

No. 655,058.

Patented July 31, 1900.

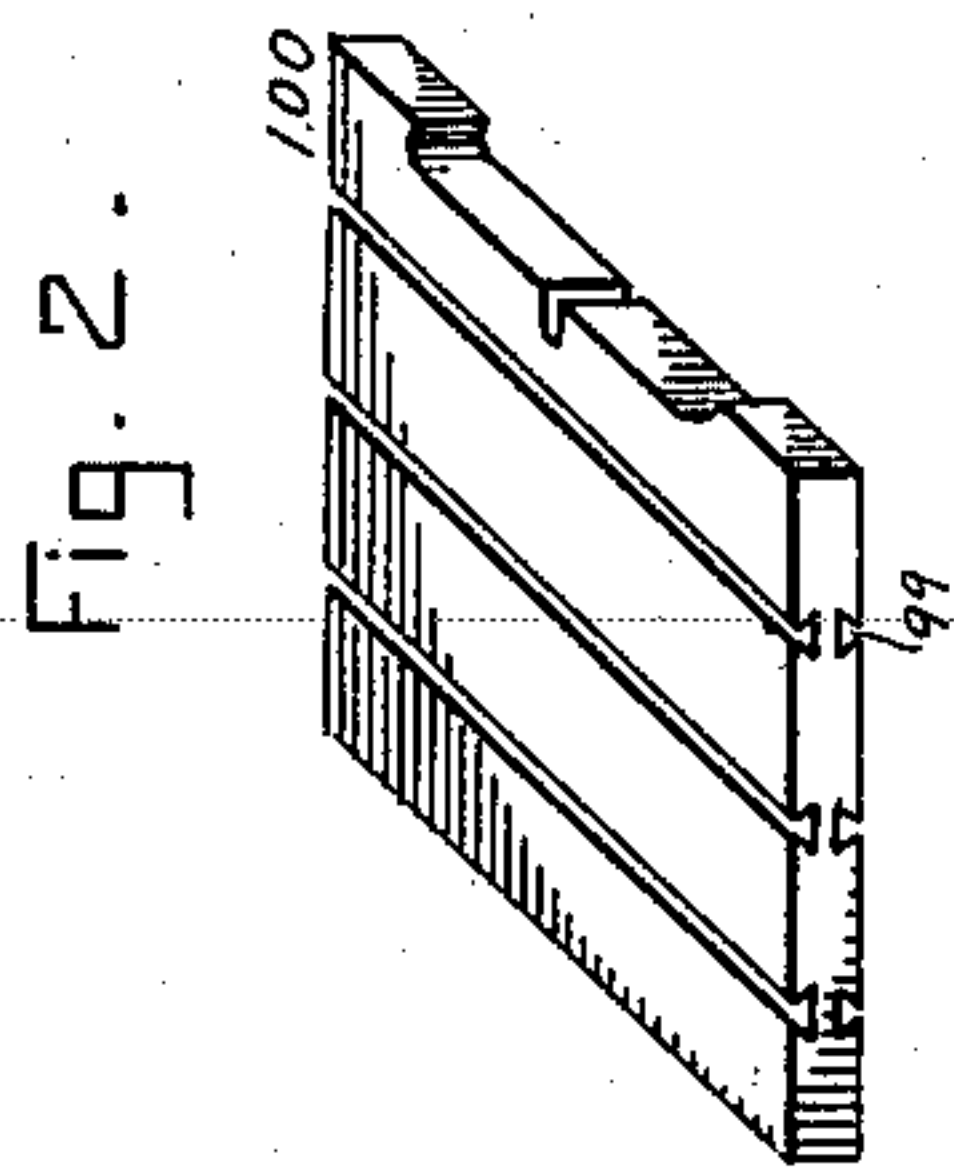
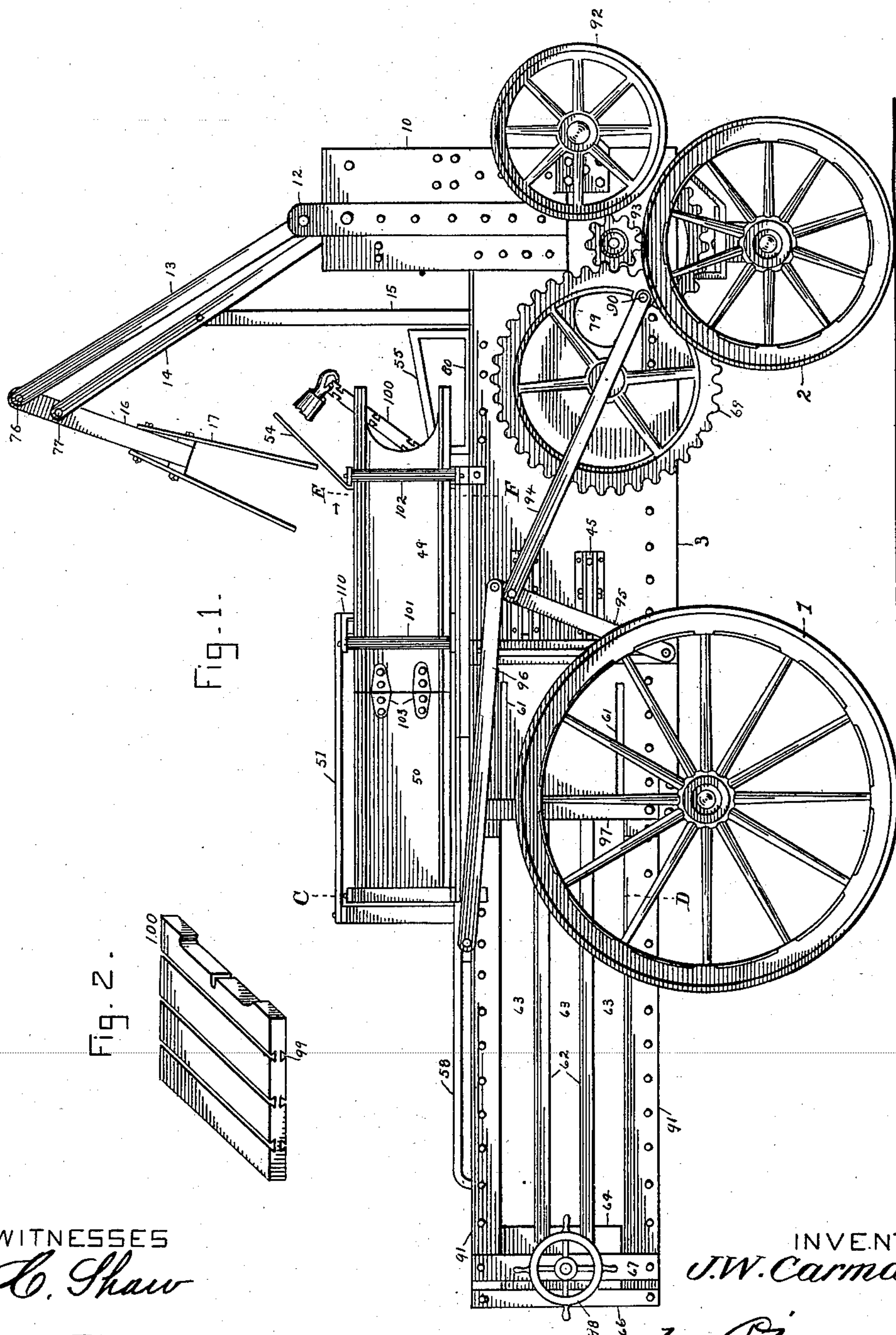
J. W. CARMACK.

HAY PRESS.

(Application filed July 7, 1899.)

(No Model.)

6 Sheets—Sheet 1.



WITNESSES

C. Shaw

Chas E Brock

INVENTOR

J.W. Carmack,

By Pineapple
ATTORNEYS

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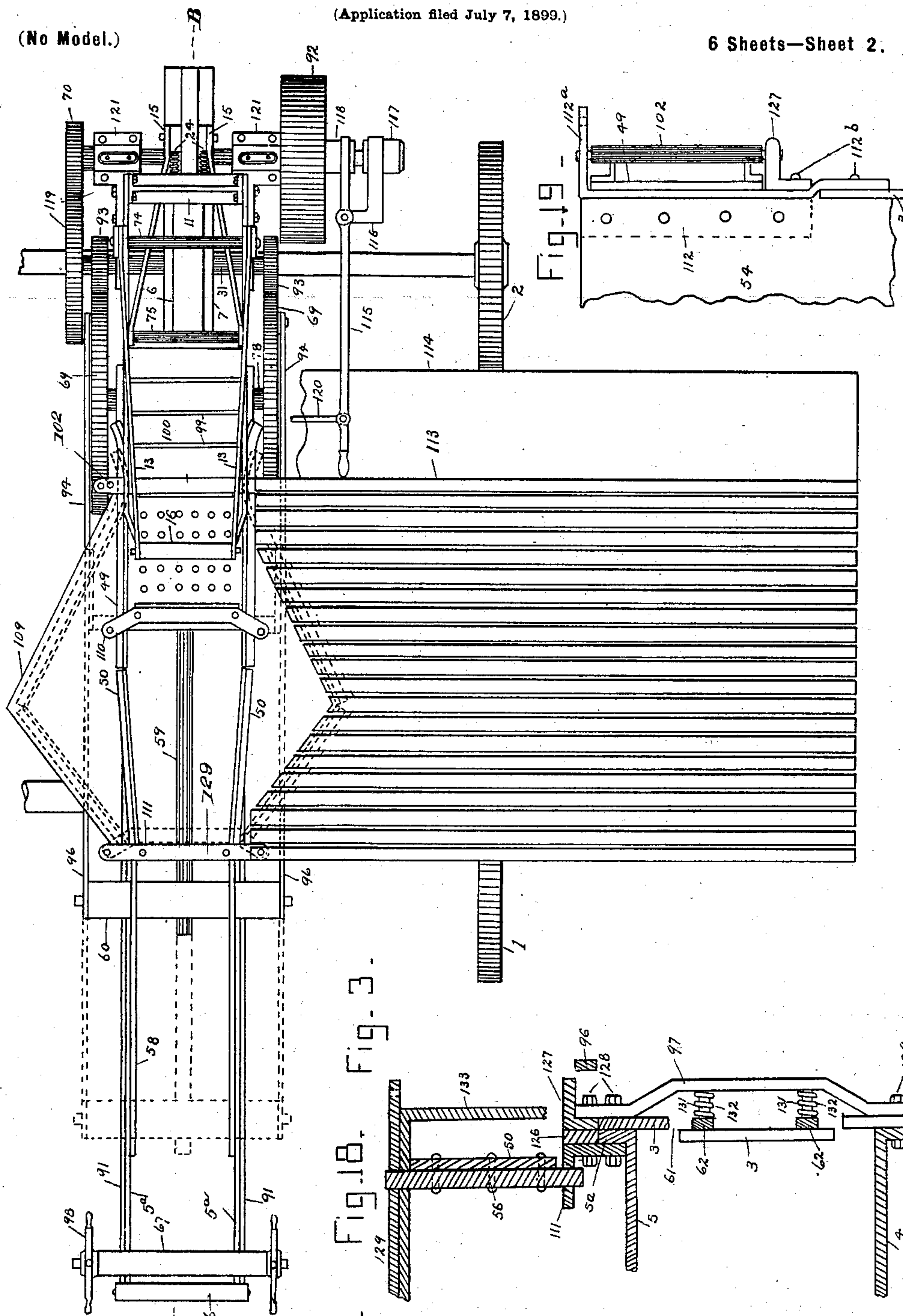
J. W. CARMACK.

HAY PRESS.

(Application filed July 7, 1899.)

(No Model.)

6 Sheets—Sheet 2.



WITNESSES

Charles Shaw

Chas. E. Brock

INVENTOR

J. W. Carmack,

by

Phurath,

ATTORNEYS

No. 655,058.

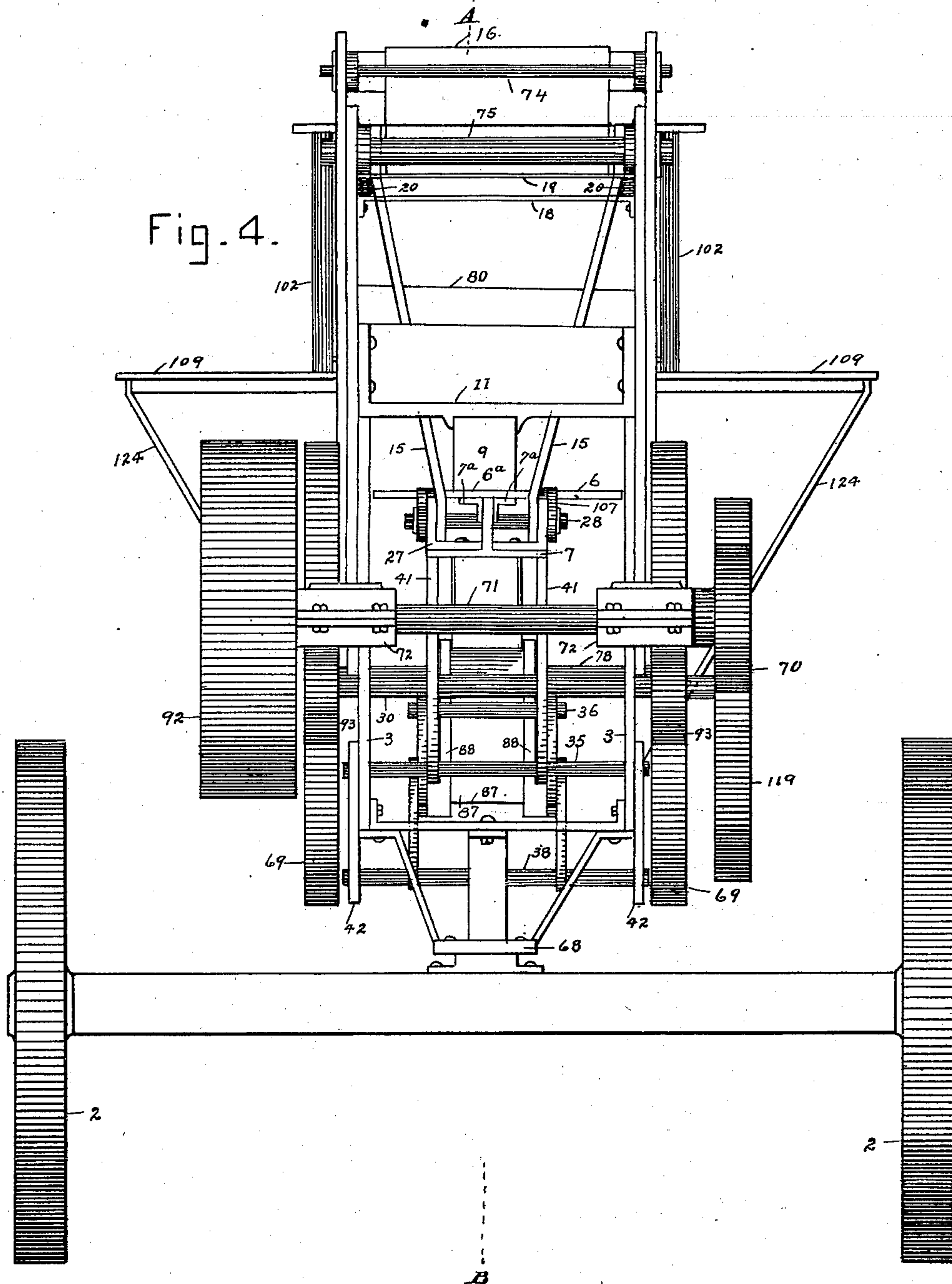
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(Application filed July 7, 1899.)

(No Model.)

6 Sheets—Sheet 3.



WITNESSES

C. Shaw.

Chas E Brock

INVENTOR

J.W. Carmack,

by Quinn T. St.
ATTORNEY

No. 655,058.

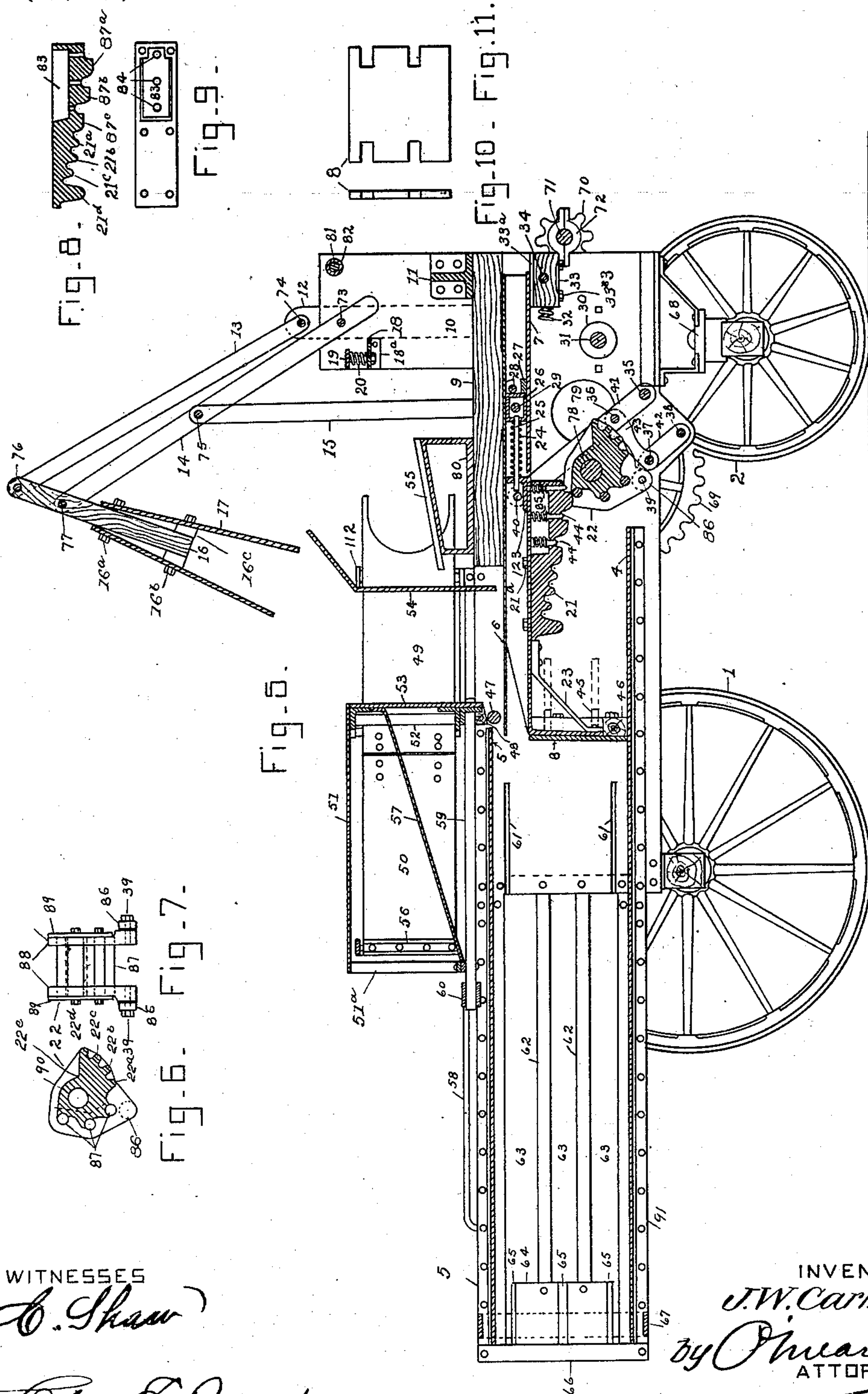
Patented July 31, 1900.

J. W. CARMACK.
HAY PRESS.

(Application filed July 7, 1899.)

6 Sheets—Sheet 4.

(No Model.)



WITNESSES

C. Shaw

Chas. C. Brock

INVENTOR

J. W. Carmack

by O. H. Carruth
ATTORNEYS

No. 655,058.

Patented July 31, 1900.

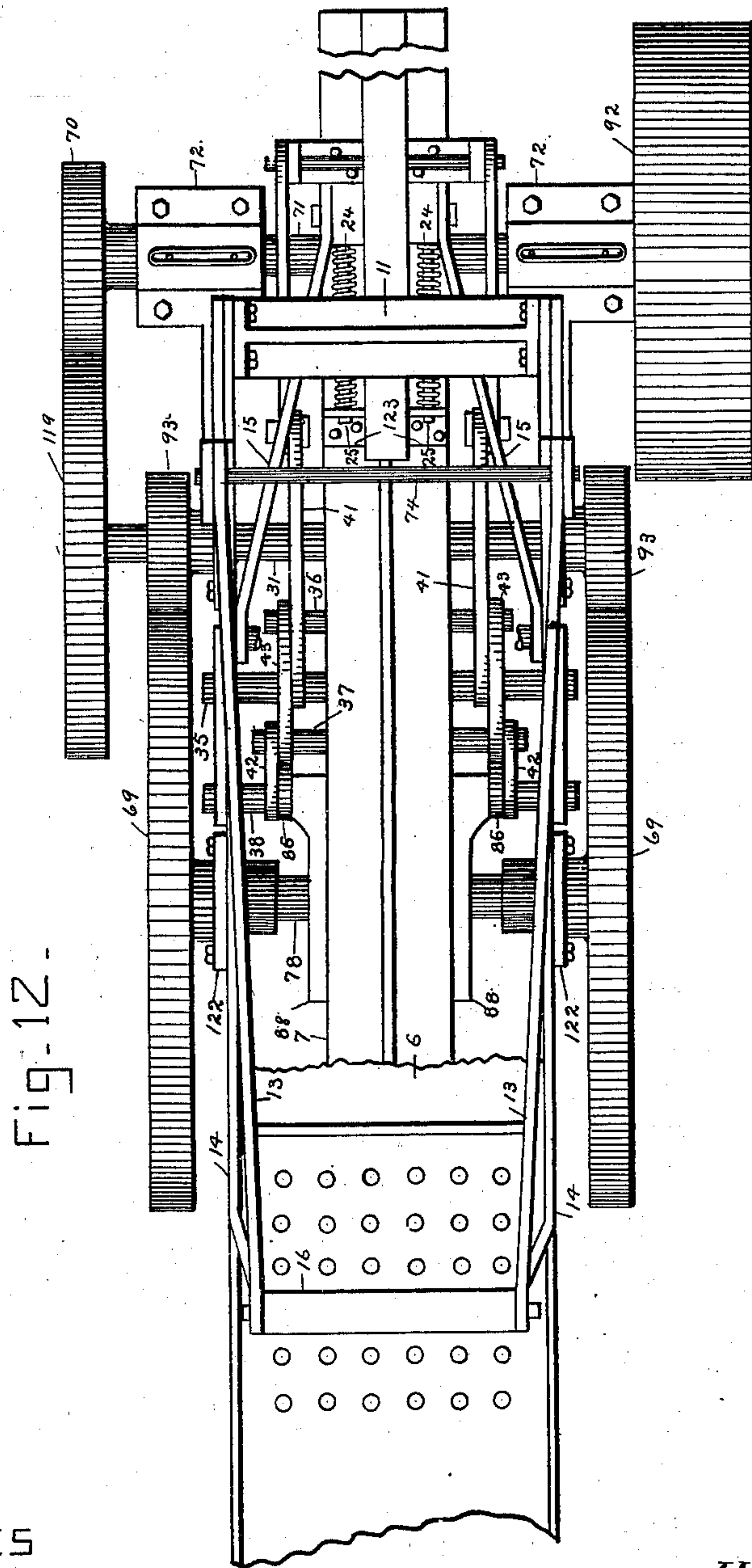
J. W. CARMACK.

HAY PRESS.

(Application filed July 7, 1899.)

(No Model.)

6 Sheets—Sheet 5



WITNESSES

C. Shaw,
Chas. Brock

INVENTOR

J.W. Carmack,
by O. Mearns,
ATTORNEYS

No. 655,058.

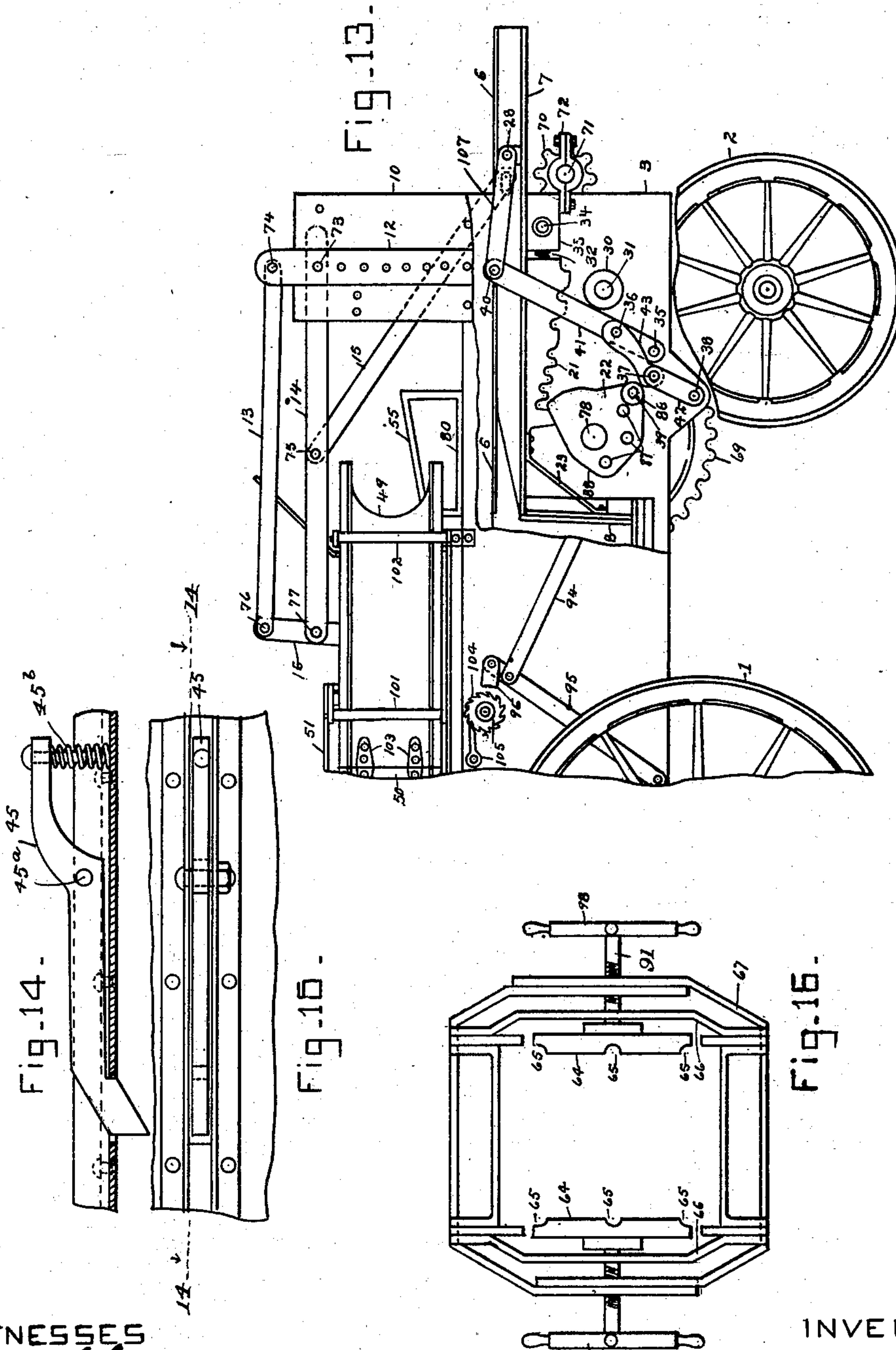
Patented July 31, 1900.

J. W. CARMACK.
HAY PRESS.

(Application filed July 7, 1899.)

(No Model.)

6 Sheets—Sheet 6.



WITNESSES

C. Shaw

Chas. E. Brock

INVENTOR

J. W. Carmack,
by Olin & Co.,
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN W. CARMACK, OF DYERSBURG, TENNESSEE, ASSIGNOR OF ONE-
FOURTH TO ISAAC H. DAWSON, OF SAME PLACE.

HAY-PRESS.

SPECIFICATION forming part of Letters Patent No. 655,058, dated July 31, 1900.

Application filed July 7, 1899. Serial No. 723,076. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. CARMACK, a citizen of the United States, residing at Dyersburg, in the county of Dyer and State of Tennessee, have invented a new and useful Hay-Press, of which the following is a specification.

My invention relates to power baling-presses, especially designed for the baling of hay, although capable of use for baling other materials.

The object is to generally improve the construction of such presses, with a view to increasing the strength and capacity thereof and decreasing the amount of power necessary to operate them.

With this object in view my invention consists in the improved construction, arrangement, and combination of the parts of a press, as fully described hereinafter and afterward specifically pointed out in the claims.

In order to enable others skilled in the art to which my invention most nearly appertains to make and use the same, I will now proceed to describe its construction and operation, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a view in side elevation of a press constructed in accordance with my invention. Fig. 2 is a detail perspective view of a separator-block. Fig. 3 is a top plan view with parts removed to expose the mechanism below. Fig. 4 is a right-hand end elevation. Fig. 5 is a longitudinal vertical sectional view on the plane indicated by the dotted line A B of Figs. 4 and 5, with the plunger at the forward end of its throw. Fig. 6 is a detail vertical sectional view of the cam-pin for driving the plunger. Fig. 7 is a plan view of the same. Fig. 8 is a detail vertical sectional view of the plunger-rack. Fig. 9 is a plan view of the same. Fig. 10 is an edge view of the plunger-head. Fig. 11 is a face view of the same. Fig. 12 is a top plan view of the power end of the press, with part of the plunger-shield and other parts removed. Fig. 13 is a view in side elevation of the power end of the press, with part of the side of the frame removed, with the plunger at the rear end of its throw. Fig.

14 is a top plan view of one of the hay-detaining dogs, the side of the baling-chamber being shown in horizontal section on the dotted line 14 14 of Fig. 15. Fig. 15 is an outside elevation of the same parts. Fig. 16 is a view in elevation of the discharge end of the press. Fig. 17 is a partial sectional detail view on the vertical plane indicated by the dotted line C D of Fig. 5, the tension-bar and other parts being broken away and the wheels omitted. Fig. 18 is a similar view on the same plane, part of the stirrup being broken away. Fig. 19 is a detail sectional view on the dotted line E F of Fig. 1, with the upper part of the rigid end wall of the condenser removed.

Like numerals of reference indicate the same parts wherever they occur in the several figures of the drawings.

Referring to the drawings by numerals, 1 and 2 indicate the wheels of the truck upon which the press is mounted, whereby it may be hauled from place to place; 3 3, the sides of the frame and baling-chamber; 4, the bottom thereof, and 5 the top thereof, the bottom and top consisting of a long channel-bar provided with vertical side flanges 4^a and 5^a.

68 indicates the fifth-wheel of the truck.

79 indicates a circular hand-hole in side sheets 3 for lubricating purposes, as shown in Figs. 1 and 5.

81 indicates a cross-bar connecting the two sheets 10 and having a pipe 82 upon it between the sheets to hold them apart.

6 indicates a sheet or plate of metal at the top of the plunger, which I denominate the "plunger-shield," which moves with the plunger, extends in width from side to side of the frame, and prevents dirt and hay from falling below it.

7 indicates the stem of the plunger, being an inverted-T bar with flanges of even width, to which the plunger-head 8 is attached.

9 indicates a longitudinal wooden bar or beam, which serves as an upper slideway for the plunger, the plunger-shield being under the beam for part of its length, and a narrower plate 6^a, in line with and forming an extension of the shield, bearing under the beam for the balance of its length, the shield 6 and extension 6^a being both supported on

top of plunger-stem 7 by angle-irons 7^a, riveted to the several parts. The plunger-shield is wide enough to reach across and cover the charge-chamber; but the extension 6^a, being always outside of the chamber, need only to be about the width of the plunger-stem, which it covers.

10 10 indicate the sides of the feeder-support, which are secured to the sides 3 of the frame by riveting or otherwise and are also similarly secured to end flanges of a T-casting 11, as shown in Fig. 5.

46 indicates a wooden wear-block at the bottom of the plunger-head 8.

15 80 indicates a forward guide for wooden slide-beam 9.

12 12 indicate uprights secured to the sides 10, which serve as supports for the rear ends of guide-bars 13 and feeder-arms 14, of which there is one of each at each side, the guide-arms being pivoted on a shaft 74 and the feeder-arms on a shaft 73, extending through the arms and uprights from side to side of the frame.

25 15 15 indicate connecting-rods between the feeder-arms 14 and the stem of the plunger, the connection with the arms being a shaft 75 and that with the plunger-stem 7 a shaft 29, passing through a slot 29^a in said stem.

30 16 indicates the stem or body of the feeder, being preferably a wooden block, which is pivotally connected to the front ends of the guide-bar 13 and feeder-arm 14 by shafts 76 and 77. To the body 16 are secured flaring blades 17 by means of bolts 16^a, passing through the blades and body 16, and bolts 16^b, passing through the blades, spreader-blocks 16^c, and the body.

40 18 indicates a cross-bar connecting the sides 10, being secured thereto by riveting to flanges 18^a.

19 indicates a cross-bar above the bar 18 and supported on the top of springs 20, which serve to cushion the feeder-bars 14 at the end of the downward stroke to prevent jars when there is no hay in the condensing-hopper.

21 indicates the plunger-rack which depends from the underside of the plunger-stem 7 and is secured thereto by bolts 21^a.

50 22 indicates the cam-pinion which actuates the plunger by its engagement with rack 21.

86 indicates rollers journaled on outer ends of cam-pinion 22 for actuating the return-arms of plunger, and 87 indicates rollers journaled in the flanges of the cam-pinion for actuating the plunger forward, said rollers engaging the three rear teeth 87^a, 87^b, and 87^c of its rack 21.

88 indicates the end flanges of the cam-pinion, and 89 plates secured on them to prevent end motion of rollers 87.

The cam-pinion is provided with teeth 22^a, 22^b, 22^c, and 22^d, the teeth 22^a being the shortest and the others gradually increasing in length to the longest, 22^d, and the pinion is cut away at 22^e just beyond tooth 22^d, and from this tooth to the first roller 87 is of its

least radii, the radius gradually increasing from said roller to the tooth 22^d.

The plunger-rack is constructed to correspond with the construction of the cam-pinion, having its teeth gradually decreasing in length from the tooth 87^a to the tooth 21^c, the tooth 21^d being longer than 21^c and adapted to engage in the space 22^e of the cam-pinion when actuated by the tooth 22^d.

23 indicates a brace on each side connecting the plunger-stem 7 and head 8.

24 24 indicate springs coiled around guide-rods 25 25, secured to sliding box 26, to which the feeder-arm connecting-rod is pivotally connected by means of the shaft 29, said guide-rods passing through clips 123, secured to the plunger-stem.

27 27 indicate right-angled clips secured to the plunger-stem 7 in the rear of the boxes 26, to which the return-arm connecting-rods 107 are connected by means of a shaft 28.

30 30 indicate boxes in which the intermediate gear-shaft 31 is journaled.

32 indicates a spring secured to the front of a block 33 to serve as a cushion for the plunger at the end of its return stroke, said block serving to support the rear end of the plunger-stem while being retracted. The block 33 is supported on a cross-rod 34 and is provided on its upper face with a rub-plate 33^a, secured by bolts 33^b.

35 indicates a shaft upon which the return-arms 41 on each side of the plunger are pivoted, said arms being also pivoted to the connecting-rods 107 by bolts 40 and to connecting-rods 43 by a shaft 36. The connecting-rods 43 are pivoted to guide-links 42 by a shaft 37, said links being pivoted to the frame by a shaft 38.

39 indicates a bolt by means of which a friction-roller 86 is journaled to the cam-pinion 22.

44 44 44 indicate valves seated in openings 84, extending through the plunger-rack 21 from an oil-reservoir 83 in its upper face, the stems of said valves being held to their seats and normally extended a short distance through them in the throats of the teeth of the rack by springs 85. The stems of the valves extend upward through holes in the plunger-stem, which serve as guides for the stems and upper bearings of the springs, the lower bearings of the springs being upon flanges formed on the stems.

69 indicates a gear-wheel on the main shaft 78, and 70 a pinion on a counter-shaft 71, journaled in boxes 72.

92 is a belt-pulley on the counter-shaft, and 93 are pinions on the intermediate shaft.

119 is a gear-wheel on the intermediate shaft, 121 the boxes for the counter-shaft, and 122 the boxes for the main shaft.

118 indicates any approved form of friction-clutch on the counter-shaft operated by the shifting-lever 115, pivoted to an arm 116, secured on the shaft by a set-collar 117, and lever 115 being provided with a rod 120, ex-

tending across the machine to operate the lever from the opposite side.

45 indicates a detent or dog, of which there is a series on each side, pivoted at 45^a outside of the side walls of the charge-chamber, the points of which project through said walls, this normal position being maintained by springs 45^b, the object being to prevent the compressed hay from back movement into the charge-chamber.

46 indicates a wooden wear-block at the bottom of plunger-head 8.

47 indicates a roller journaled in the side frames, its journals projecting beyond the frames and carrying on each side a ratchet-wheel 104, with the teeth of which a pawl 105, pivoted to the side wall, engages to prevent rotation in one direction. This roller is located at the forward upper edge of the charge-chamber and is free to rotate by the contact of the hay pressed out of the charge-chamber into the bale-chamber by the plunger-head. This roller I designate the "tucker-roller."

48 indicates a wooden cross bar or block secured to the lower edge of the movable wall or head 53 of the condenser to bear and slide on the top of the bale-chamber.

49 and 50 indicate the side walls of the condenser. These walls are movable, the part 50 on each side having a vertical pintle 56 riveted to it, said pintle being journaled at its lower end in an angle-clip 111, secured to one of the flanges 5^a of the top 5 of the bale-chamber, and its upper end in a stirrup 133, also secured to flange 5^a, and in a cross-bar 129, secured on top of the stirrup, said cross-bar serving also as a support for the hay-chute. Upon the outside of the angle-clip 125 is a fillet or dutchman flush with and resting on top of flange 5^a. On the outside of the flange 5^a is the upper edge of side sheet 3 of the frame, and resting on the top of said sheet is an angle-iron 127, cut away to accommodate the stirrups 133. The side sheet 3 is horizontally slotted from its forward edge at 61 61. The side bars 62 62 of the bale-chamber are secured to the outside of this edge of the sheet 3 of the baling-chamber, and a stud 131 projects outwardly from each side bar.

Around each stud is coiled a spring 132, which bears outwardly against a tension-bar 97, secured to the upper and lower parts of side sheets 3 above and below the slots 61. The angle-irons 125, flanges 5^a, fillets 126, upper edge of side sheets 3, angle-iron 127, and upper ends of tension-bars 97, are all secured together by bolts 128, while the flanges 4^a, lower part of sheet 3, and lower ends of tension-bars 97 are secured by bolts 134. The parts 49 of these movable side walls of the condenser are hinged to the outer edges of the parts 50 by hinges 103 to permit of movement outward, at the point of hinging, from positions substantially in line with the sides of the frame to the positions shown in dotted lines in Fig. 3. The free edge of each part 49 passes between the edge of the rigid end

wall 54 of the condenser and a vertical roller 102, journaled at its upper end in a horizontal bend 112^a of an angle-iron 112, riveted to the wall 54, and at its lower end in the angle-iron 127. The lower end of angle-iron 112 is offset outward to pass down on the outside of sheet 3 and is secured thereto by riveting, as shown in Fig. 1.

51 indicates a sheet of metal secured at one end to bearings 110 of rollers 52 and 101, said bearings being secured on top of movable end wall 53 of condenser, as shown in Figs. 1 and 5, and at the other end to two uprights 51^a, the sheet serving as a shield to prevent hay from falling in rear of movable end wall. These rollers have their lower bearings in angle-irons secured to the lower edge of the movable end wall.

57 is a central brace for the movable wall 53 of the condenser, secured at its lower end to tubular stem 59 of the condenser, as best shown in Fig. 5. The stem 59 is secured at one end to the movable end wall 53 and at its opposite end to a cross-head 60 and uprights 51^a. The cross-head slides under bars 58, secured to flanges 5^a of the top sheet 5.

24 indicates a pitman from crank-pin 90 on gear 69 to rocking lever 95, pivoted to frame.

96 is a pitman connecting lever 95 with cross-head 60 of the condenser.

109 indicates sheets forming platforms on each side of bale-chamber for movable wall 49 and 50 to move on, being supported by braces 124.

55 indicates the separator-block chute, upon which the separator-blocks 100 are placed, as shown in Fig. 3, ready to be raised at one end by hand, as shown in Fig. 1, and dropped into a slot 112 in the top of the charge-chamber on top of the plunger-shield 6, which is withdrawn to permit the blocks to fall into the chamber.

The side bars 62 are spaced apart, as shown in Figs. 1 and 5.

64 indicates side tension-plates at the discharge end, having grooves 65 for the wires on bales to pass through.

66 indicates the side braces, which are offset to permit the outward movement of the tension-plates 64.

67 is a hoop or band surrounding the discharge end, which is composed of two overlapping sections, through which pass screws 91 to set up tension-plates, said screws provided with hand-wheels 98.

113 indicates the hay chute or platform, which is connected to baler on either side in any suitable manner, being shown in Fig. 3 as provided with studs to engage holes in bars 129 and 112^a, and supplied at the side with a stage-plank for the operator to stand on.

The operation of my improved press may be described as follows: The empty press being started by engaging the clutch on the counter-shaft, the rotation of the main shaft to the left, as seen in Figs. 1, 5, and 13, will

actuate the plunger forward or to the left, as in said figures, the first forward movement of the plunger being effected by the engagement of the tooth 22^d of the cam-pin-
 5 ion with tooth 21^d of the plunger-rack, the point of this, the longest tooth, reaching into the throat between the teeth 22^d and 22^c, which is the deepest throat. The continued rotation of the shaft brings teeth 21^c, 21^b, and
 10 21^a and roller 87 of the cam-pinion consecutively into contact with 22^c, 22^b, 22^a, 87^c, 87^b, and 87^a of the rack. As before stated, these teeth and rollers of the cam-pinion are consecutively of lesser radii and the teeth of the
 15 plunger-rack of consecutively-greater length. The effect of this arrangement is to move the plunger forward at a speed gradually lessening and with a power gradually increasing, the power being required to increase as the
 20 hay becomes more compact and solid. The two long teeth assure the engagement of the pinion and rack. As the rollers 87 pass into the throats of the teeth they raise the valve-stems 44 and permit oil to pass down through
 25 the openings from the oil-reservoir 83 to lubricate the rollers 87. The machinery should not be stopped with any of the rollers in contact with a valve-stem, as this would permit leakage of oil.
 30 To begin baling with an empty press we will let it be supposed that the parts are in the following positions—viz., the plunger at about the middle of its forward stroke, the feeder-blades just clear of the condenser-hop-
 35 per and on their upstroke, the condenser-walls in their open positions, and the condenser-head contracted. At this juncture the operator standing on the stage-plank 114 will deposit a charge of hay previously placed
 40 on the chute 113 into the condenser. In the continued operation of the press the plunger continues its forward motion, the feeder its upstroke, and the condenser-head begins its forward movement, resulting in the inward move-
 45 ment of the condenser side walls, all of these parts completing these strokes at the same time. At the end of these strokes the movement changes, the condenser-head moving forward at a speed to require a half-revolution of
 50 the crank-shaft to complete its stroke and the main plunger at a speed to require one-seventh of a revolution of the same shaft to complete its return movement. The feeder comes down in the same space of time required to
 55 retract the plunger, or one-seventh of a revolution, as stated. Now the condenser has moved but a very short distance backward during the return movement of the main plunger, owing partly to the fact that the
 60 main shaft has only made one-seventh of a revolution and partly to the fact that both movements of the condenser-head are slowest at their beginning and ending, these movements being made by a crank and pitman,
 65 which at the exact moments of ending of the forward and backward strokes passes its two dead-centers, the head being virtually still

for about one-sixth of a revolution at each dead-center. The next forward movement of the main plunger now begins, and as it
 70 takes six-sevenths of a revolution of the main shaft to complete this movement the condenser-head during the movement completes its forward movement and makes its entire
 75 next return movement bringing the main plunger to the end of its forward movement, at the same time the return of the condenser-head is completed and, as before stated, the feeder is at the end of its upward movement.
 80 At the point in the return movement of the main plunger where, as before stated, a charge of hay was introduced into the condenser-hopper a second charge is now introduced and the movements continue, as last stated, to the end
 85 of the return of the plunger. Each charge of hay placed in the condenser-hopper is pressed by the feeder into that part of the main chamber immediately below the hopper, which I
 90 designate as the "charge-chamber," in advance of the plunger-head, which at the time of the receipt of the hay in the charge-chamber has begun its forward movement. Each forward
 95 movement of the main plunger presses the last charge against the preceding one, pushing them into the baling-chamber. In first starting to bale hay with an empty press these
 100 movements are continued until the hay in the baling-chamber has attained sufficient compactness, when at the point in the operation when the plunger has moved far enough on its
 105 forward movement to bring its shield below the slot in the top of the chamber a separator-block on the separator-block chute is raised to a vertical position in the slot, with its lower
 110 edge resting on the plunger-shield. The separator-block remains in this position until the plunger completes its forward movement and has moved far enough on its return to permit
 115 the block to drop into the charge-chamber. The plunger in its next forward movement presses the charges placed in the hopper against the separator and into the bale-chamber until a sufficient number of charges to form
 120 a bale have been pressed forward, which will be indicated by the ringing of a suitable alarm-bell, which I have not shown, and which alarm will be the signal for the operator to
 125 stand another block in the slot. As soon as a separator-block appears in the open-work portion of the bale-chamber wires, already cut to length and twisted into a loop at one
 130 end, are passed through the spaces 63 and the groove in the separator-block, and upon the appearance of the next block the wires are inserted in its front grooves and the end
 secured in the loop by twisting. As the separator-block and pressed hay pass between those portions of the side sheets 3 between the slots 61 a lateral inward-tension pressure is exerted against them, so that the resistance
 to their passage will be sufficient to compact the succeeding charges until the first bale reaches the discharge end of the chamber, where a tension-pressure is exerted against

its sides by the tension-plates 64, pressed inward to give any desired pressure, by means of the screws 91, operated by hand by means of the hand-wheels 98. The outer edges of the side sheets 3, between the slots 61, act as detents to prevent return movement of the hay and serve to assist the spring-actuated detents 95 in this function. The hay pressed under the tucker-roller 47 passes freely, owing to the free rotation of the roller in that direction, but is prevented from moving backward by the roller, which is locked against backward rotation. The movements in and out of the side walls 50 and 49 are effected by rollers 101 and 52, respectively. These rollers are mounted vertically, 101 on the outside and 52 on the inside of said walls, and are moved forward and backward in straight lines with the condenser cross-head. Their lines of movement are parallel with the sides of the frame, and the pintles of the walls 50 are set slightly within said lines, so that movement of the rolls toward the pintles will press the walls outward, and vice versa. The motion of the condenser cross-head is effected by the crank-pins 90, pitman 94, rocking arms 95, and connecting-rods 96, the points of connection of pitman 94 with rocking arms 95 being nearer the pivots of the arm than the points of connection of connecting-rods 96 therewith, the advantages due to this arrangement being to apply the power to the cross-head more nearly in the line of its movement and to lengthen the stroke of the cross-head, thereby increasing the spread of the side walls of the condenser and increasing its capacity for the reception of loose hay. The length of stroke of the cross-head may be varied by adjusting the pivotal connections of pitman 94 in the slot 95^a of the rocking arm.

As before described, the feeding mechanism is actuated from the plunger-stem by means of the cross-shaft 29, secured in the lower ends of the connecting-rod 15 and passing through an elongated slot 29^a in the stem. (See Fig. 20.) This permits of the movement of the shaft and stem with relation to each other, due to the yielding connection between the boxes 26, which carry the shaft and the stem by means of clips 123 and springs 24. The connecting-rod 15 is in a vertical position when the feeder is in its highest position, and the first part of the return movement of the plunger-stem has very little effect in moving the feeder down; but as the connecting-rod 15 is inclined away from its vertical position by the continued movement of the stem the downward movement of the feeder is accelerated. The latter portion of the upward movement of the feeder is retarded correspondingly, thus giving the effect of a rest at the upper end of its strokes and allowing more time in which to feed the hay into the hopper. A further effect of this arrangement is to cause the feeder to act as an equalizer of the strain on the power, inas-

much as the arrangement requires the application of a greater amount of power to drive the feeder down than would be necessary with more direct connections. This is due to the fact that the pull exerted upon the feeder-arm 14 by connecting-bar 15 is almost in line with the feeder-arm, thus increasing the work required of the plunger-stem in its backward movement.

The quick return of the plunger is effected as follows: As soon as the cam-pinion in its rotation to the left, as viewed in Fig. 5, leaves the position shown in that figure, the roller 87 passing down out of contact with tooth 87^a of the plunger-rack, the roller 86 engages the link 43 at its pivotal junction with guide-link 42 and forces the two links backward, carrying the return-arm 42 with them to the position shown in Fig. 13, this return-arm carrying the plunger-stem back with it by means of connecting-rod 107. This movement, as before stated, is accomplished during one-seventh of a revolution of the main shaft, and at its completion the tooth 21^d is ready to engage the tooth 22^d of the plunger-rack to begin the next forward stroke, during the first part of which the return-arm 41 is drawn back by the plunger-stem and the roller 86 engages the curved edge of link 43, thus preventing rattle, lost motion, or wrong engagement of teeth of the pinion and rack.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a baling-press, the combination with a frame, and the horizontally-reciprocating plunger, of uprights secured to the frame, feeder-bars pivoted at their rear ends to the uprights, a feeder-stem carrying blades and pivotally attached to the front end of the feeder-bars, and connecting-bars pivotally secured at their outer ends to the feeder-bars intermediate their pivotal points on the uprights and the feeder-stem, and at their lower ends having a sliding and pivotal connection with the plunger in a position to bring said connecting-bars to a vertical position when the plunger is at the forward end of its stroke, substantially as described.

2. In a baling-press, the combination with a frame and a slotted plunger, of uprights secured to the frame, feeder-bars pivoted directly to the uprights, a feeder-stem pivotally connected to the outer ends of the feeder-bars, boxes slidably secured to the plunger, and a shaft mounted in the boxes and passing through the connecting-bars and plunger-slot, substantially as described.

3. In a baling-press, the combination with a frame and a slotted plunger, of uprights secured to the frame, feeder-bars pivoted directly to the uprights, a feeder-stem pivotally connected to the outer ends of the feeder-bars, boxes slidably secured to the plunger, and a shaft mounted in the boxes and passing through the connecting-bars and plunger-slot, and springs normally holding the boxes at

their rear positions, substantially as described.

4. In a baling-press the combination with the frame, and a slotted plunger, of a feeder-stem, arms supporting it, and pivotally connected to the frame, connecting-bars pivoted to said arms, boxes slidably secured to the plunger, and a shaft mounted in the boxes and passing through the connecting-bars and the slot in the plunger, rods projecting from said boxes parallel with the plunger, springs coiled about said rods, and clips secured to the plunger and bearing against the outer ends of the springs, substantially as described.

5. The combination in a baling-press, of a condenser comprising the side walls, each carrying a stationary pintle by means of which it is pivoted to the frame at one end, and composed of two sections pivotally connected at their inner ends, and means for moving the walls outward and inward on the stationary pintle, substantially as described.

6. The combination in a baling-press of a condenser comprising side walls hinged together in the center and to the frame at one end, a moving head or plunger and parallel vertical rollers on the moving plunger, straddling the hinged side walls, substantially as described.

7. The combination in a baling-press, of a condenser comprising side walls hinged to the frame at one end and together in the middle, a plunger, parallel vertical rollers journaled to the plunger, and embracing the side walls, a cross-head on the plunger, connecting-rods secured to the cross-head, a rocking arm pivoted at its outer end to the connecting-rod, a crank-wheel, and a pitman connecting the crank with the rocking arm, substantially as described.

8. In a baling-press, the combination with the main baling-chamber, a rocking arm pivoted thereto, a wheel having a crank-pin, a condenser and a condenser-plunger, a cross-head connected thereto, a rod connecting the cross-head to the rocking arm, and a pitman connecting the rocking arm to the crank-pin, substantially as described.

9. In a baling-press, a baling-chamber comprising sides composed of metal sheets slotted or deeply notched inward from their outer ends separating the middle portions of the ends of the sheets from the outer portions, in combination with the longitudinal strips forming the sides of the bale-chamber and secured to the middle portions of the ends of the side sheets of the baling-chamber, and means for pressing the said middle portions of the ends of the sheets inward, whereby the width of the baling-chamber is decreased and the ends of the middle portions of the side sheets projected inward, thereby preventing backward movement of the bales, substantially as described.

10. The combination in a baling-press of the side sheets of the baling-chamber slotted or

deeply notched inward from their front or delivery ends, and means for pressing said slotted ends inward, whereby the sheets form side tension-plates to press upon the bales, and the ends of the sheets are pressed inward to prevent backward movement of the bale, substantially as described.

11. The combination in a baling-press with the top and bottom of the baling-chamber, of the side sheets thereof secured to the top and bottom and slotted, or deeply notched rearwardly from their forward ends leaving the middle portion of said ends free from attachment to the top or bottom, and springs arranged to press inwardly against the said free portions of said ends, substantially as and for the purposes set forth.

12. The combination in a baling-press with the top and bottom of the baling-chamber of the side sheets thereof secured to the top and bottom and slotted or deeply notched rearwardly from their forward ends, leaving the middle portion of said ends free from attachment to the top and bottom, stirrups secured to the top and bottom and extending vertically across the side sheets, and springs arranged between the stirrups and the free ends of the side sheets substantially as described.

13. In a baling-press, the combination with a charge-chamber provided with the usual hay-receiving opening, and having a transverse slot in its top wall adjacent to said opening, of a separator-block chute mounted above the chamber having its front end above and in proximity to the slot, and its top inclined rearwardly upward away from the slot, substantially as described.

14. In a baling-press, the combination with a charge-chamber provided with the usual hay-receiving opening and having a transverse slot in its top wall adjacent to said opening, of a separator-block chute mounted above the chamber having its front end above and in proximity to the slot and its top inclined rearwardly upward away from the slot, said top having longitudinal ribs, substantially as described.

15. The combination in a baling-press of the frame a cam-pinion, a plunger, a rack on the plunger engaging the cam-pinion, a return-arm pivoted to the frame, a link connecting the return-arm to the plunger, and a friction-roller carried by the cam-pinion and actuating the return-arm, substantially as described.

16. The combination in a baling-press, of a cam, a plunger, a return-arm pivoted to the frame, and connected to the plunger, a guide-link pivoted to the frame, a link connecting it to the return-arm, and a friction-roller on the cam engaging the connecting-link to actuate the return-arm, substantially as described.

17. The combination in a baling-press, of a cam, a plunger, a return-arm pivoted to the frame, and connected to the plunger, a guide-link pivoted to the frame, a link connecting

it to the return-arm, having a curved upper face, and a friction-roller on the cam adapted to force the connecting-link backward and to engage the curved upper surface thereof, in the return movement, substantially as described.

18. The combination in a baling-press with the frame, of a plunger, a rack carried thereby, a lever pivoted to the frame and connected to the plunger, and a cam-pinion provided with teeth for engaging the rack to actuate the plunger forward, a friction-roller to engage the lever to return the plunger, and a smooth portion between the teeth and the friction-roller whereby the rack and pinion are

disengaged during the return movement of the plunger, substantially as described.

19. The combination in a baling-press, of a plunger, a rack carried thereby, a cam-pinion engaging the rack to actuate the plunger forward, and an arm pivoted to the frame, and connected to the plunger, and a roller on the cam-pinion to actuate the arm to move the plunger backward, the rack and pinion being disengaged during the return movement, substantially as described.

JOHN W. CARMACK.

Witnesses:

CHAS. E. BROCK,
CLARENCE SHAW.