

(No Model.)

2 Sheets—Sheet 1.

J. F. APPLEBY.

MECHANISM FOR RAISING AND LOWERING HARVESTING MACHINES.

No. 310,928.

Patented Jan. 20, 1885.

Figure 1.

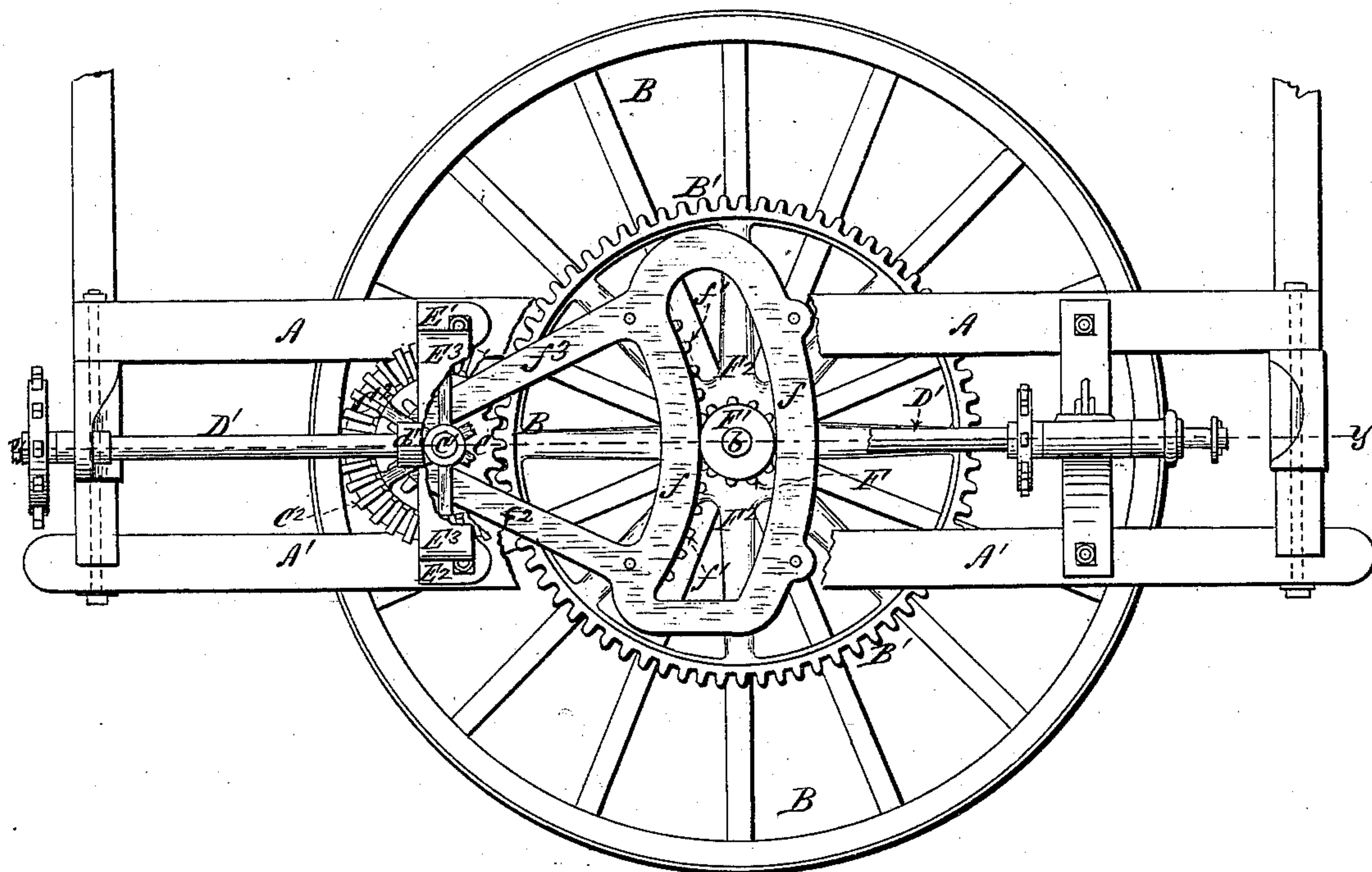


Figure 2.

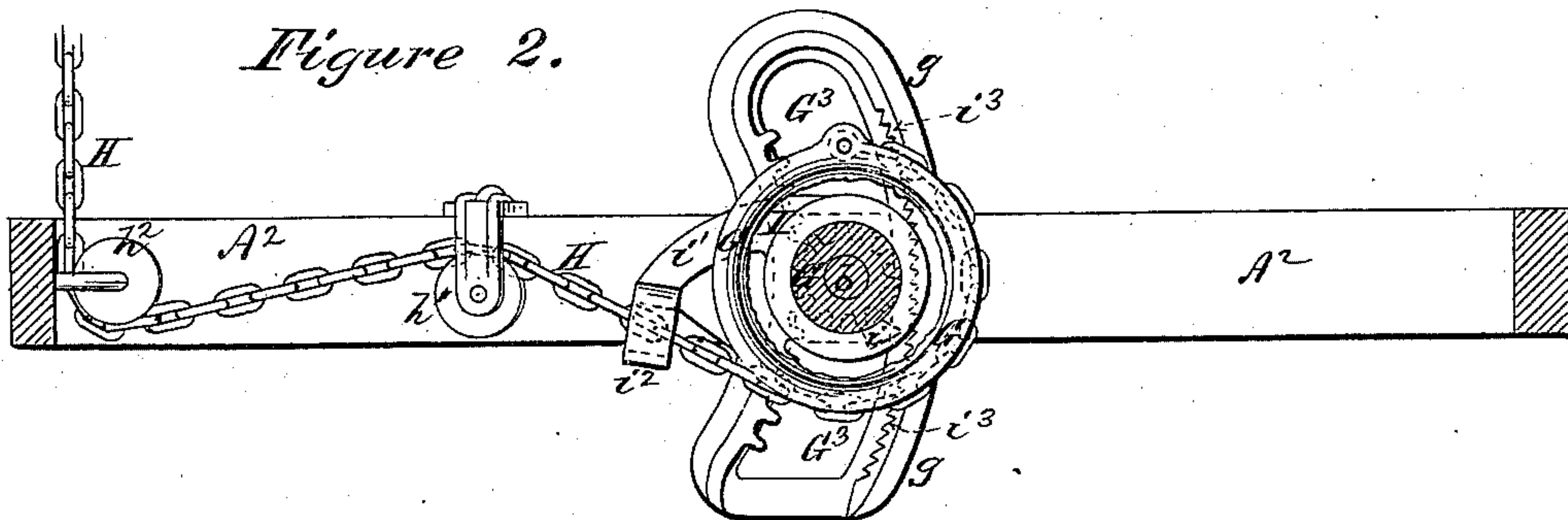
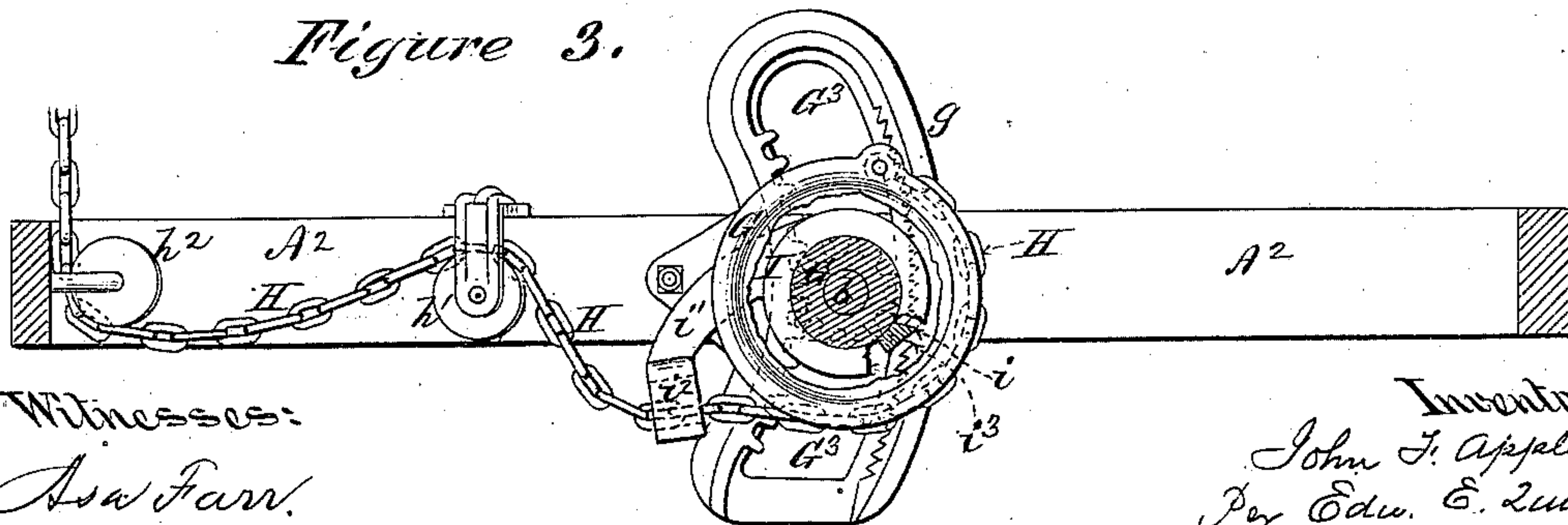


Figure 3.



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(No Model.)

2 Sheets—Sheet 2.

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Figure 4.

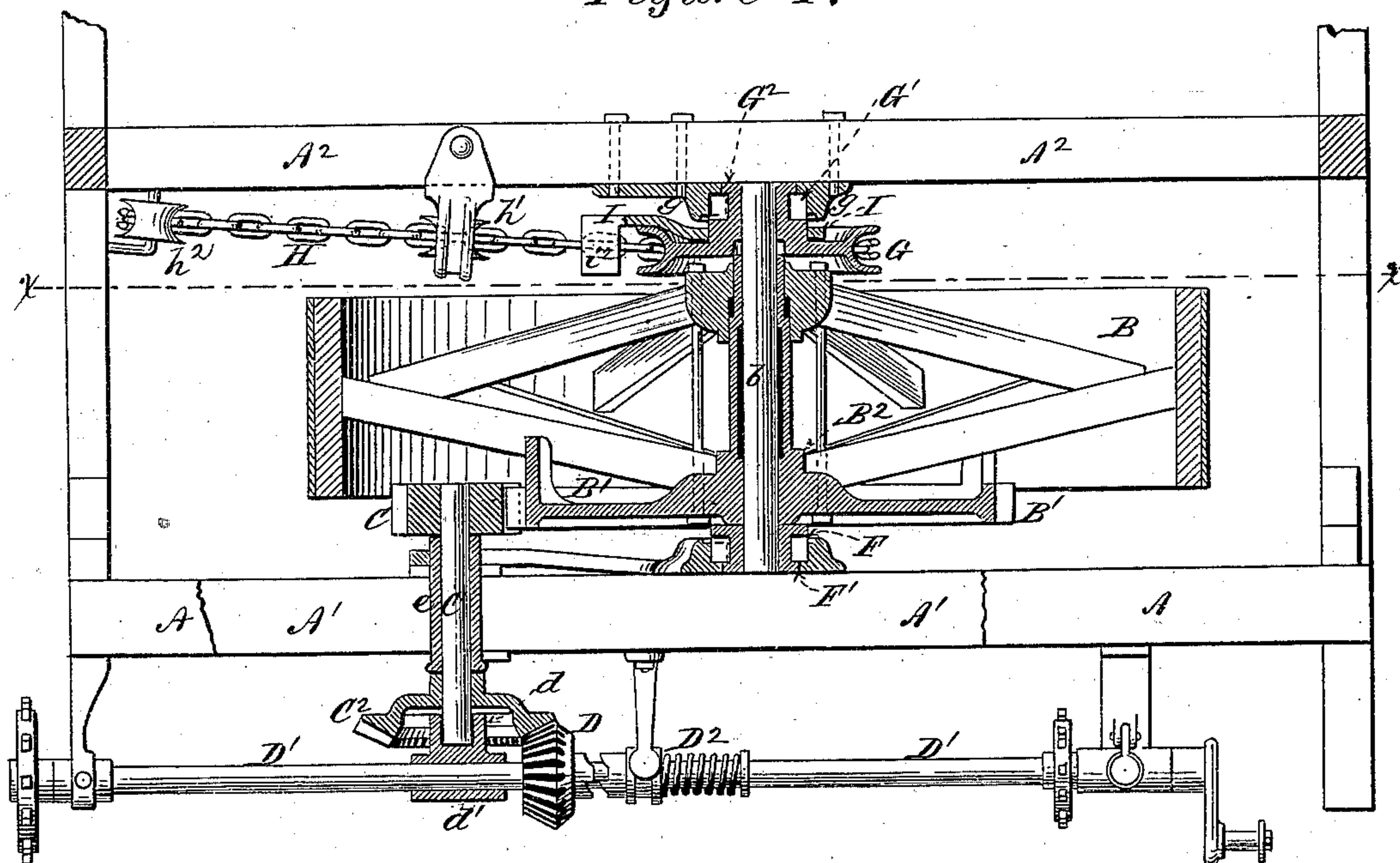


Figure 5. Figure 6.

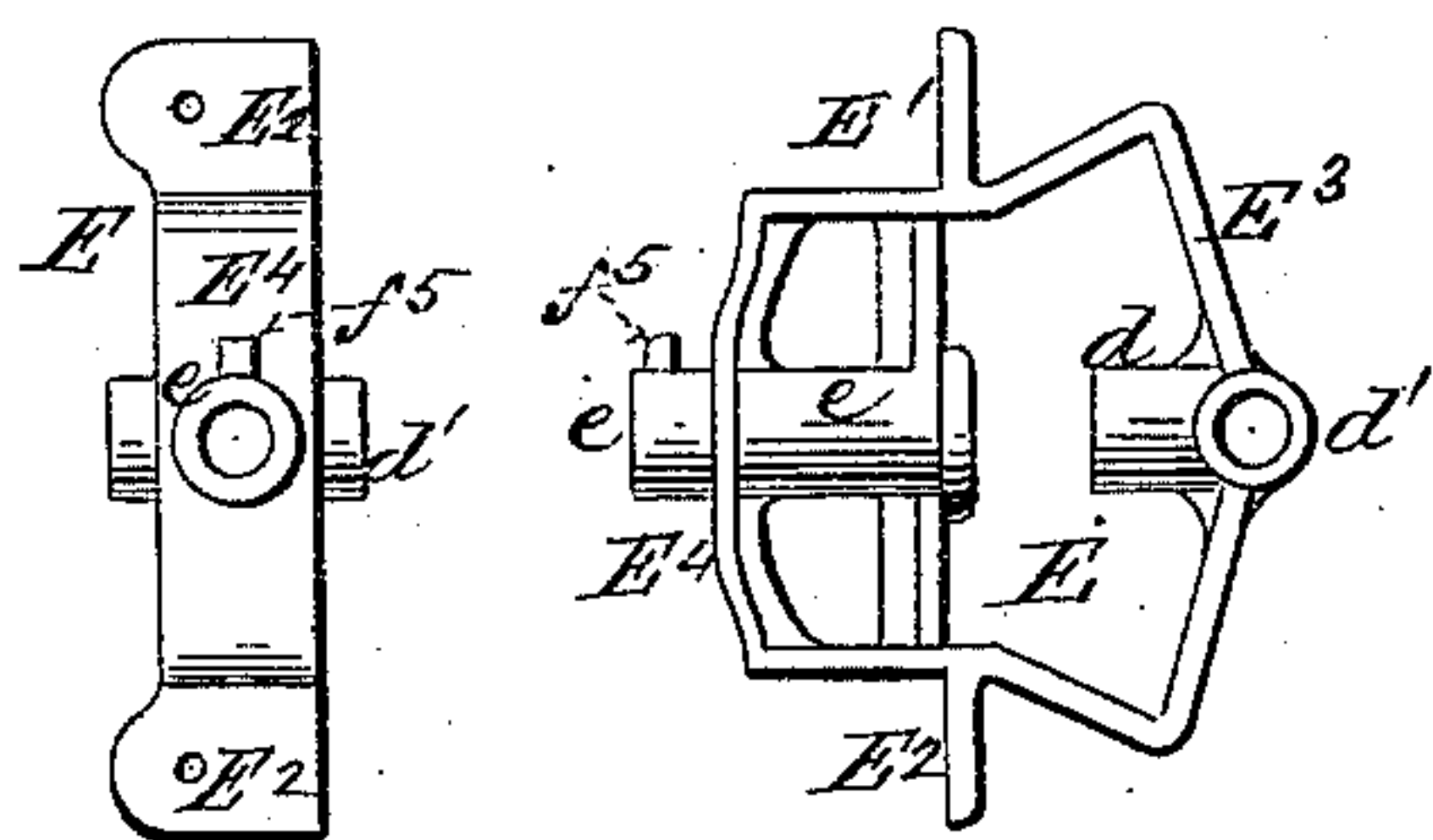


Figure 7.

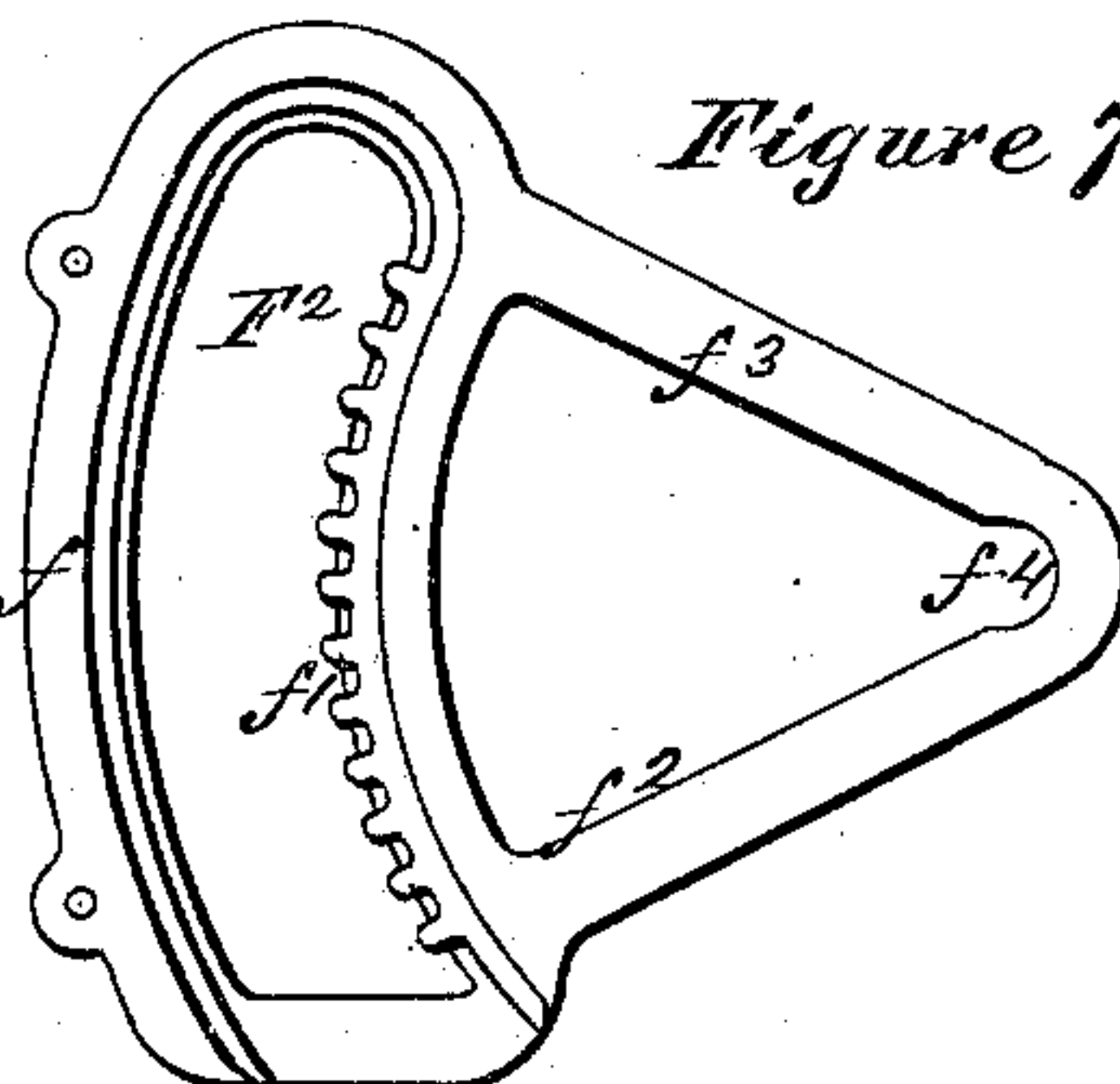


Figure 9.

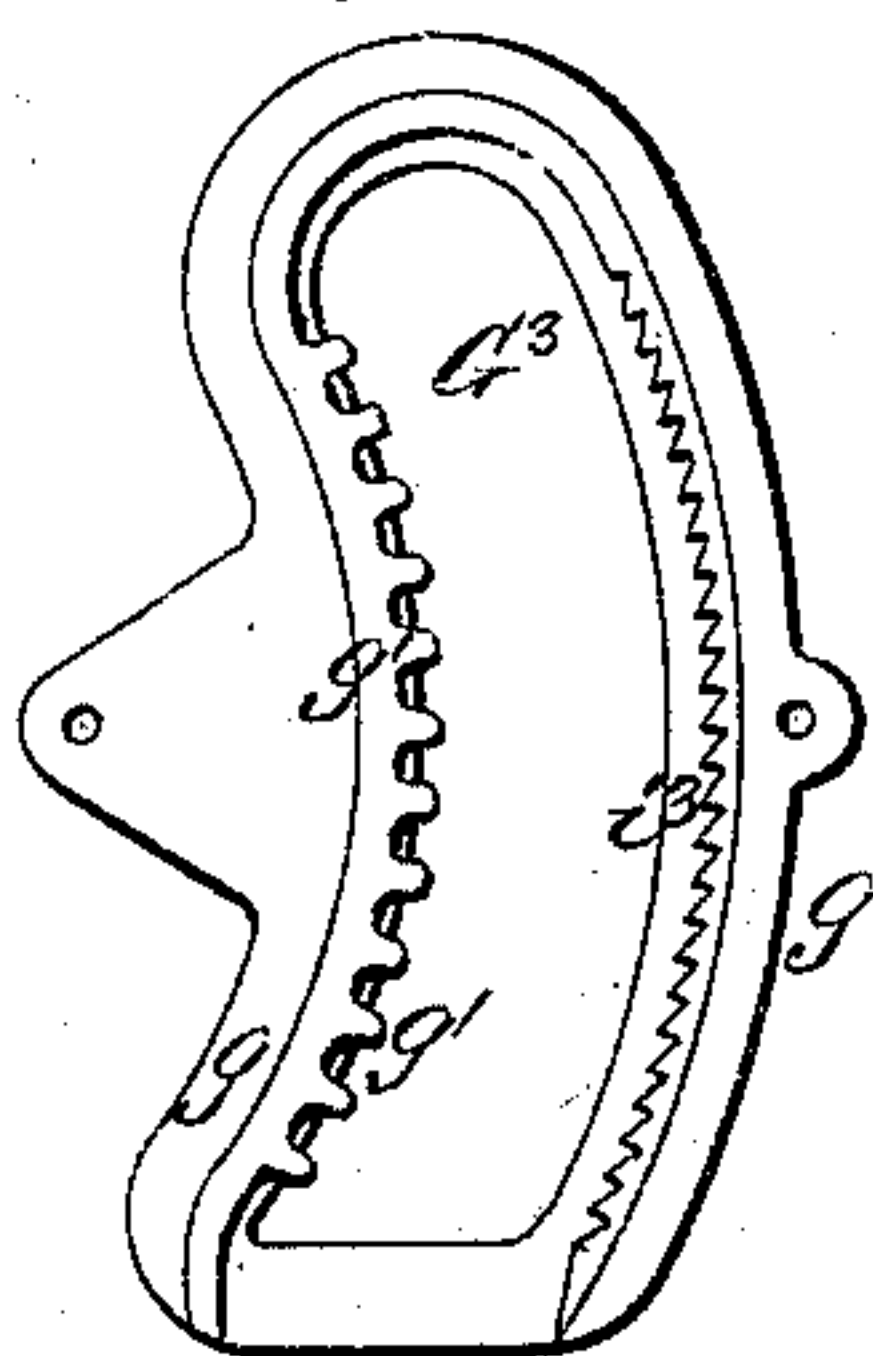


Figure 8.

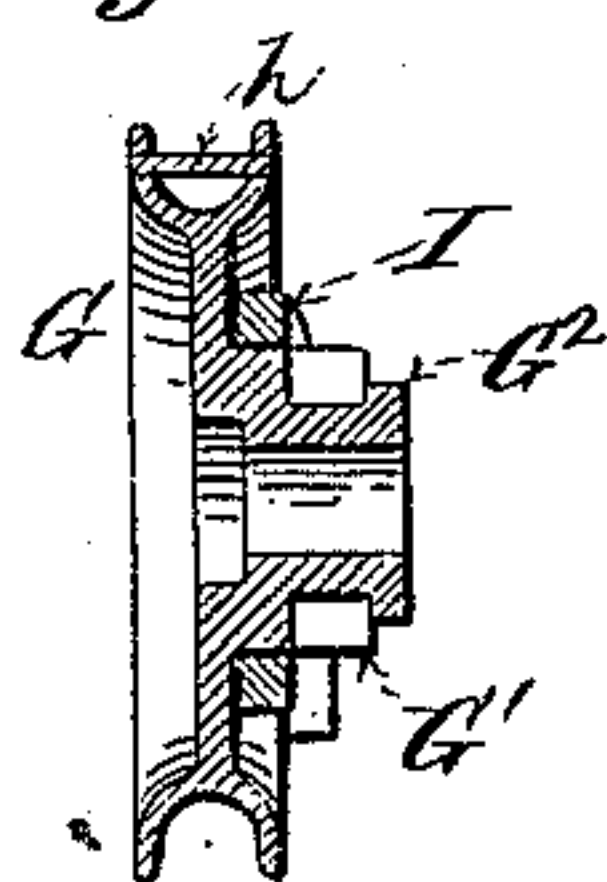
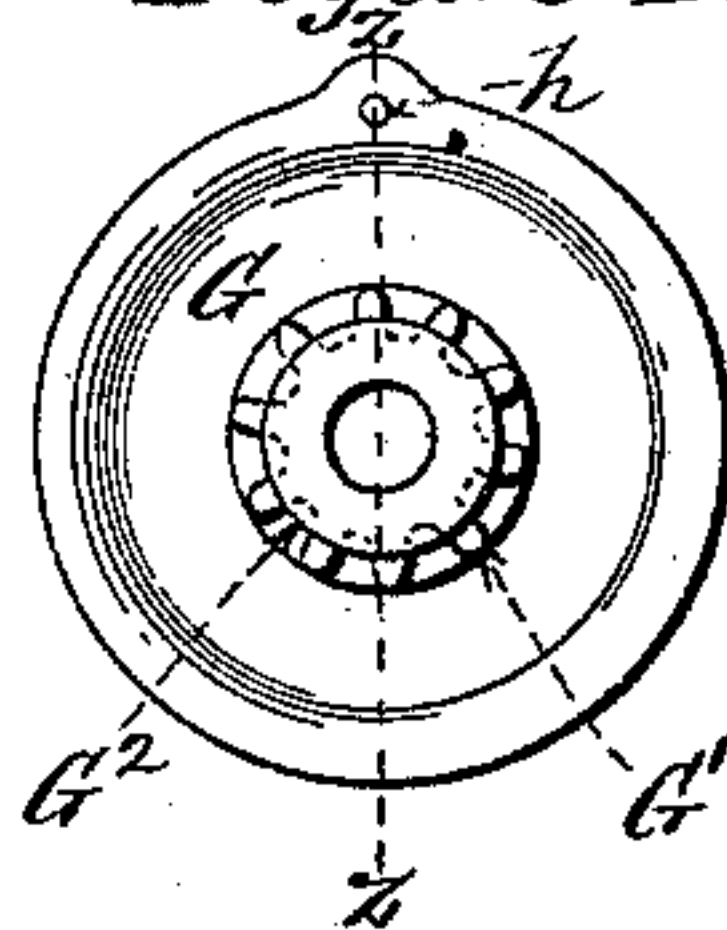
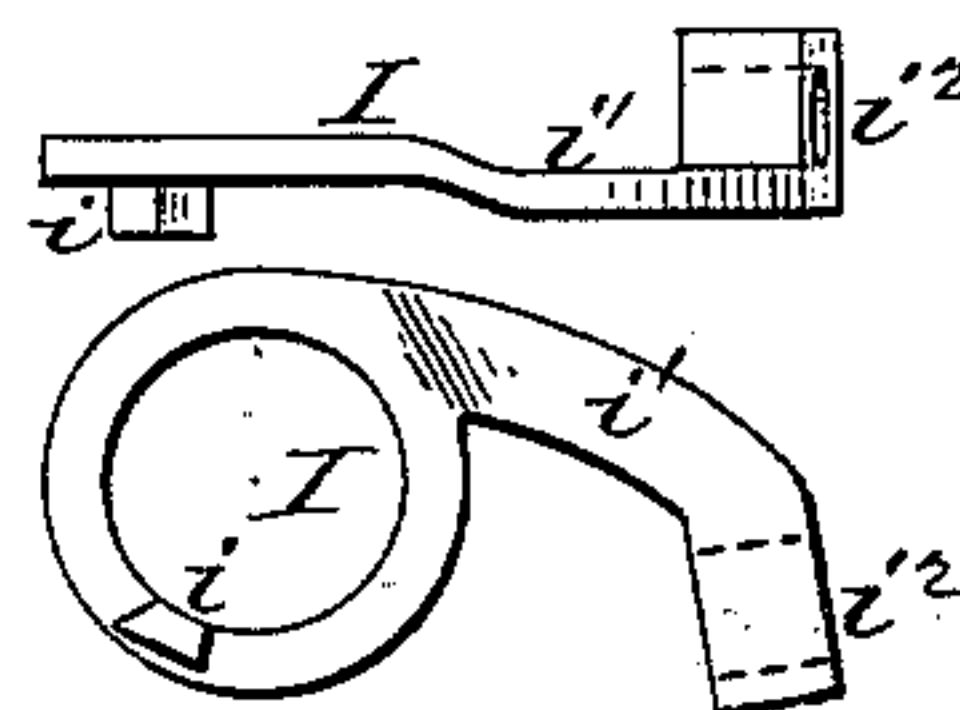


Figure 10.



Figures 11 & 12.



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UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE MINNEAPOLIS HARVESTER WORKS, OF SAME PLACE.

MECHANISM FOR RAISING AND LOWERING HARVESTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 310,928, dated January 20, 1885.

Application filed November 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. APPLEBY, of Minneapolis, Minnesota, have invented certain Improvements in Mechanism for Raising and Lowering Harvesting-Machines, of which the following is a specification.

My improvements relate to the class of mechanism for raising and lowering harvesters shown and described in Letters Patent of the United States, No. 228,971, issued to me June 22, 1880, in which a windlass-shaft, which constitutes the axle of the drive-wheel, has affixed to its opposite ends, respectively, pinions which mesh into the teeth of segmental racks upon the convex walls of curved slots formed in metallic standards fastened to the timbers of the gear-frame on opposite sides of the drive-wheel.

My invention consists, first, in the employment of a metallic yoke forming a lateral extension of one of the rack-standards and hung over the box which affords the bearing for the counter-shaft by which power is transmitted from the drive-wheel gear, the purpose of this yoke being to prevent any possible springing away of the box, which is bolted to one part of the frame, from the rack-standard, which is bolted to another part of the frame, and to thus preserve the engagement of the drive-wheel gear with the pinion upon the counter-shaft when the machine is raised or lowered.

Secondly, my invention consists in the provision of an automatic stop-pawl for preventing the gear-frame from being elevated by the tendency of the counter-shaft pinion to ride up upon the drive-wheel gear when there is excessive resistance to the working of the machine.

The accompanying drawings of so much of a harvester as is necessary to illustrate my improvements are as follows: Figure 1 is an elevation of the drive-wheel side of the machine with portions broken out to exhibit the interior mechanism. Fig. 2 is a vertical section through the line *xx* on Fig. 4, looking toward the grain-wheel side of the machine, with the interior portion of the chain-wheel broken out, showing the windlass-chain taut and the stop-pawl held out of engagement with the ratchet-

teeth formed in the rack-standard. Fig. 3 is a similar section, showing the windlass-chain slackened and the stop-pawl carried into engagement with one of the ratchet-teeth in the rack-standard. Fig. 4 is a horizontal section through the gear-frame in the line *yy*, Fig. 1. Fig. 5 is an elevation of the grain-wheel side of the iron frame which contains the bearing for the counter-shaft, and also one of the bearings for the sprocket-wheel shaft, to which motion is imparted by means of bevel-gearing from the counter-shaft. Fig. 6 is a rear elevation of the frame shown in Fig. 5. Fig. 7 is an elevation, looking outwardly from the drive-wheel, of the rack-standard provided with a yoke for embracing the box in which the counter-shaft has its bearing. Fig. 8 is an axial section of the windlass-wheel and the pinion cast in one piece therewith through the line *zz* on Fig. 10. Fig. 9 is an elevation of the rack-standard erected upon the side of the gear-frame opposite the grain-wheel side of the drive-wheel, having formed in its concave side ratchet-teeth for engagement by the automatic stop-pawl. Fig. 10 is an elevation of the face of the windlass-wheel toward the grain-wheel. Figs. 11 and 12 are respectively top and side views of the stop-pawl.

In a harvester of the class represented in the drawings the gear-frame surrounds the drive-wheel and has two horizontal timbers, *A A'*, on the outer side of the drive-wheel and one horizontal timber, *A''*, on the inner side of the drive-wheel.

The drive-wheel *B* has affixed to it the cog-wheel *B'*, which engages and drives the pinion *C* on the inner end of the counter-shaft *C'*, to the outer end of which the bevel-gear *C''* is affixed. The latter meshes with the bevel-pinion *D*, affixed to the horizontal shaft *D'*. The shaft *D'* is provided with a clutch, *D''*, by means of which it is connected with and made to partake of the rotary motion of the bevel-pinion *D*, and is also provided with suitable sprocket-wheels and a crank, by means of which power is distributed to the various devices by which the functions of the machine are directly performed. The counter-shaft *C'* has its bearing in the box *e*, cast in one with the bevel-gear

frame E, which is provided with the perforated flanges E^1 E^2 , by means of which it is bolted to the horizontal timbers A and A' of the gear-frame.

5 The boss d , cast upon the inner side of the front member, E^3 , of the frame E, is cylindrically recessed to receive the outer end of the counter-shaft C'. The hollow box d' , also cast in one with the frame E, affords one of the
10 bearings for the horizontal shaft D'.

The shaft b , which constitutes the axle of the drive-wheel, is inserted through the hollow hub B^2 of the drive-wheel. The pinion F, affixed to the outer end of the drive-wheel
15 axle b , is provided with the cylindrical shoulder F' , which is seated in the narrower portion of the curved slot F^2 , formed in the rack-standard f . The convex wall of the slot F^2 is provided with the curved rack f' , the teeth
20 of which mesh with the teeth of the pinion F. The rack-standard f is bolted to the inner side of the timbers A and A' of the gear-frame, and is provided with a V-shaped yoke, composed of the two backwardly-converging
25 arms f^2 and f^3 .

A semicircular recess, f^4 , is formed in the bight of the yoke, which is hung over the projecting inner end of the box e , in which the counter-shaft C' has its bearing. At its inner
30 end the box e is provided with a collar or a fixed radial projection, f^5 , which serves to prevent the dislodgment of the yoke after it has been hung over the part of the box e between the projection f^5 and the upright member E^4 of the bevel-gear frame E.
35

The inner end of the drive-wheel axle b has affixed to it the windlass or chain wheel G and the pinion G', which is affixed to or formed in one with the windlass-wheel. The pinion G' is
40 provided with the cylindrical flange G^2 , which works in the curved slot G^3 , formed in the rack-standard g , which is bolted to the face of the horizontal timber A'. The teeth of the curved rack g' , formed upon the convex
45 wall of the slot G^3 , mesh into the teeth of the pinion G'.

The windlass-chain H is secured to the windlass-wheel G by the transverse pin h , and is led over the guide-roller h' and under the
50 guide-roller h^2 to a hand-lever or other instrumentality which is moved in one direction to take up the chain for the purpose of raising, and in the opposite direction to pay off the chain for the purpose of lowering, the machine. When the hand-lever is so moved as
55 to take up the chain, the latter unwinds from and turns the windlass-wheel G, whereby the pinions G' and F on the opposite ends of the drive-wheel axle b are in like manner turned, and by the engagement of their teeth with the
60 racks f' and g' they elevate the rack-standard, and of course the main frame of the machine, to which the rack-standards are affixed. The paying off of the chain H lowers
65 the main frame, which, by means of the racks and pinions, winds up the chain upon the

windlass-wheel G. In the normal operation of the machine, therefore, the chain H remains taut, and the weight of the gear-frame is carried upon the teeth of the pinions F and G'. If, however, there should be a sudden
70 and excessive resistance to the continued operation of the working parts of the machine, the pinion C on the counter-shaft would tend to ride upward upon the gear-wheel B', and in so riding upward it would carry up the
75 gear-frame. One object of my invention is to prevent the gear-frame from being elevated from this cause, and I accomplish this object by means of the automatic stop-pawl I, the
80 hub of which surrounds the hub of the windlass-wheel G, and is provided upon its outer face with the tooth i . The crank-arm i' of the stop-pawl is provided at its free end with the perforated lug i^2 , through which the chain H is led.
85 When the weight of the machine is carried upon the pinions affixed to the axle of the drive-wheel, the chain H is taut and the crank-arm i' of the stop-pawl is lifted into the position in which it is shown in Fig. 2, but if
90 the pinion C rides upward upon the cog-wheel B' the chain H is at once slackened by the unwinding of the drum G, and the weight of the chain suspended in the perforated lug i^2 rocks the crank-arm downward into the position in
95 which it is shown in Fig. 3. In this position the tooth i is carried into engagement with one of the ratchet-teeth i^3 formed upon the concave wall of the slot G^3 in the rack-standard g . A portion of the hub of the stop-pawl is represented in Fig. 3 as broken out, and there is
100 thus afforded a view of the tooth i and one of the ratchet-teeth with which it has been brought into engagement by the dropping of the arm i' of the pawl.
105

In Fig. 2 the tooth i is represented in dotted lines and as out of engagement with the ratchet-teeth i^3 . By the engagement of the tooth i with one of the ratchet-teeth i^3 the further
110 elevation of the gear-frame is at once arrested, and the pinion C is enabled to overcome the resistance to its rotation.

The perforated lug i^2 answers a double purpose. It not only serves to connect the arm i' with the chain, but it also serves as a weight
115 upon the arm i' , and, if need be, can be made heavy enough to make the arm i' fall by its own gravity whenever the chain is so far slackened down as to permit it to fall. In such cases the chain need not necessarily be suspended
120 upon the crank-arm or in a part of the crank-arm; but, for abundant caution, I deem it better to have the chain led through the perforated lug i^2 at the extremity of the crank-arm, so that the weight of the chain when
125 it is slackened will be added to the weight of crank-arm and will insure the falling of the arm and the consequent engagement of the tooth i with the ratchet-toothed rack i^3 .

It will be seen that when the gear-frame
130 moves up or down it is kept in proper relation to the drive-wheel by the engagement of

the shoulders G^2 and F' , respectively, with the sides of the slots F^2 and G^3 , and also that during its movement up or down from any cause the centers of the drive-wheel and the counter-shaft C are rigidly maintained at the same distance from each other by the yoke affixed to or forming a part of the rack-standard f .

I claim as my invention—

10 1. In mechanism for raising and lowering harvesters of the type in which a pinion rigidly mounted upon the axle of the drive-wheel engages a rack secured to the main frame, the rack-standard secured to the main frame, and a metallic yoke cast or otherwise formed in
15 one piece therewith, in combination with a bearing for the counter-shaft, also secured to the main frame and embraced by the bight of the said yoke, substantially as and for the purpose set forth.

20 2. The rack-standard f , armed with a metallic yoke having the recess f^4 in its bight, in combination with the box e , provided with the projection f^5 , as and for the purpose set forth.

25 3. The bevel-gear frame E , provided with the box e for the counter-shaft C' upon one side of the bevel-gear C^2 , and with the box d for the counter-shaft C' upon the other side of the

bevel-gear C^2 , and with the transverse box d' for the shaft D' , and with suitable flanges adapting it to be fastened upon the main frame 30 of the harvester.

4. The rack-standard g , secured to the main frame and provided with the rack i^3 , in combination with the weighted stop-pawl I , loosely mounted upon the main axle, and means for 35 automatically releasing the said pawl when the frame is raised by the riding upward of the pinion C upon the drive-wheel gear B' , whereby the tooth i of the pawl by the action of gravity is swung into engagement with the rack i^3 , and 40 the further ascent of the frame is prevented, as set forth.

5. The rack i^3 , affixed to the frame of the machine, and the stop-pawl I , provided with a suitable tooth for engaging the teeth of said 45 rack, in combination with the windlass-chain H , and the windlass G , affixed to the axle of the drive-wheel, as and for the purposes set forth.

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Witnesses:

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