(No Model.) 5 Sheets—Sheet 1.

J. A. McMASTER.

HARVESTER BINDER.

No. 536,788. Patented Apr. 2, 1895.

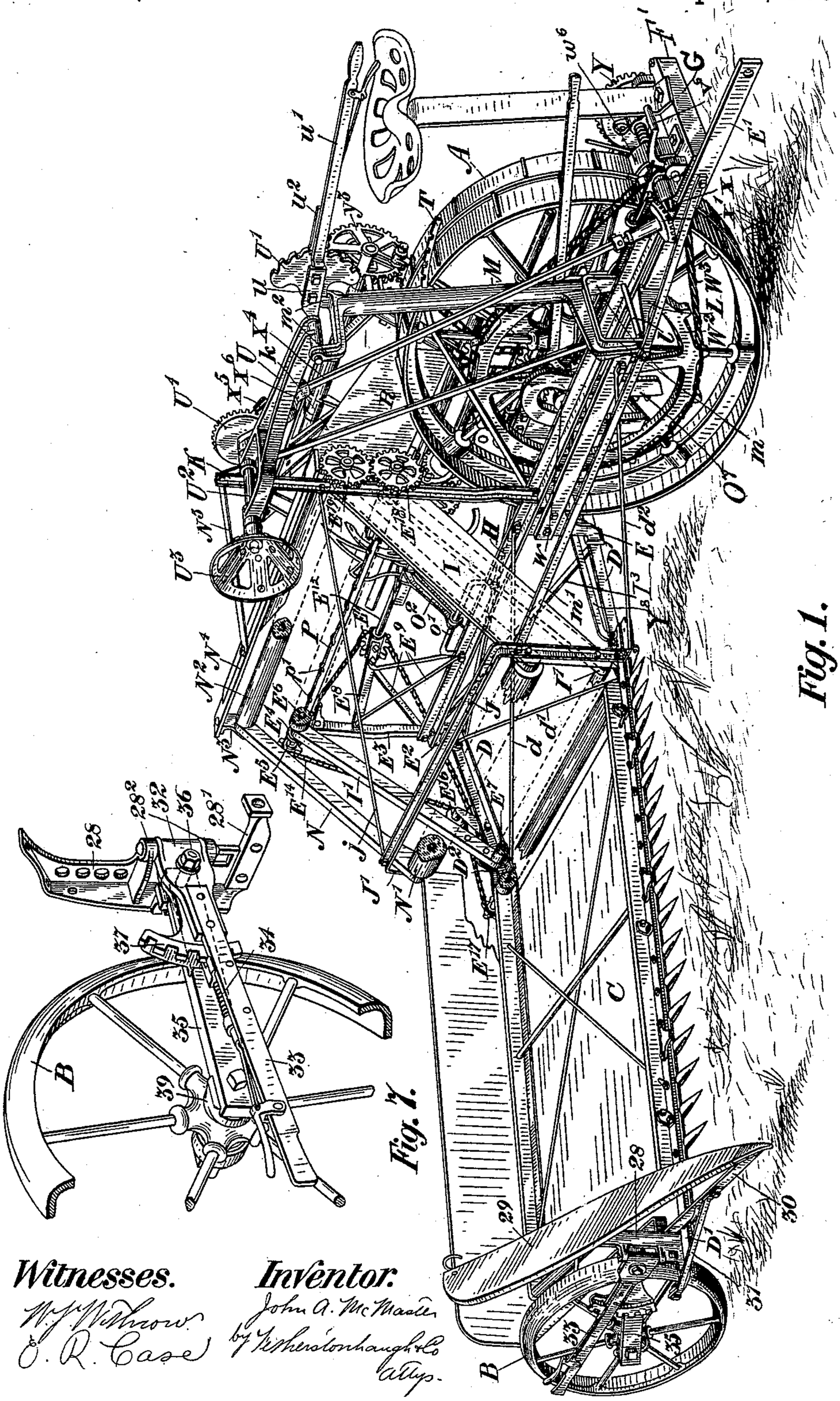

Fig. 1.

Witnesses.
W. J. Withrow
O. R. Case

Inventor.
John A. McMaster
by Pierson Vaughan & Co
Attys.

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J. A. McMASTER.

HARVESTER BINDER.

No. 536,788. Patented Apr. 2, 1895.

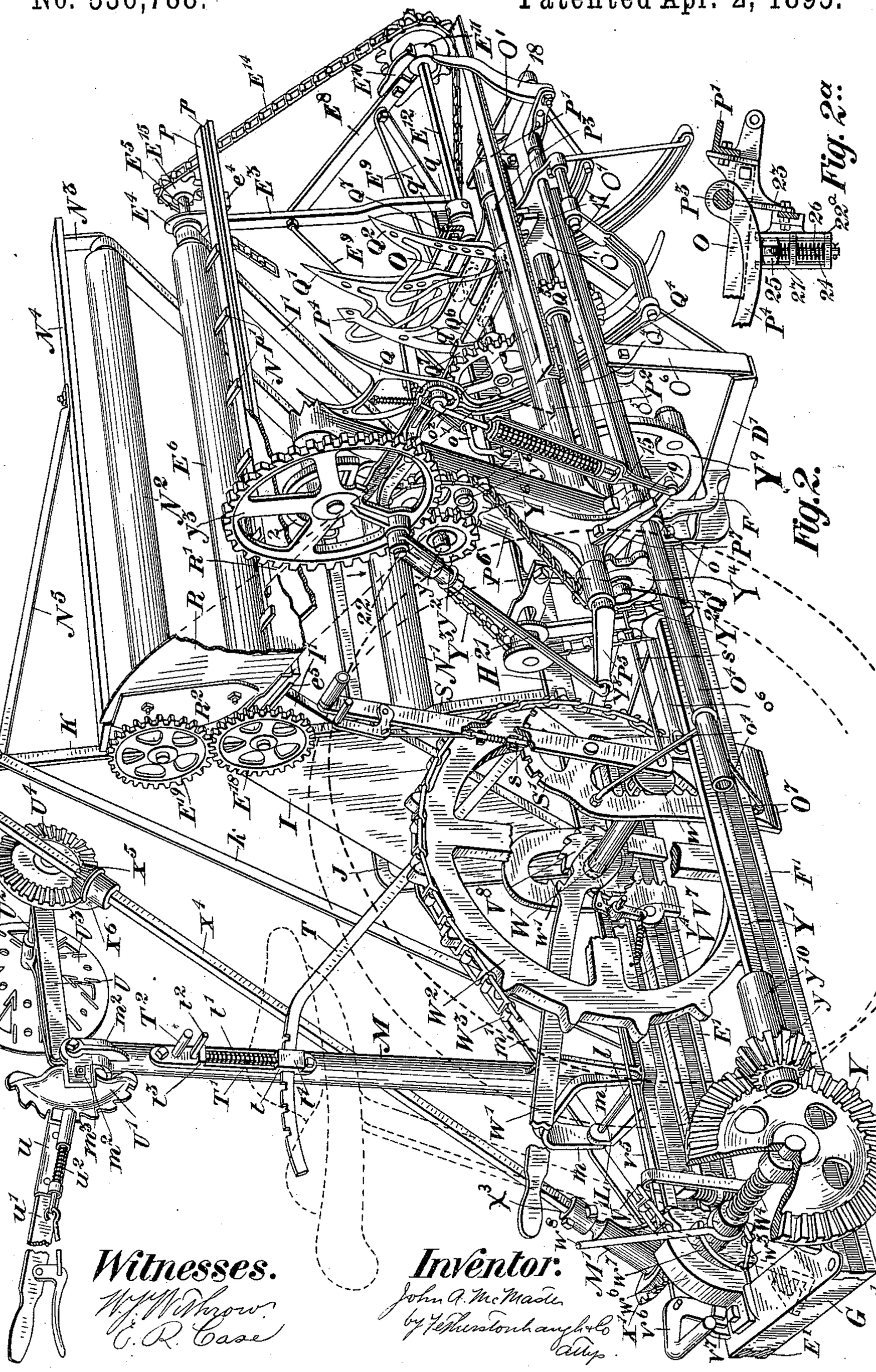

Fig. 2.

Fig. 2a.

Witnesses.
W. J. Whitrow.
E. R. Case

Inventor:
John A. McMaster
by J. E. Thurston Langhorne
Attys.

(No Model.) 5 Sheets—Sheet 3.

J. A. McMASTER.

HARVESTER BINDER.

No. 536,788. Patented Apr. 2, 1895.

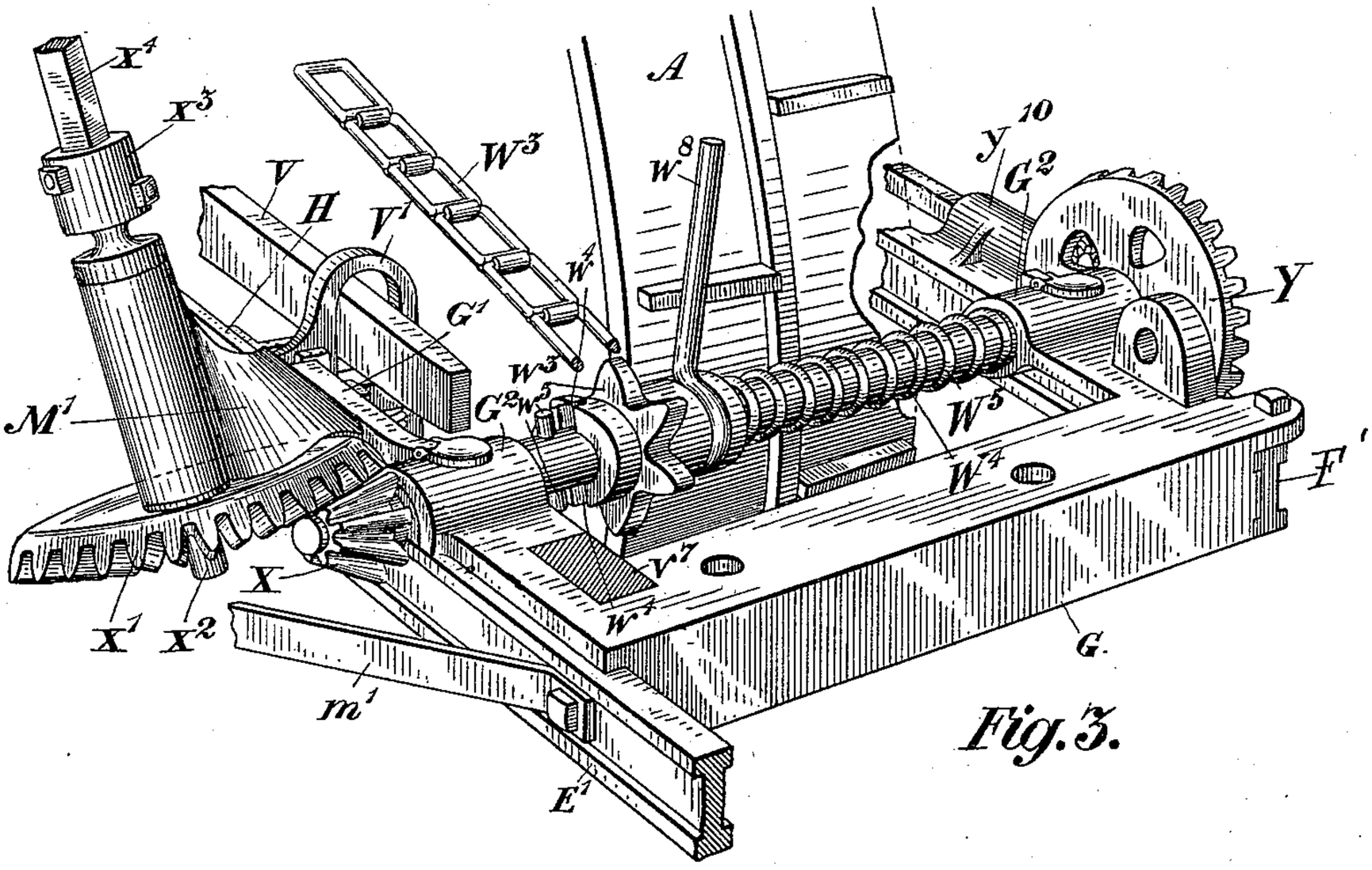

Fig. 3.

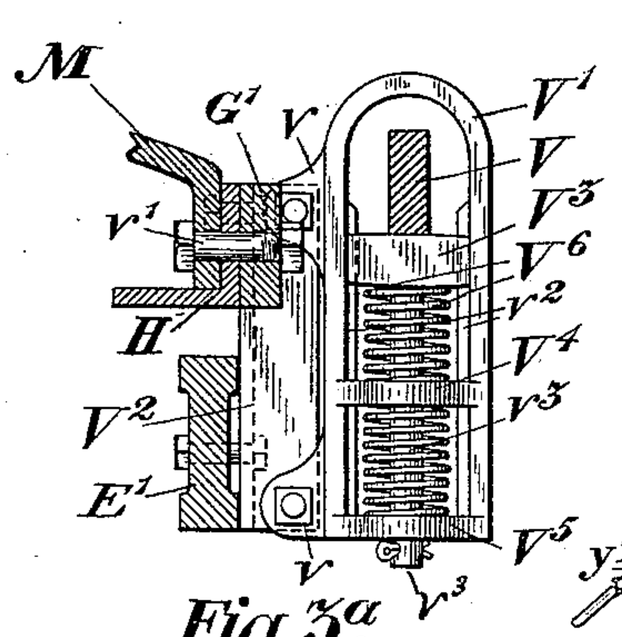

Fig. 3a.

Fig. 5. Fig. 5a.

Witnesses.
W. J. Wilkinson
E. R. Case

Inventor.
John A. McMaster
by Fetherstonhaugh & Co
Attys.

(No Model.) 5 Sheets—Sheet 4.

J. A. McMASTER.

HARVESTER BINDER.

No. 536,788. Patented Apr. 2, 1895.

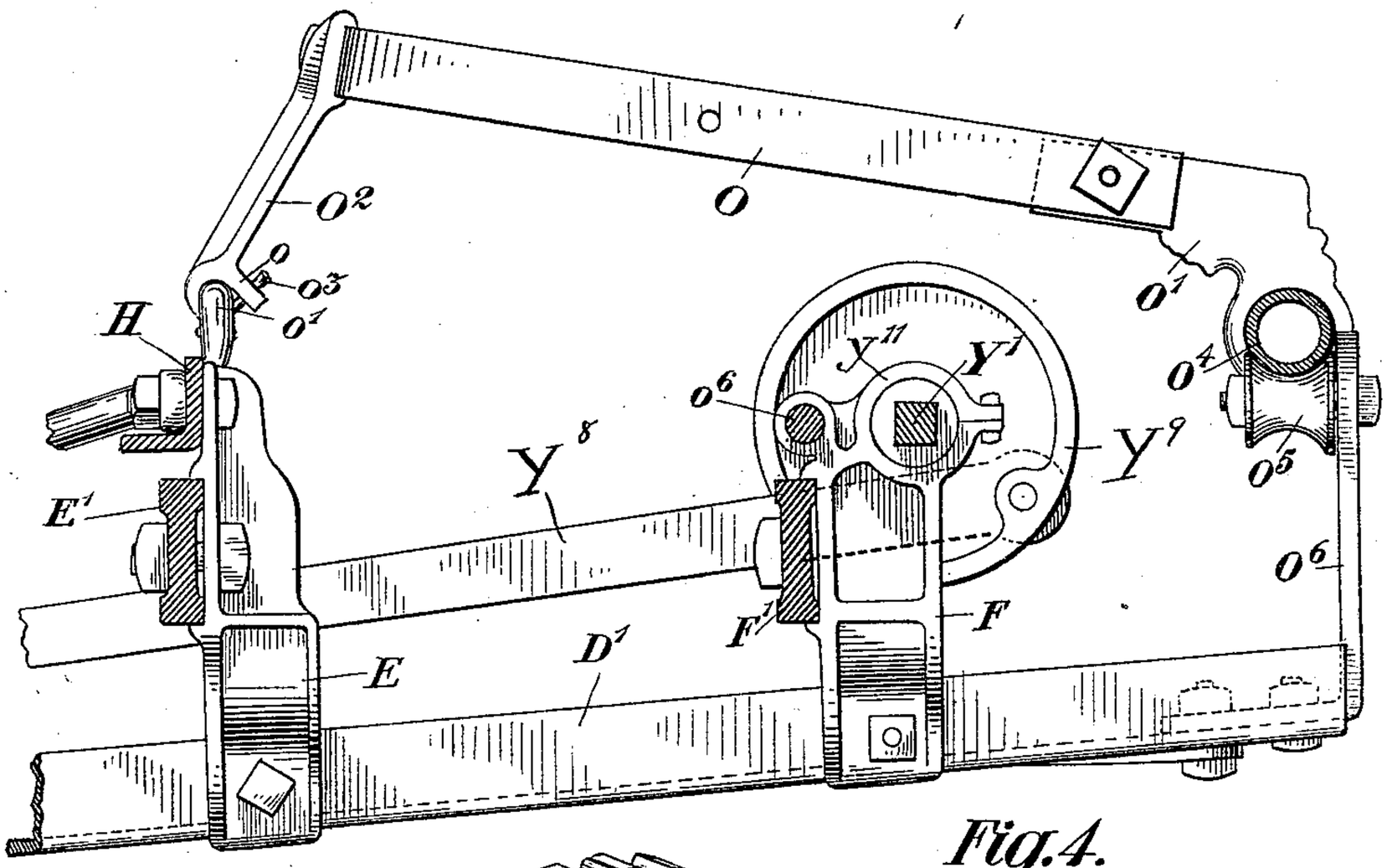

Fig. 4.

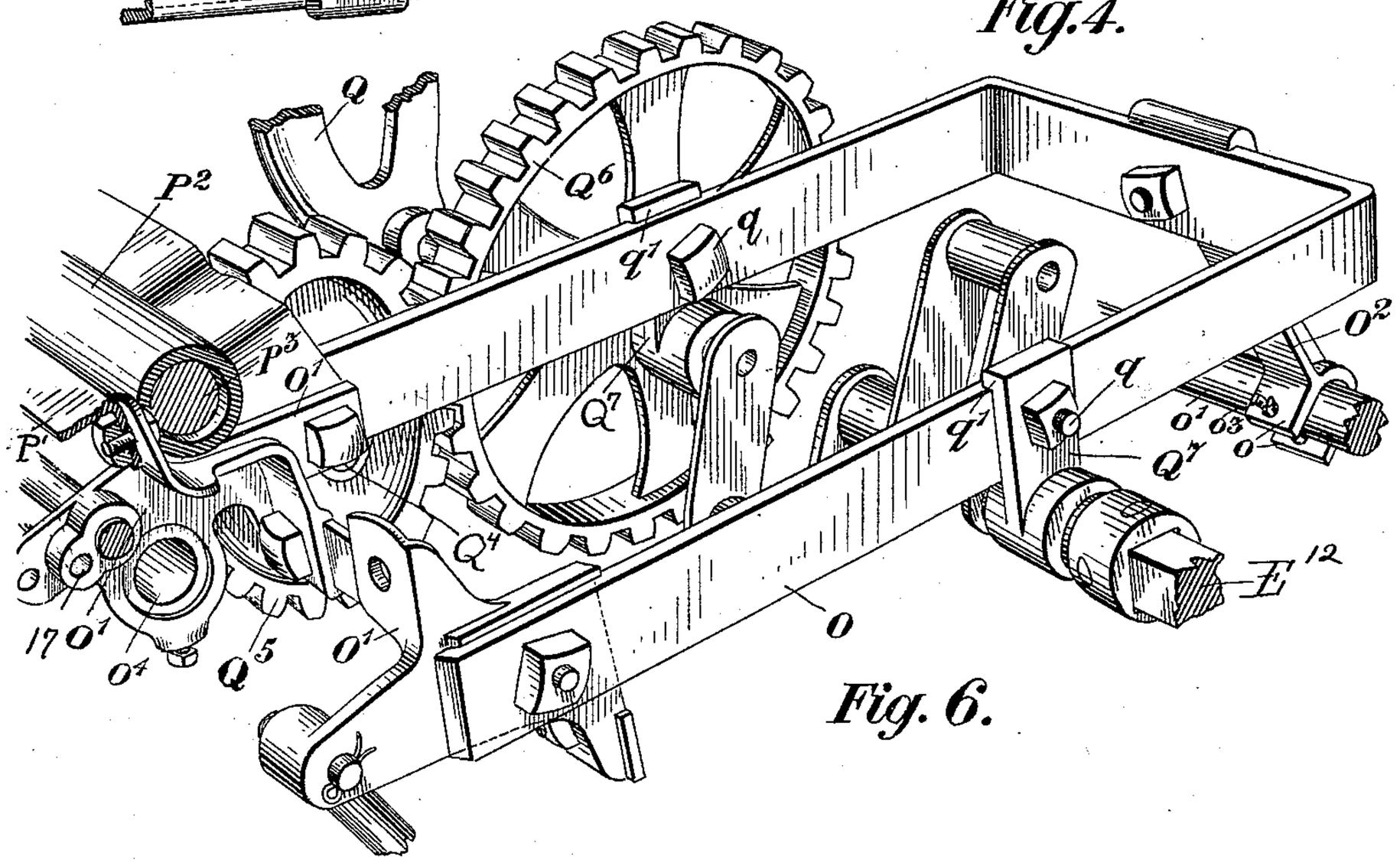

Fig. 6.

Witnesses.
W. J. Withrow.
E. R. Case

Inventor.
John A. McMaster
by Fetherstonhaugh & Co
Atty

(No Model.) 5 Sheets—Sheet 5.

J. A. McMASTER.

HARVESTER BINDER.

No. 536,788. Patented Apr. 2, 1895.

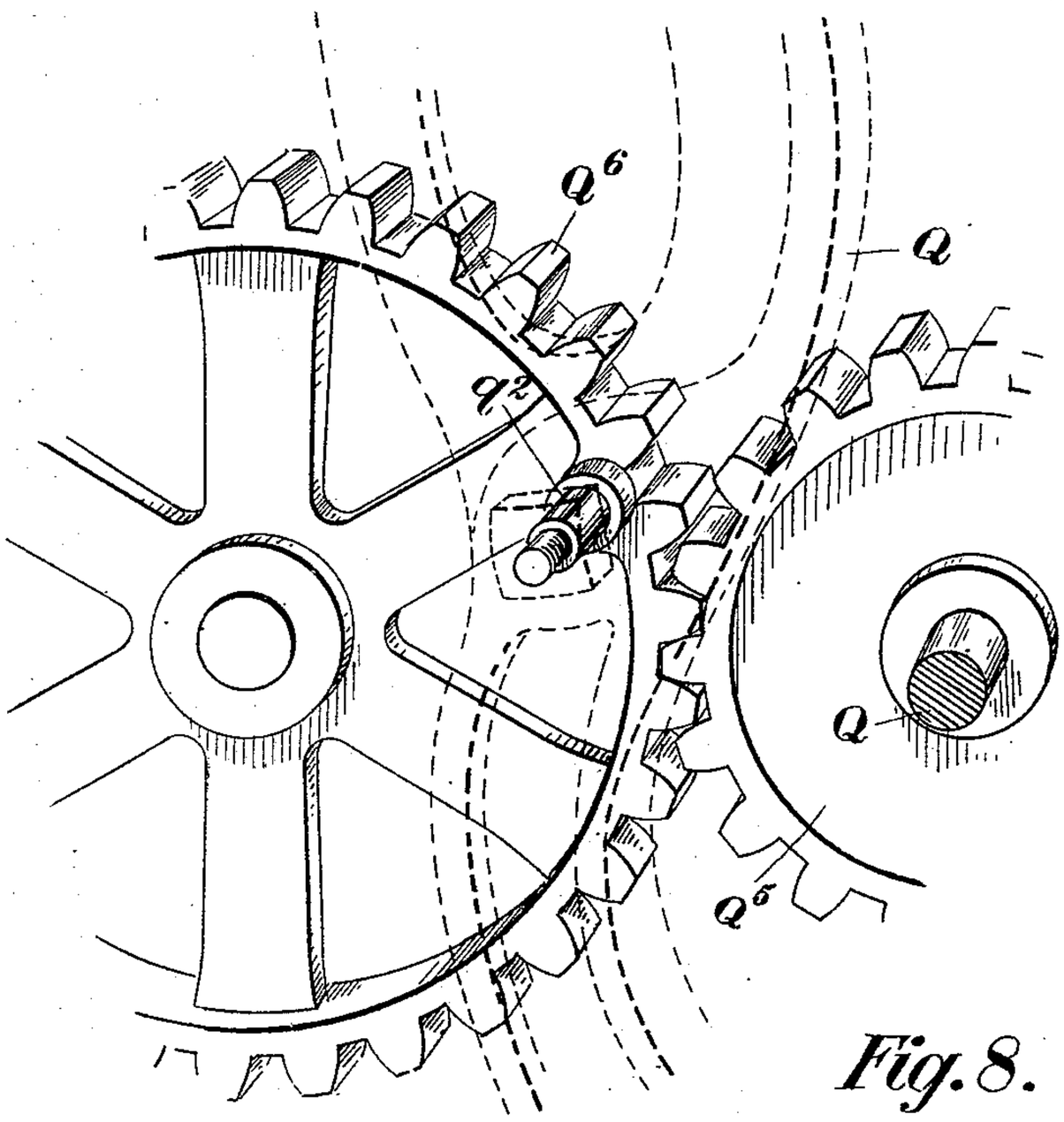

Fig. 8.

Witnesses

W. J. Withrow

H. C. Young

Inventor:

J. A. McMaster

by Fetherstonhaugh & Co

Attys.

UNITED STATES PATENT OFFICE.

JOHN ALLAN McMASTER, OF ORANGEVILLE, CANADA.

HARVESTER-BINDER.

SPECIFICATION forming part of Letters Patent No. 536,788, dated April 2, 1895.

Application filed December 28, 1893. Serial No. 494,967. (No model.)

To all whom it may concern:

Be it known that I, JOHN ALLAN McMASTER, manufacturer, of the town of Orangeville, in the county of Dufferin, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Harvester-Binders, of which the following is a specification.

My invention relates to improvements in rear-cut binders and the object of the invention is to provide a simple, strong and durable machine containing the improved features hereinafter described.

The invention is illustrated in the accompanying drawings, in which—

Figure 1, is a perspective view of my machine, the canvas being removed and parts of the elevating rollers being broken away to exhibit more clearly the construction of the frame. Fig. 2, is a perspective view from the binding table side of the machine, the binding table being mostly broken away so as to exhibit the mechanism beneath it. Fig. 2^a, is a detail of the compressor spring by which the needle is given an impetus in its upward movement so as to throw the connecting rod from the needle shaft to the knotter gear wheel over the center. Fig. 3, is a perspective detail of the frame forward of the driving wheel. Fig. 3^a, is a vertical cross section through the frame behind the counter shaft, on the side of the machine in which the relief spring is designed to receive the weight of the lever arm. Fig. 4, is a sectional elevation showing the means of attaching the frame surrounding the wheel to the main portion of the frame. Fig. 5, is an end elevation partially in section showing the drive for the knotter and trip mechanism. Fig. 5^a, is a detail of the means for shifting the sprocket wheel for driving the binding mechanism. Fig. 6, is a perspective detail of the frame upon which the packers are journaled. Fig. 7, is an enlarged detail of the mechanism for adjusting the grain table upon the grain wheel. Fig. 8, is a detail of the packer crank and gear wheel.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

A, is the main driving wheel; B, the grain wheel; C, the grain table, and D, D′, the angle bars upon which are supported the elevating frame and binding table. The continuation of the angle bars, D, D′, extends underneath the front and rear of the grain table.

E, and, F, are brackets secured at the lower end of the angle bars, D′.

E′, and, F′, are the side bars of the wheel frame. The rear ends of the side bars, E′, and, F′, are securely bolted to the brackets E, and, F, as indicated in Figs. 1, 2, and 4. The forward end of the side bars, E′, and, F′, are secured to the casting, G, preferably formed of cast iron and located in front of the drive wheel.

H, is an angle bar which is securely bolted at the front end to the rearward extension, G′, of the casting, G, intermediately to the top of the bracket, E, and at the rear end on the top of the bracket, E^2, secured to the angle bar, D.

E^3, is an upright secured to the angle bar, H, and bracket, E^2, and supporting at its upper end the journal plate, E^4.

I, is the end board which is secured at its lower end to the front end of the L-shaped angle bar, J, which is secured at the bottom to the angle bar, D′. The upper end of the board, I, is secured to the upright bar, K, bolted at the bottom to the angle bar, H, and braced by the rod, *k*, which is connected at the top to the angle bar, K, and at the bottom to the angle bar H.

d^2, is a brace extending from the shoe of the cutter bar to the side bar, E′.

L, is a bracket which is secured to the side bar and *l*, is a spindle which passes through the end of the bracket and the angle bar, H. To the outside of the bracket and inside of the angle bar, H, are journaled upon the spindle, *l*, the legs, *m*, of the reel standard, M.

m′, is a brace which is secured to the front of the L-shaped angle bar, J, on the end of the spindle, *l*, and to the side bar, E′.

I′, are the side bars, the forward one of which is secured to the end board, I, and the rear one at the bottom to the bracket, D^2, attached to the angle bar, D, and at the top to the spindle, E^5, of the upper roller, E^6, around which passes the endless conveyer canvas.

E^7, is the lower roller journaled in the bottom of the side bars, I′.

I^3, is a brace extending from angle bar, D′, to rear end of angle bar, H.

N, is the rear side bar of the elevating

frame. The lower end of the side bar, N, is secured to the downwardly extending end, J′, of the L-shaped angle bar, J. The upper end of the side bar, N, is supported on the bracket, N^3, secured on the end of the cross bar, N^4, which is braced to the bar, K, by the rod, N^5.

The rollers, N′, N^2, carrying the upper conveying canvas are journaled at the rear end in the bar, N, and at the forward end to a bar attached to the end board, I. The rear end of the L shaped angle bar, J, is also braced to the upright, K, by the rod, *j*.

E^8, is a bar extending obliquely downwardly and laterally from the upright, K. The bar, E^8, is braced to the angle bar, H, by the rods, E^9. (See Figs. 1 and 2.)

E^{10}, is a bearing box, which is secured on the end of the bar, E^8, in which is journaled the hub of the sprocket wheel, E^{11}, secured to the packer shaft, E^{12}.

O, is the packer frame which is rectangular and attached at its outer end to the sleeve, P^2, and to the supporting brackets, O′, and at its inner end with an arm, O^2, which has jaws, *o*, which straddle the guide rod, *o′*, secured to the angle bar, H, at a suitable distance above it. The jaws, *o*, of the bar O^2, are closed by a pin o^3.

O^4, is a pipe which is partially supported on the grooved roller O^5, journaled in the upper end of the bracket, O^6, which is secured at the outer end to the longitudinal angle bar, D′.

o^4, is a brace which encircles and supports the pipe, O^4, and has its ends secured in the rack, O^7, which is attached to the side bar, F′.

P, is the top bar of the binding table which has a groove, *p*, cut along its lower edge and a series of fingers, *p′*, secured to it and extending obliquely from its upper edge into proximity with the roller, E^6. These fingers are designed to prevent the grain falling out between the roller and the binding table. The top bar, P, is supported upon the bar, e^4, forming part of the journal plate, E^4, and upon the bar, e^5, secured to the end board, I, or in any other suitable manner.

P′, is the bottom bar of the binding table, which forms part of the sleeve P^2, of the needle shaft and is suitably supported upon the bracket, O′, secured to the outer end of the packer frame. The boards of the binding table are supported upon the groove, *p*, of the cross bar, P, and at the bottom upon the bar, P′, the binder table being adjustable in the manner hereinafter described.

R, is the angular butt board, the base of which extends over the binding table, R′, (a portion only of which is shown.) A portion also of the angular butt frame is only shown, the remaining portion being indicated by dotted lines. The portion of the binding table shown indicates the middle position of such table in relation to the butt board. The butt board is secured at the top to the plate, R^2, which is attached to the end board, I.

The needle shaft, P^3, has a needle, P^4, secured at its rear end and a crank, P^5, formed at its outer end. The needle shaft, P^3, is journaled to the hollow standard P^6, upon which the knotter mechanism is supported and secured.

Q, Q′, Q^2, are the packers which are supported on suitable cranks and operated in the usual manner.

Q^4, is a driving shaft for the packers, which extends through the bracket, P^7, under the standard, P^6, and has secured near its rear end the gear wheel, Q^5, which meshes with the gear wheel, Q^6, secured on the forward end of the packer shaft and to which is secured one of the packer cranks.

In order to provide a simple means for disconnecting the packer shaft and cranks from the packer frame, O, so that the packers may if broken be readily removed and replaced by new ones if necessary I support the packer shaft upon the hanger journals, Q^7, which are secured to the packer frame by the bolts and nuts, *q*, and held in position by the lips, *q′*, extending over the top of the bars of the frame.

The standard, P^6, supporting the knotted mechanism is securely bolted to a bracket, P^7, through which extends the pipe O^4, which forms one of its supports. The rod, o^6, forms the other support for the bracket, P^7, a jaw, p^7, of which extends over the rod, o^6, and is held to it by the split pin, p^8. The rod, o^6, has one end securely bolted to the elevating rack O^7 and to the frame and the other end secured in the bracket, F. It will now be seen that the standard, P^6, and knotter mechanism connected thereto are supported by the bracket, p^7, upon the pipe, O^4, and rod, o^6, and the lower side of the binding table is supported upon the bar, P′, and the packer frame is supported at one end upon the pipe, O^4, by the bracket, O′, and at the other end upon the rods *o′*, by the arm, O^2. All these parts are capable of longitudinal adjustment upon the pipe, O^4, rod, o^6, and rod, *o′*, and upon the groove, *p*, made in the bar, P. All of these parts are shown to the rear of their normal position about half way of their adjustment rearwardly as will be seen from the position of the front end of the binding table underneath the base of the angle butt board, R.

In order to adjust the knotter frame, packer frame and binding table from front to rear upon the pipe, O^4, rods, o^6, *o′*, and bar, P, I provide the following mechanism: S, is a lever provided with a spring pressed plunger, *s*, operated from the handle and, S′, is a quadrant formed in the top of the elevating rack, O^7. The lever, S, is pivoted upon the rack, O^7, and has a rod, *s′*, connected to its lower end. The other end of the rod has a loop s^2, which fits over a lug, p^9, forming part of the bracket, P^7. By swinging this lever to the front or rear the frames above mentioned are moved to the rear or front respectively.

I shall now describe the mechanism for ad-

justing the reel standard and the mechanism for raising and lowering the reel.

The reel standard, M, as hereinbefore described is journaled by means of its legs, *m*, upon the spindle, *l*, having bearings in the end of the bracket, L, and in the angle bar, H.

T, is a rod having its lower end pivoted on the angle bar, H, and its upper end quadrant-shaped, provided with notches and extending through a notch, *t*, made in the bar, T′, secured to the standard, M.

t′, is a spring pressed plunger provided with a handle, t^2, which extends through the lug, t^3. The bottom of the spring pressed plunger extends through the lug, t^4, into one of the notches in the quadrant-shaped end of the lever, T.

T^2, is a pin extending outwardly from the bar, T′. By grasping the pin, T^2, and handle, t^2, and bringing such handle upwardly the spring pressed plunger, *t′*, may be removed from a notch of the quadrant of the rod, T, and the standard adjusted to the front or the rear to the position desired for the grain it is intended to cut.

m^2, are upwardly extending arms in which are journaled one end of the frame, U. The frame, U, has a forward extension *u*, in which is secured the lever, *u′*. The lever, *u′*, is provided with an adjustable spring pressed plunger, u^2.

U′, is a ratchet toothed quadrant secured to the outwardly extending lug m^3, forming part of one of the arms, m^2.

U^2, is a shaft journaled in the rear end of the frame, U, and having secured at one end the spider, U^3, to which the arms of the reel are secured and at the other end the bevel gear wheel, U^4. It will now be seen that upon adjusting the position of the lever, *u′*, upon the quadrant, U′, the position of the spider, U^3, and consequently the height of the reel above the ground will be determined.

In order to provide for relieving the frame of the machine from the jar of the main driving wheel as it passes over rough ground I provide the following mechanism:

V, is an arm one end of which is loosely journaled on the main axle, W, of the machine. The other end extends through a loop, V′, which is securely bolted through the lugs, *v*, to the angle bar, V^2, which itself is bolted at the bottom to the bar, E′, and at the top to the rearward extension, G′, angle bar, H, and journal bracket, M′, of the reel driving shaft, hereinafter described by a bolt *v′*. The free end of the arm, V, rests upon the block, V^3, which is grooved at each side and is adjustable in guide ways, v^2, forming part of the loop, V′.

v^3, is a plunger rod forming part of the block, V^3, and extending down through the cross bars, V^4, and, V^5.

V^6, is a spiral spring encircling the rod, v^3, and extending between the block, V^3, and cross bar, V^5, and passing through an opening in the cross bar, V^4.

V^7, is a spring dog pivoted in the arm, V, and engaging with the ratchet wheel, V^8, secured on the main axle, W. The tail of the dog, V^7, is connected by a spiral spring, v^4, to the arm V, and the upper end of the arm, V, is connected by the rod, v^5, to the foot crank, v^6, pivoted on the lug, v^7.

w, are pinions secured on the end of the main axle, W, and engaging with the teeth of the racks, O^7.

W′, is a hand lever the inner end of which is slotted and supported from the main axle, W. The lever, W′, has a tooth *w′*, which is designed to be brought into engagement with the ratchet wheel, V^8, so as to raise or lower the frame of the machine upon the main driving wheel.

It will be seen from what has been before described that the jar on the frame of the machine as the wheel passes over rough ground will be relieved by the dog, V^7, engaging with the ratchet wheel, V^8, and pivoted on the arm, V, which rests upon the block, V^3, supported on the spiral spring, v^3.

I shall next describe the manner in which several working parts of my machine are operated through one continuous drive.

W^2, is the main sprocket driving wheel, which is secured to or forms part of the hub of the main driving wheel and is connected by a sprocket chain, W^3, to the sprocket pinion, w^3, on the counter shaft, W^4, which is journaled in bearings, G^2, forming part of the front casting, G. The sprocket pinion, w^3, is caused to rotate loosely on the shaft, W^4, except when it is desired to set in motion all the operating mechanism the means for doing which I shall now describe. The hub of the sprocket wheel, w^3, has radial grooves, w^4, cut in one side of the hub. These grooves are designed to be brought so as to engage the pins, w^5, by the spiral spring, W^5, encircling the counter shaft, W^4, and extending between the hub of the sprocket wheel and the bearing, G^2.

In order to form a cover for the sprocket wheel and at the same time provide a means for throwing out the sprocket wheel from engagement with the pins, w^5, on the shaft, W^4, I provide the cover bracket, w^6, which has a laterally inclined side edge, w^7. w^8, is a rod provided with a ring end, which fits loosely into a groove in the elongated portion of the hub of the sprocket wheel. By moving this arm, w^8, up or down the inclined edge, w^7, the sprocket wheel is thrown out of or into engagement with the pins on the shaft, W^4, so as to throw out or in most of the driving mechanism hereinafter described. At the one end of the counter shaft, W^4, I provide a bevel pinion, X, which meshes with the bevel wheel, X′, secured on the end of the spindle, X^2, journaled in the bracket, M′. The spindle, X^2, is connected by a universal coupling, X^3, to a square shaft, X^4, (see Figs. 2 and 3) which extends upwardly from the bevel pinion, X^5, which is journaled in the

end of the bracket, X^6, loosely journaled on the end of the spider shaft, U^2. The bevel gear pinion, X^5, meshes with the bevel gear wheel, U^4, secured on the end of the spider shaft, U^2. The square shaft, X^4, is capable of longitudinal adjustment within the bevel gear pinion, X^5, and consequently no matter into what position the reel may be raised or lowered the easy drive of such reel from the counter shaft is insured.

Y, is a bevel gear pinion secured at the opposite end of the counter shaft, W^4, to that at which the bevel pinion, X, is situated. The gear wheel, Y, meshes with the gear pinion, y, secured on the shaft, Y', which is journaled at the front end in the bearing box, y^{10}, attached to the side bar, F', and at the rear end in the sleeve journal, y^{11}, having its bearing at the top of the bracket, F, and extends through the fork, p^{11}, forming part of the bracket, P^7. The shaft y' carries a disk Y^9 which is connected by a pitman Y^8 with the cutter bar for reciprocating the latter.

Immediately in front of the bracket, P^7, is situated the sprocket wheel, Y^2, which communicates motion to the sprocket chain, Y^3, to the sprocket wheel, Y^4, on the end of the packer driving shaft, Q^4, and to the sprocket wheel, Y^6, secured on the stud, y', extending outwardly from the standard, P^6. The fork, p^{11}, extends into an annular groove, y^{12}, in the hub of the sprocket wheel, Y^2, (see Fig. 5^a) and consequently upon the forward or rearward movement of the binding table frame the sprocket wheel, Y^2, is carried with it. The stud, y', has also loosely journaled on it outside the sprocket wheel, Y^6, the gear wheel, Y^2, which meshes with the gear wheel, y^3.

y^4, is the ordinary trip dog, which is pivoted at, y^5, upon the gear wheel, Y^2. This gear wheel is shown in dotted lines in Fig. 5.

y^6, are the ordinary friction rollers journaled on studs extending outwardly from the sprocket wheel, Y^6, and designed to engage with the trip so as to rotate the gear wheel, Y^2, as soon as the inwardly extending lug, y^7, indicated by the portion of the trip above the dotted lines in Fig. 5, is released from the lever, Y^7, and thrown by the spring, y^8, so that the shoulder, y^9, is within the path of the friction rollers. The operation of the trip lever, Y^7, and its connections I shall describe hereinafter.

The packer driving shaft, Q^4, driven as hereinbefore described conveys motion by means of the gear wheel, Q^5, to the gear wheel, Q^6, on the end of the packer shaft, E^{12}, so as to drive the packers. Situated at the rear end of the square packer shaft, E^{12}, is a sprocket wheel, E^{11}, which communicates motion by means of the sprocket chain, E^{14}, to the sprocket wheel, E^{15}, on the end of the roller, E^6. (See Fig. 2.) The sprocket chain is an endless one and passes beneath the guiding roller, E^{16}, to the sprocket wheel, E^{17}, by which the roller operating the table canvas is driven. (See Fig. 1.) The roller, E^6, by which the lower elevating canvas is driven has secured to its spindle at the front end a gear wheel, E^{18}, which meshes with the gear wheel, E^{19}, secured to the front end of the spindle of the roller, N^2, so as to drive the upper elevating canvas.

I shall now describe the manner in which the relation of the trip lever to the trip dog is regulated, so as to provide for their ready disengagement no matter what condition the grain being bound may be in.

The knotter driving gear wheel, y^3, is provided with the usual cam, 2, and arc-shaped guiding rib, 3.

4, is a lever pivoted at, 5, and provided at its inner end with a roller, 6 which is designed to be operated upon by the cam, 2, so as to tilt the lever, 4, on its pivot. The outer end of the lever, 4, is enlarged and provided with a slot, 7. The lever, Y^7, is pivoted at, 8, on the lever, 4, and is provided at one end with a lateral projection, 9, which normally rests against the projection, y^7, of the trip dog y^4. The opposite end of the lever, Y^7, has a boss, 10, formed on it which extends through the slot, 7, made in the end of the lever, 4.

11, is a lateral projection formed on the outer end of the lever, 4, and extending over the outer end of the lever Y^7.

12, is a rod hooked near the end of the lever, Y^7, and extending through a hole in the lateral projection, 11.

13, is a spiral spring surrounding the rod, 12, and, 14, is a nut, which is adjustable upon the threaded end of the rod, 12, so as to adjust the compression of the spring, 13.

14', is a set screw also extending through the lateral projection, 11, on to the top of the boss, 10. This set screw, 14, is designed to adjust the position of the levers, 4, and, Y, in relation to each other and thereby regulate the position of the lateral projection 9, on the inner end of the lever, Y^7, in relation to the lateral projection, y^7, on the outer end of the trip dog, y^4.

15, is the ordinary spring compression link connecting the end of the lever, Y^7, to the arm, 16, on the end of the rod, 17, on the opposite end of which is secured the compressor trip arm, 18. 19, is a flat compressor spring, which is secured to a lug, 20, forming part of the standard, P^6. The outer end of the spring presses upon the arm, 16, and the spring, 19, is of sufficient strength, so as to overcome the spring, 13, on the rod, 12, which extends upwardly from the lever, Y^7, as hereinbefore described.

As the operation of the trip lever, Y^7, in reference to the trip dog, y^4, is generally understood in reference to the driving mechanism of the binding table of a harvester it is not necessary to describe it. It is sufficient to say, however, that as soon as the roller, 6, on the lever, 4, has reached that portion of the cam, 2, farthest away from the center of the knotter shaft the outer end of the lever, Y^7, is raised so as to bring up with it by means

of the connecting rod, 15, the arms, 16, and consequently the compressor trip arm, 18, so as to compress the sheaf at this side. The needle is also brought up by means of the connecting rod, 21, connected at one end to the arm, P^5, on the end of the needle shaft and to the pin, 22, on the knotter gear wheel, as such gear wheel rotates in the direction indicated by arrow, so as to compress the sheaf from the other side. In regulating the tightness of compression upon the grain in forming the sheaf it will be understood the necessary pressure exerted upon the compressor arm, 18, is provided for by tightening or loosening the nut, 14, upon the rod, 12, on which the spring, 13, is located.

In order to insure the lateral projection, y^7, of the trip dog, y^4, passing the end of the trip lever, Y^7, during the first and second revolutions of the gear wheel, Y^2, that is during the major period that the sheaf is being compressed I provide as hereinbefore described the spring, 19, the outer end of which rests upon the arm, 16, to which the link, 15, is connected. As the roller, 6, on the end of the lever, 4, is compresed outwardly by the eccentric cam, 2, in its revolution it will be seen that on account of the outer end of the lever, 4, being slotted that the outer end of the lever, Y^7, will be permitted to be drawn down by the pressure of the spring, 19, and held out of the path of the projection, y^7, of the trip dog, y^4, as it rotates. In addition to this function the spring, 19, insures the lever being thrown out of the path of the dog, should the binding mechanism be set in motion before sufficient grain had accumulated to exert enough pressure upon arm 18 to lift the trip lever Y^7. This may occur in the event of the operator disengaging the trip before there is any grain in, or in the event of a tangled sheaf holding on to the trip arm so as to prevent it getting to its proper position.

In order to readily carry the needle connecting rod, 21, past the center line between the center of the knotter shaft and the eye of the crank of the needle shaft as such connecting rod is being carried around in the direction indicated by arrow and thereby relieve the trip dog from contact with the friction rollers, and bring the tail, y^9, against the hub I provide the following device: 22^a, are guide bars secured to the bracket 23, which is bolted to the packer frame, O. 24, is a plunger rod having secured to or forming part of it at the top a block, 25, which is within guide bars, 22^a. 26, is a spiral spring surrounding such plunger rod, 24, and designed to exert an upward pressure upon the block. 27, is a lug, which extends laterally from the block, 25, underneath the needle. It will thus be seen that immediately upon the upper end of the connecting rod coming on the line of centers that the pressure of such spring, 26, will by means of the lug, 27, give a pressure upon the under side of the needle and thereby hold the upper end of the connecting rod firm so as to prevent it coming back immediately after it has passed the line of centers hereinbefore described.

I shall next describe the means by which the outer end of the grain table is lowered or raised upon the grain wheel referring particularly to Figs. 1 and 7.

28, is a standard which is secured at the bottom to the end of the angle bar, D′, and has secured to the top of it the divider board, 29.

30, is a bar extending from the bottom of the standard, 28, to underneath the front end of the divider board, which it is secured to and supports.

31, is a brace extending from the bar, 30, to the outwardly extending portion, 28′, of the standard, 28.

32, is the enlarged end of the lever, 33. The enlarged end, 32, is pivoted vertically in the bosses, 28^2, forming part of the standard, 28′.

34, is a spring pressed plunger secured to the lever, 33, and operated in the usual way.

35, is a bar which is pivoted on the bolt, 36, which extends through the enlarged end, 32, of the lever, 33.

37, is a quadrant attached to or forming part of the bar, 35.

B, is the grain wheel which is journaled in the bearing, 39, secured to the end of the bar, 35.

It will now be seen that by manipulating the lever and its plunger, 34, that the outside of the frame of the binder table to which the standard, 28, is attached as hereinbefore described may be raised or lowered to any desired position and secured in such position.

It will also be seen that the grain wheel by reason of the vertically pivoting of the lever, 33, between the bosses 28, may be swung outwardly when desired so as to enable the machine to be swung around easily.

What I claim as my invention is—

1. In a harvester binder the combination with the angle bars, D, D′, supporting the grain table, of the upwardly extending brackets, E, and, F, secured to the front of the angle bar, D′, and having attached to their upper ends the side bars E′ and, F′, of the driving wheel frame, and the upright, E^3, secured to the rear angle bar, D, and having attached to it the angle bar, H, which is also secured to the bracket, E, and to the front end of the side bar, E′, of the driving wheel frame and the brace, I^3, as and for the purpose specified.

2. The combination with the angle bars, D, D′, the brackets, E, and, F, secured to the angle bar, D′, the upright, E^3, secured to the angle bar, D, the side bars, E′, and, F′, secured to the brackets, E, and, F, the angle bar, H, secured to the upright, E^3, bracket, E, and attached by the bar, V, at the front end to the side bar, E′, the L-shaped bar, J, secured at the front end to the angle bar, D′, the upright, K, secured at the bottom to the angle bar, H, and braced by the rod, j, to the rear end of the L-shaped angle bar, J, and by the bar, N^5, to the cross bar N^4, and the

end board, I, extending upwardly and secured to the upright portion of the L-shaped angle bar, J, and the upright bar, K, as and for the purpose specified.

3. The combination with the angle bars, D, D′, the brackets, E, and, F, secured to the angle bar, D′, the upright, E^3, secured to the angle bar, D, the side bars, E′, and, F′, secured to the brackets, E, and, F, the angle bar, H, secured to the upright E^3, bracket, E, and attached by the bar, V, at the front end to the side bar, E′, the L-shaped bar, J, secured at the front end to the angle bar, D′, the upright, K, secured at the bottom to the angle bar, H, and braced by the rod, *j*, to the rear end of the L-shaped angle bar, J, and by the bar, N^5, to the cross bar, N^4, the end board, I, extending upwardly and secured to the upright portion of the L-shaped angle bar, J, and the upright bar, K, brace, *j*, the bars, I′, supporting the lower canvas elevating rollers, E^6, and, E^7, and the bars for supporting the upper elevating canvas rollers, N′, N^2, the rear bar, N, of which is supported on the downwardly projecting portion, J′, of the angle bar, J, and the bracket, N^3, secured to the cross bar, N^4, as and for the purpose specified.

4. The combination with the angle bars, D, D′, the angle bar, H, secured to and supported upon the bracket, E, attached to the angle bar, D′, and the upright, E^3, secured at the bottom to the angle bar, D, of the packer frame, O, supported at its inner end by the arm, O^2, upon the guide rod, *o*′, secured to the angle bar, H, and at the outer end by the bracket, O′, on the pipe, O^4, attached to sleeve, P^2, and supported upon the roller, O^5, journaled at the upper end of the bracket, O^6, which is fastened to the end of the angle bar, D′, beneath the binding table as and for the purpose specified.

5. The combination with the main driving wheel, main sprocket wheel, W^2, sprocket chain, W^3, sprocket pinion, w^3, on the counter shaft, W^4, bevel wheel, Y, on the opposite end of the counter shaft, gear pinion, y^2, on the shaft, Y′, sprocket chain Y^3, sprocket wheel, Y^6, gear wheel, Y^2, connected to the sprocket wheel as specified, and knotter gear wheel, y^3, sprocket wheel Y^4, on the end of the shaft, Q^4, gear wheel, Q^5, secured on the opposite end, gear wheel, Q^6, shaft, E^{12}, sprocket wheel, E^{13}, sprocket chain, E^{14}, sprocket wheel, E^{15}, on the end of the roller, E^{16}, gear wheel, E^{18}, secured at the opposite end of the roller, E^6, and meshing with the roller, E^{19}, on the end of the roller, N^2, and roller, E^{17}, secured on the end of the roller driving the canvas of the grain table as and for the purpose specified.

6. The combination with the gear wheel, Y^2, spring trip dog, y^4, secured to the same, sprocket wheel, Y^6, driven as specified and provided with rollers, y^6, lever, Y^7, pivoted at 8, on the lever, 4, and having the projection, 9, designed to engage with the projection, y^7, of the trip dog, y^4, roller, 6, on the inner end of the lever, 4, cam, 2, on the knotter gear wheel, y^3, boss, 10, formed on the end of the lever, Y^7, and extending into the slotted end, 7, of the lever, 4, rod, 12, hooked into the end of the lever Y^7, and extending through the lateral projection, 11, of the lever 4, and provided with a spring, 13, and nut, 14, link, 15, arm, 16, on the forward end of the rod, 17, compressor trip arm, 18, on an arm at the opposite end of the rod, 17, and the spring 19, designed to press against the arm, 16, as and for the purpose specified.

7. The combination with the main driving wheel and axle, W, provided with pinions, *w*, engaging with the teeth of the elevating rack, O^7, of the ratchet wheel, V^8, arm, V, supported on the axle, W, pivoted spring dog, V^7, engaging with the ratchet wheel, V^8, block, V^3, supporting the opposite end of the arm, V, held in guide ways and supported by the spring, v^3, within the loop, V′, which is secured to the angle bar, H, and side bar, E′, as and for the purpose specified.

8. The combination with the main driving wheel and axle, W, provided with pinions, *w*, engaging with the teeth of the elevating rack, O^7, of the ratchet wheel, V^8, arm, V, supported on the axle, W, pivoted spring dog, V^7, engaging with the ratchet wheel, V^8, block, V^3, supporting the opposite end of the arm, V, held in guide ways and supported by the spring, v^3, within the loop, V′, which is secured to the angle bar, H, and side bar, E′, and means whereby the spring dog, V^7, is released from the ratchet wheel, V^8, as and for the purpose specified.

9. The combination with the main driving wheel and axle, W, provided with pinions, *w*, engaging with the teeth of the elevating rack, O^7, of the ratchet wheel, V^8, arm, V, supported on the axle, W, pivoted spring dog, V^7, engaging with the ratchet wheel, V^8, block, V^3, supporting the opposite end of the arm, V, held in guide ways and supported by the spring, v^3, within the loop, V′, which is secured to the angle bar, H, and side bar, E′, and the rod, V^5, connected at the inner end to the dog, V^7, and at the other to the foot crank, V^6, as and for the purpose specified.

10. The combination with the main driving wheel and axle, W, provided with pinions, *w*, engaging with the teeth of the elevating rack, O^7, of the ratchet wheel, V^8, arm, V, supported on the axle, W, pivoted spring dog, V^7, spring supported block, V^3, on which the outer end of the arm, V, rests, means for releasing the dog and the lever arm, W′, provided with a tooth, *w*′, as and for the purpose specified.

JOHN ALLAN McMASTER.

Witnesses:
B. BOYD,
H. H. YOUNG.