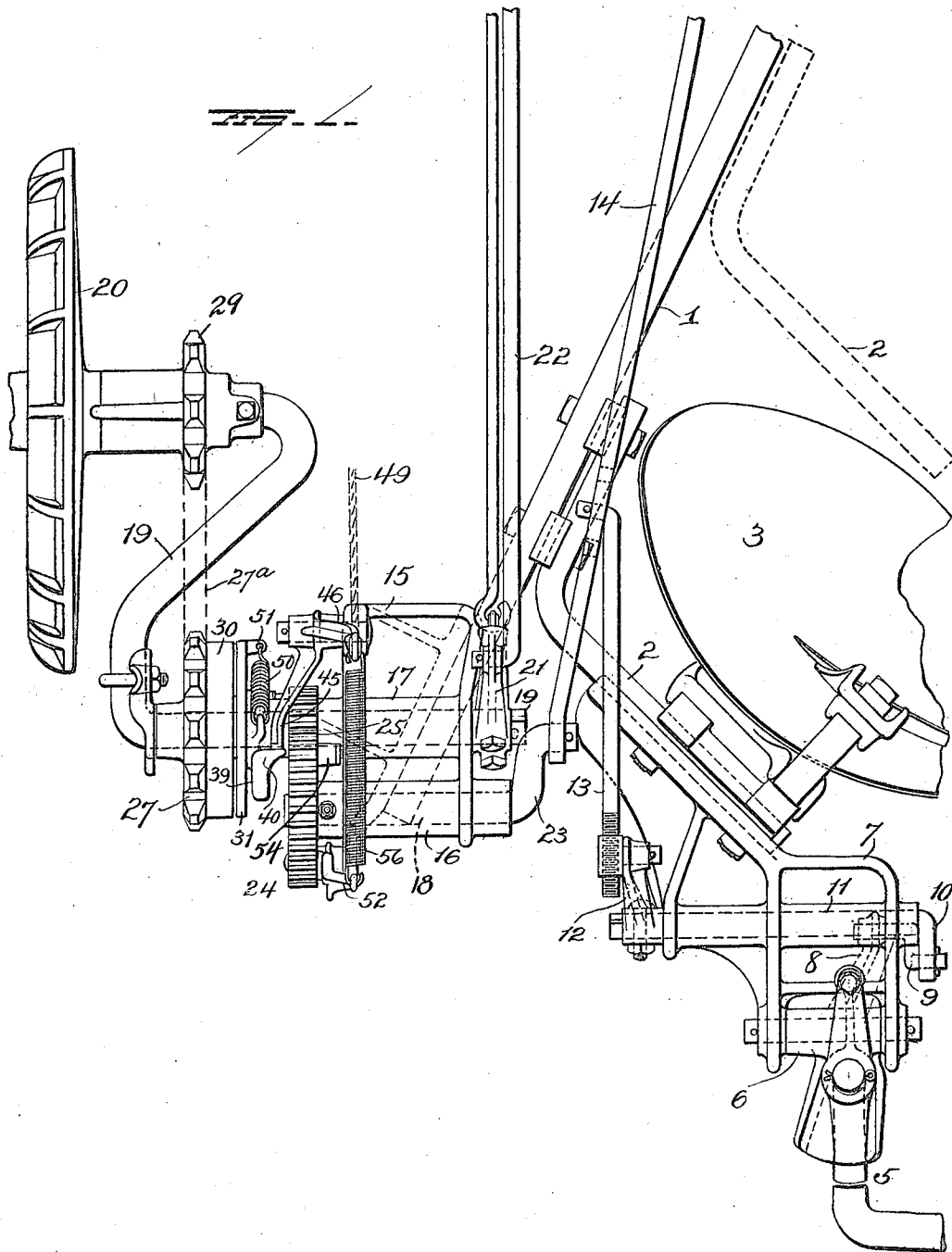
POWER LIFT MECHANISM FOR PLOWS.

APPLICATION FILED APR. 9, 1918.

1,386,867.

Patented Aug. 9, 1921.

3 SHEETS—SHEET 1.



WITNESSES

E. Nottingham
G. J. Downing

INVENTORS

E. M. Heylman
L. V. Kingsbury
L. W. Stickley

By Seymour Bright Attorneys

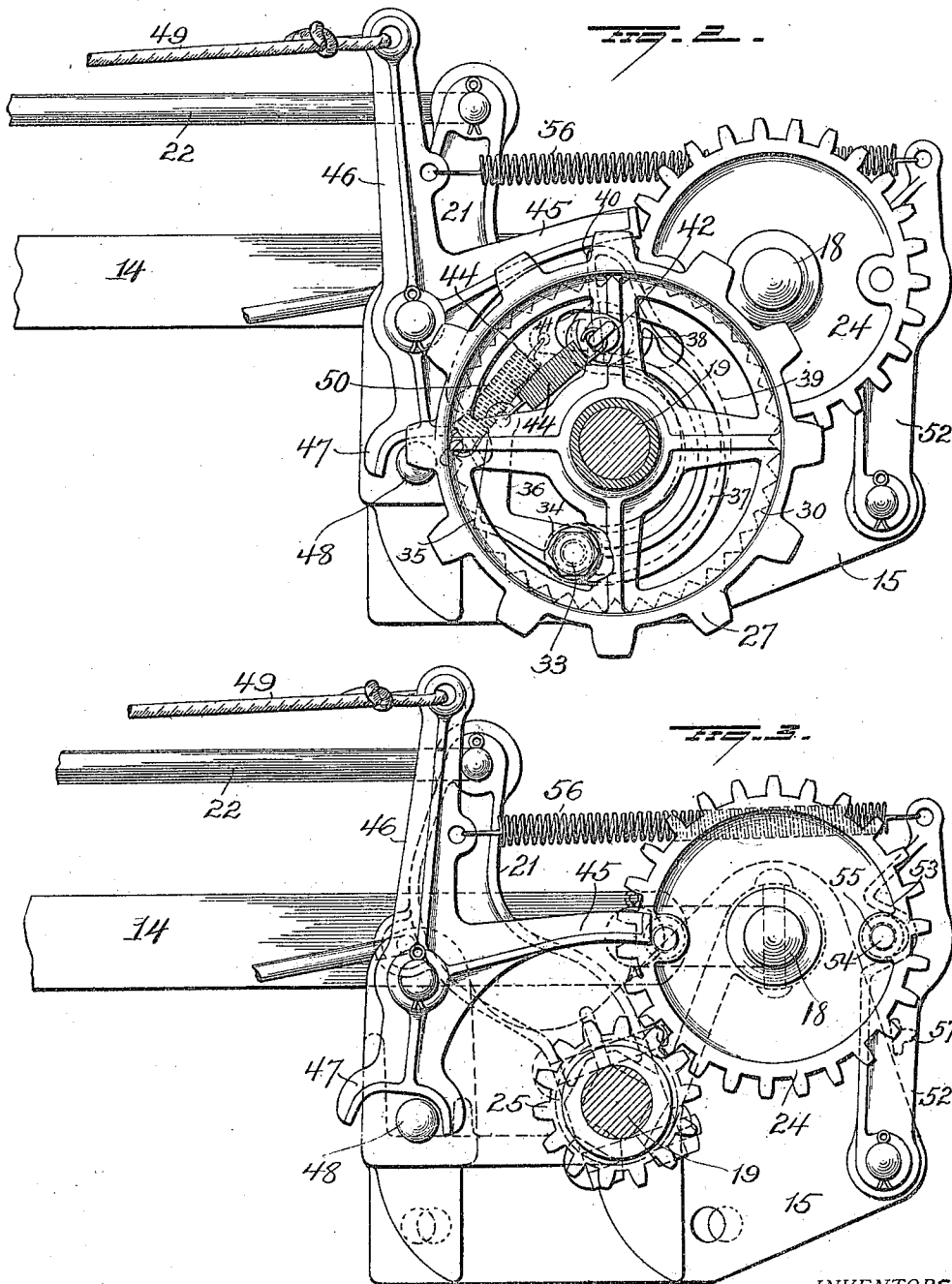
E. M. HEYLMAN, L. V. KINGSBURY AND L. W. STICKLEY.
POWER LIFT MECHANISM FOR PLOWS.

APPLICATION FILED APR. 9, 1918.

1,386,867.

Patented Aug. 9, 1921.

3 SHEETS—SHEET 2.



WITNESSES
E. M. Heylman
G. F. Downing

INVENTORS
E. M. Heylman
L. V. Kingsbury
L. W. Stickley
By *Seymour & Bright* Attorneys

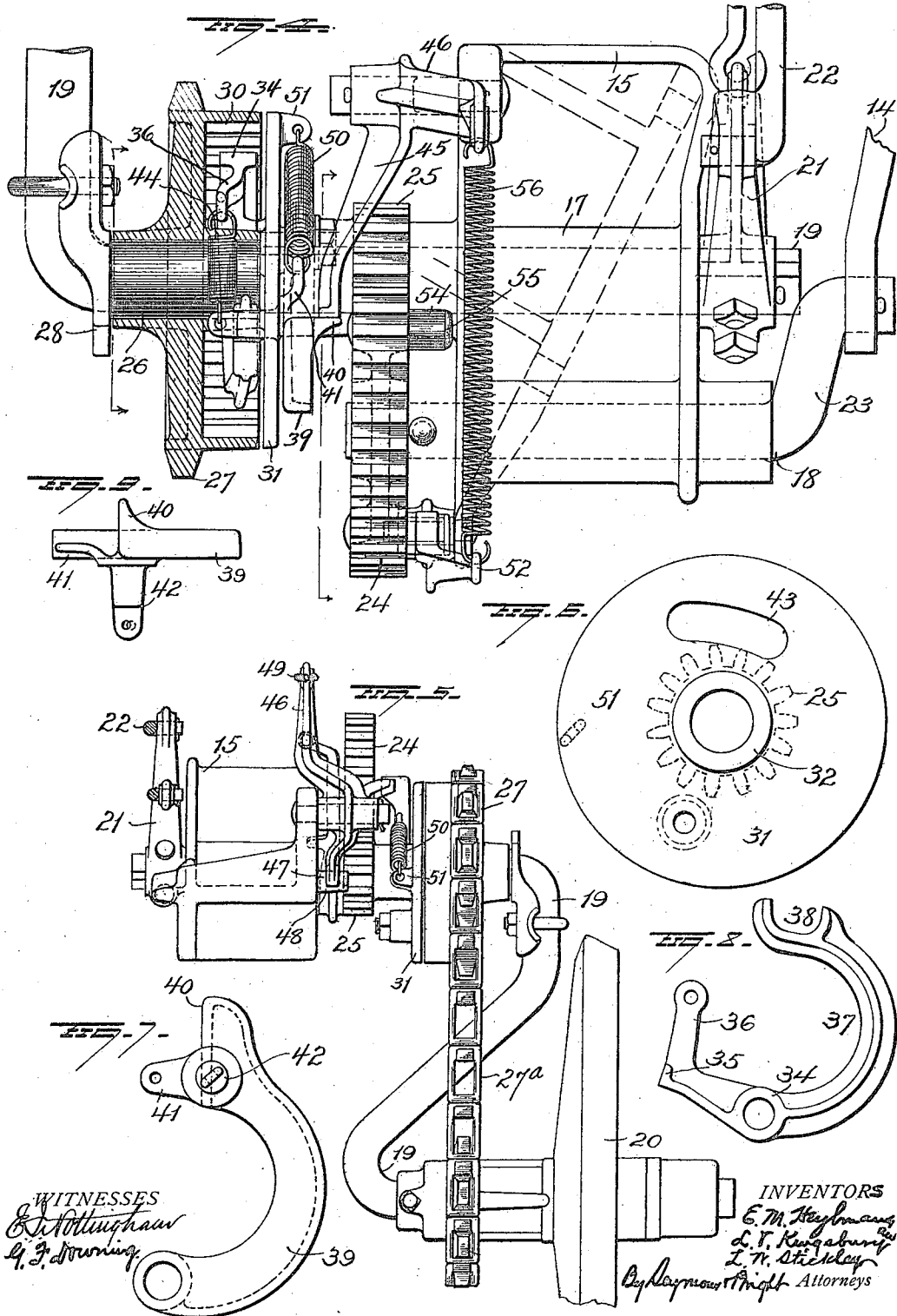
E. M. HEYLMAN, L. V. KINGSBURY AND L. W. STICKLEY.
POWER LIFT MECHANISM FOR PLOWS.

APPLICATION FILED APR. 9, 1918.

1,386,867.

Patented Aug. 9, 1921.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

EDWARD M. HEYLMAN, LEON V. KINGSBURY, AND LLOYD W. STICKLEY, OF SOUTH BEND, INDIANA, ASSIGNORS TO OLIVER CHILLED PLOW WORKS, OF SOUTH BEND, INDIANA.

POWER LIFT MECHANISM FOR PLOWS.

1,386,867.

Specification of Letters Patent.

Patented Aug. 9, 1921.

Application filed April 9, 1918. Serial No. 227,534.

To all whom it may concern:

Be it known that we, EDWARD M. HEYLMAN, LEON V. KINGSBURY, and LLOYD W. STICKLEY, citizens of the United States, and residents of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Power Lift Mechanism for Plows; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in plows and more particularly to clutch and holding devices employed in power lift mechanism, one object of the invention being to provide simple and efficient clutch devices for power lift mechanism, which can be readily controlled to insure the positive and accurate operation of such mechanism, and to provide simple and efficient means whereby the gearing with which said clutch devices cooperate will be held in certain definite positions.

With this and other objects in view the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a portion of a plow structure showing an embodiment of our invention; Figs. 2 and 3 are enlarged side views, partly in section, showing the gearing and clutch devices; Fig. 4 is an enlarged plan view partly in horizontal section showing the same mechanism; Fig. 5 is a partial plan view showing the power mechanism and driving means therefor; Fig. 6 is a view showing the clutch disk; Fig. 7 is a detail view of the trip dog; Fig. 8 is a detail view of the driving dog, and Fig. 9 is a top view of the trip dog.

1 represents a plow beam or frame to which a plurality of brackets or standards 2 are secured for the accommodation of soil engaging devices, such, for example, as disks as shown at 3.

The rear end of the plow structure is supported on a rear furrow wheel, not shown, having its axle 5 mounted in a bracket 6 pivoted to a bracket 7 rigidly secured to the rear end of the plow frame, preferably to the rear bracket or standard

2. The pivoted axle bracket is provided with an arm 8 projecting forwardly under the fixed bracket 7 and this arm is connected by a link 9 with the arm 10 of a crank shaft 11 mounted on the fixed bracket 7. An arm 12 is secured to the crank shaft 11 and with this arm, a rod 13 is adjustably connected, the other end of said rod being adjustably attached to an actuating bar 14. When the actuating bar is moved longitudinally (as hereinafter explained), motion will be transmitted, through the connections above described, to the pivoted axle bracket and result in raising or lowering the plow structure.

A bearing bracket or frame 15 is securely bolted to the rear end of the plow beam or frame 1 and is made with tubular portions 16, 17 which provide bearings, respectively, for a crank shaft 18 and the axle 19 of a land wheel 20. The axle 19 may be made in the form of a crank of approximately Z-shape and is provided at one end with a crank arm 21 with which a rod 22 is connected, the other end of said rod being intended for connection with operating means (not shown) at the forward end of the plow structure for operating said crank axle to lift and level said plow structure. The arm or crank 23 of the shaft 18 is loosely connected with the rear end of the actuating bar 14 for moving the latter to impart motion to the lifting means associated with the rear furrow wheel, as above described, and the forward end of said actuating bar may be also connected with devices (not shown) at the forward end of the structure to cooperate with the forward furrow wheel to lift the forward portion of the plow structure, as disclosed in application for patent filed by E. M. Heylman on the 29th day of March, 1918, Serial No. 225,517.

The crank shaft 18 has secured thereto a gear wheel 24 which receives motion from a smaller gear 25 rotatable with a part mounted on the crank axle 19. A bearing sleeve 26 is secured on the land-wheel crank axle and on this sleeve, the hub of a sprocket wheel 27 is mounted, said bearing sleeve being slightly longer than the hub of said sprocket wheel to prevent binding of the collar 28 against the hub of the sprocket wheel where the pressure on the land wheel is toward bearing bracket 15. Motion is transmitted to the sprocket wheel 27 by

means of a sprocket chain 27^a, and a sprocket wheel 29 mounted on the spindle portion of the crank axle 19 and connected with and rotated by the hub of the land wheel 20.

5 Interposed between the smaller gear or pinion 25 and the sprocket wheel 27, clutch or controlling mechanism is employed and its construction and mode of operation will now be explained.

10 The sprocket wheel 27 is provided with an internally toothed ratchet wheel 30 and adjacent to the latter, a clutch plate or disk 31 is mounted on the crank axle 19 and carries the smaller gear or pinion 25. The

15 clutch disk 31 carries a stud 33 on which a driving dog 34 is loosely mounted. This dog is made with a tooth 35 to engage the internally toothed ratchet wheel 30, and from the toothed portion of said dog a finger 36 projects for a purpose hereinafter explained. The body portion of the dog 34

20 is made in the form of a curved arm 37 which partly encircles the hub of the sprocket wheel 27 within the ratchet wheel 30 and said arm is bifurcated at its free end to form a recess 38. A trip dog 39 is located at the opposite side of the clutch plate

25 from the driving dog and is mounted at one end on the same stud 33 on which said driving dog is mounted. The trip dog has a general curved shape and is provided at its free end with a shoulder 40 and with a finger 41. A pin 42 projects laterally from the trip dog near the free end thereof and after

30 passing through an elongated slot 43 in the clutch disk, enters the recess 38 formed by the bifurcated free end of the arm 37 of the driving dog 34. A spring 44 is attached at one end to the pin 42 on the trip dog and

35 at its other end to the finger 36 of the driving dog 34,—said spring operating normally to retain the tooth of the driving dog out of engagement with the teeth of the ratchet wheel 30, when the shoulder 40 of said trip

40 dog engages the arm 45 of a trip lever 46. This lever is pivotally mounted between its ends on the bearing bracket 15 and its lower arm is bifurcated, as at 47, to cooperate with a pin 48 to limit the movements of said

45 lever. A cord or other flexible device 49 is connected with the lever 46 and extended to a suitable point within convenient reach of the operator. A spring 50 is attached at one end to a lug or projection 51 on the clutch

50 disk 31 and at the other end to the finger 41 of the trip dog 39 for forcing the driving dog into engagement with the ratchet wheel 30 when the parts are in the positions shown in Fig. 3.

55 A lever 52 is pivotally attached at one end to the bearing frame 15 and provided between its ends with a cam notch 53 (preferably V-shaped in form) to engage a roller 54 on one or the other of two pins 55 which

60 project laterally from the gear wheel 24 at

diametrically opposite points thereon. A spring 56 is attached at one end to the lever 52 and at the other end to the trip lever 46,—said spring serving to insure proper engagement of the lever 52 with one or the other of 70 the pins on the gear wheel 24 and hold the latter locked when the actuating bar 14 is in dead-center relative to the axis of the shaft 18, and said spring also serves to retain the arm 45 of the trip lever in the path of the 75 shoulder 40 of the trip dog 39. The lever 52 may be provided with a stop lug 57 to engage the bearing bracket 15 to limit the inward movement of said lever.

It will be observed that in the clutch 80 mechanism, the pivots of the trip dog and the driving dog have a common axis eccentric with respect to the axis of the clutch plate and that the trip dog loosely engages the driving dog to permit the accurate op- 85 eration of the latter.

In the operation of our improvements, the driving dog will be under proper control at all times. The tripping of the trip dog 39 allows the driving dog 34 to engage the 90 internally toothed ratchet wheel 30, and this will cause rotation of the clutch plate 31, which motion will be imparted through the gears 25 and 24 to the crank shaft 18,—the

latter operating the actuating bar 14 and 95 the lifting mechanism associated with the wheels of the plow to raise the plow frame. When the clutch plate 31 has made one complete rotation, the trip dog 39 will come in contact with the arm 45 of the trip lever 46

100 and force the driving dog 34 out of engagement with the ratchet wheel 30. This movement also puts tension on the spring 44 and when the driving dog 34 is released from the teeth of the ratchet wheel 30, the 105 spring 44 will pull the dog away from the teeth of the ratchet wheel. This construction prevents the driving dog from engaging the ratchet wheel under normal operating conditions of the plow. It will be ob-

110 served that by connecting the spring 44 with the trip dog and the driving dog, said spring will have no tendency to release the driving dog when the latter is in driving position, as this spring is not under tension 115 at that time.

In the operation of the mechanism, when the gear 24 shall have made a half revolution, it will be locked by the lever 52 and the plow frame will be locked in its raised 120 position,—the connection of the actuating bar 14 with the crank 23 of shaft 18 being on a dead center relative to the axis of the shaft 18 and the forward connection of said actuating bar.

When the trip lever is permitted 125 to move so that its arm will become disposed in the path of the shoulder 40, the clutch devices will be unlocked and the plow frame will be permitted to descend to its working position. It will also be observed 130

that the gear 24 and crank shaft 18 will be locked by the lever 52 when the plow is in working position with the connection of the actuating bar 14 in dead-center relation to the axis of shaft 18, and thus the weight of the wheels of the plow will be brought to bear to keep the disks or plow bases properly to their work and at uniform depth in hard ground.

10 Various slight changes might be made in the details of construction of our invention without departing from the spirit thereof or limiting its scope and hence we do not wish to restrict ourselves to the precise details
15 herein set forth.

Having fully described our invention what we claim as new and desire to secure by Letters-Patent, is:—

1. In mechanism of the class described, 20 the combination of a ratchet wheel, means for rotating the same, a clutch disk, gearing driven from said clutch disk, clutch devices for connecting the clutch disk with the ratchet wheel, means for controlling said
25 clutch devices, and means coöperable with said gearing to lock the same in definite positions.

2. In mechanism of the character described, the combination of a ratchet wheel, 30 means for driving the same, a clutch disk, clutch devices coöperative with said clutch disk and ratchet wheel, a gear rotatable with said clutch disk, a larger gear meshing with said first-mentioned gear, pins carried
35 by said larger gear, and a locking lever coöperable with said pins to lock said larger gear at each half revolution thereof.

3. In mechanism of the character described, the combination of a wheel, means 40 for driving the same, clutch devices coöperable with said wheel, a trip lever for said clutch devices, a gear connected with said clutch devices, pins on said gear at diametrically opposite points, a pivoted locking lever coöperable with said pins to hold the
45 gear at each half revolution thereof, and a spring connecting said locking and trip levers.

4. In mechanism of the character described, the combination of a ratchet wheel, 50 driving means for the same, a clutch disk, driving and trip dogs carried by said clutch disk and having a common pivotal axis, a loose connection between said dogs, a spring connecting said dogs, and a manually operable trip lever coöperable with the trip
55 dog.

5. In mechanism of the character described, the combination of a ratchet wheel, means for driving the same, a clutch disk, 60 a driving dog mounted on said disk and coöperable with the ratchet wheel, a trip dog also mounted on said disk, a loose connection between said dogs, a trip lever to engage the trip dog, a spring connected at one end with
65 the trip dog and at the other end with the driving dog and operating normally to hold the driving dog out of engagement with the ratchet wheel, and a spring connected at one end to the clutch disk and at the other
70 end to the trip dog.

6. In mechanism of the character described, the combination of a ratchet wheel, driving means therefor, a clutch disk having a slot, gearing connected with the clutch 75 disk, a driving dog mounted on the disk to engage said ratchet wheel and having an arm bifurcated at its free end, a trip dog mounted on said disk and having a part projecting through the slot of the disk and
80 engaging the bifurcated part of the driving dog, a trip lever to engage said trip dog, a spring connecting said dogs to retain the driving dog out of engagement with the ratchet wheel, and a spring connected with
85 the driving dog for moving the latter into engagement with the ratchet wheel.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses.

EDWARD M. HEYLMAN.
LEON V. KINGSBURY.
LLOYD W. STICKLEY.

Witnesses:

EDWIN NICAR,
GEORGE LANPHERE.