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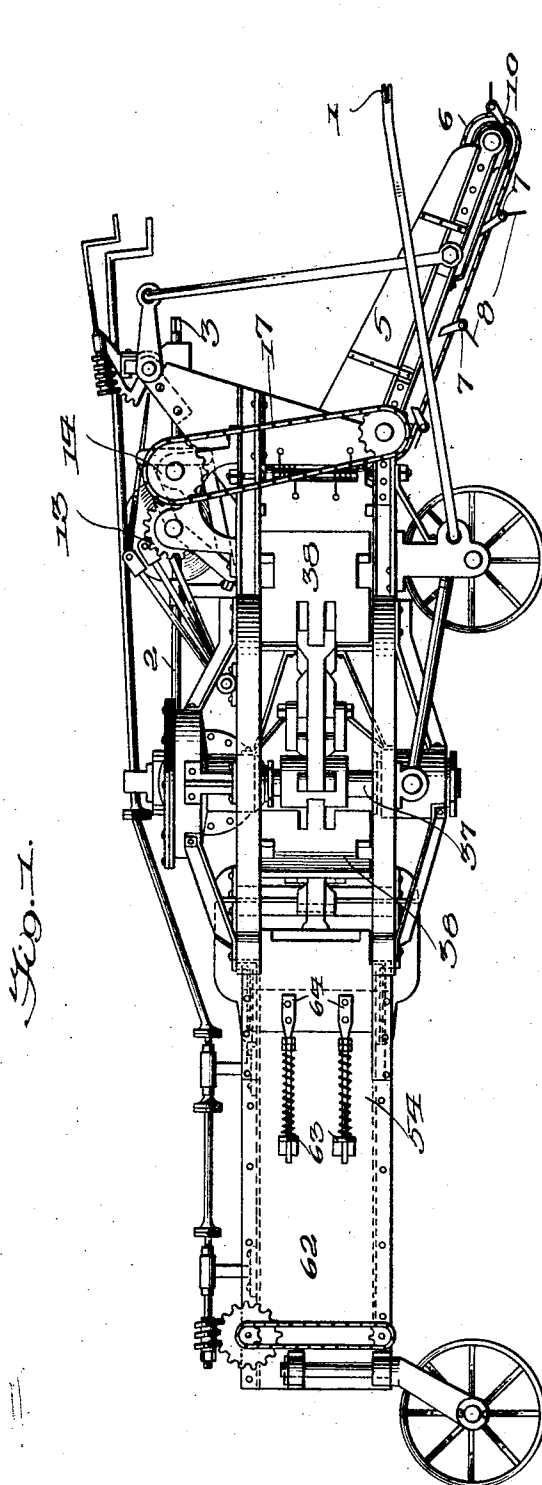
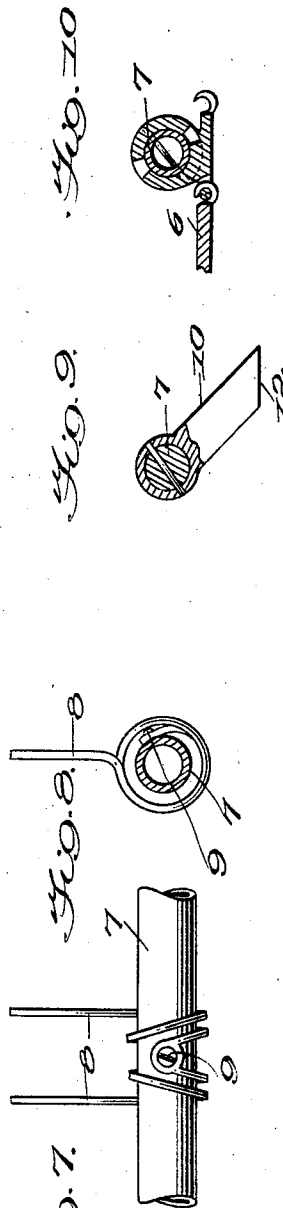
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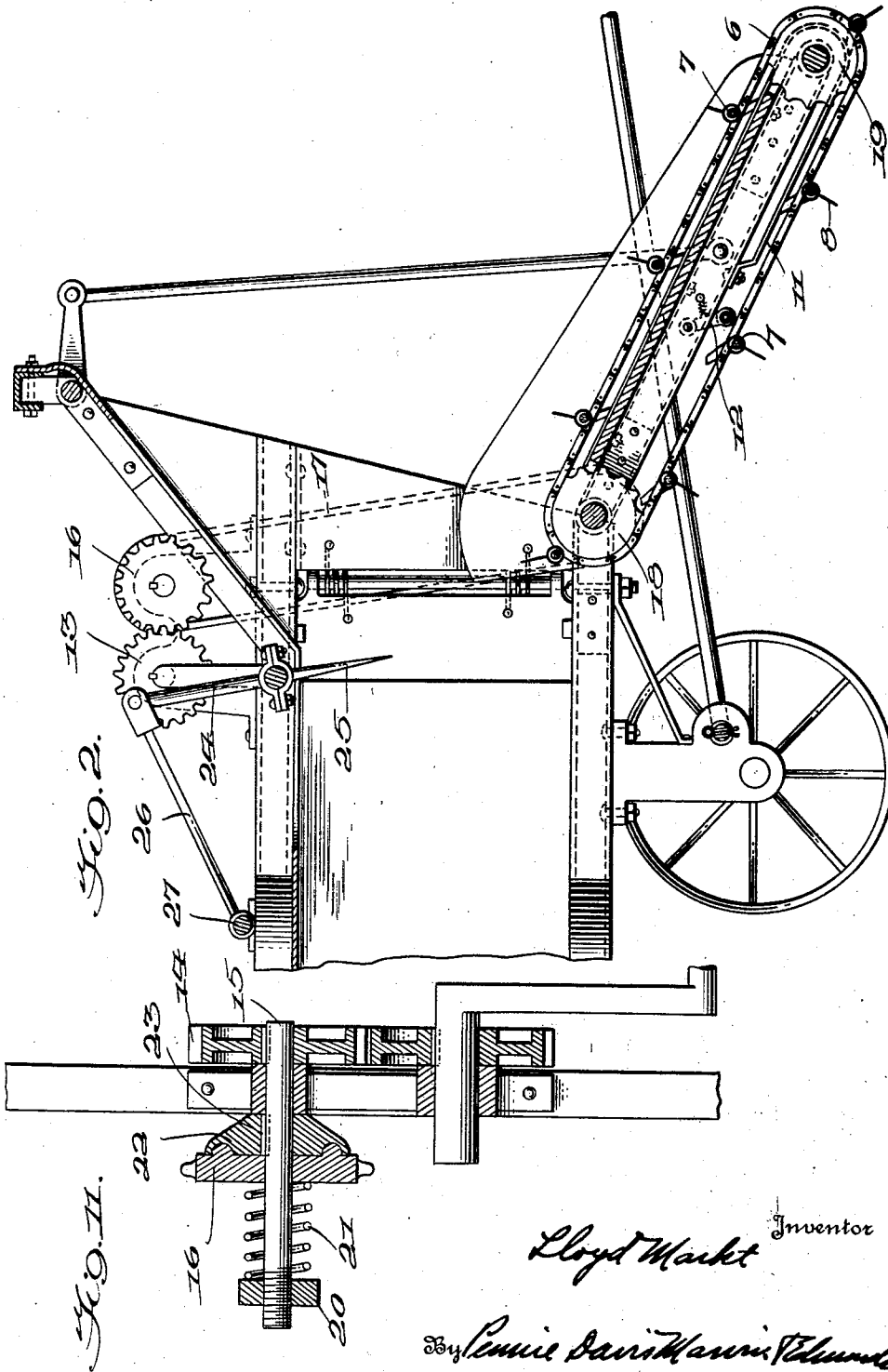
L. MARKT

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Lloyd Markt

Inventor

By *Rennie Davis Mann & Edmund*

Attorney

June 2, 1931.

L. MARKT

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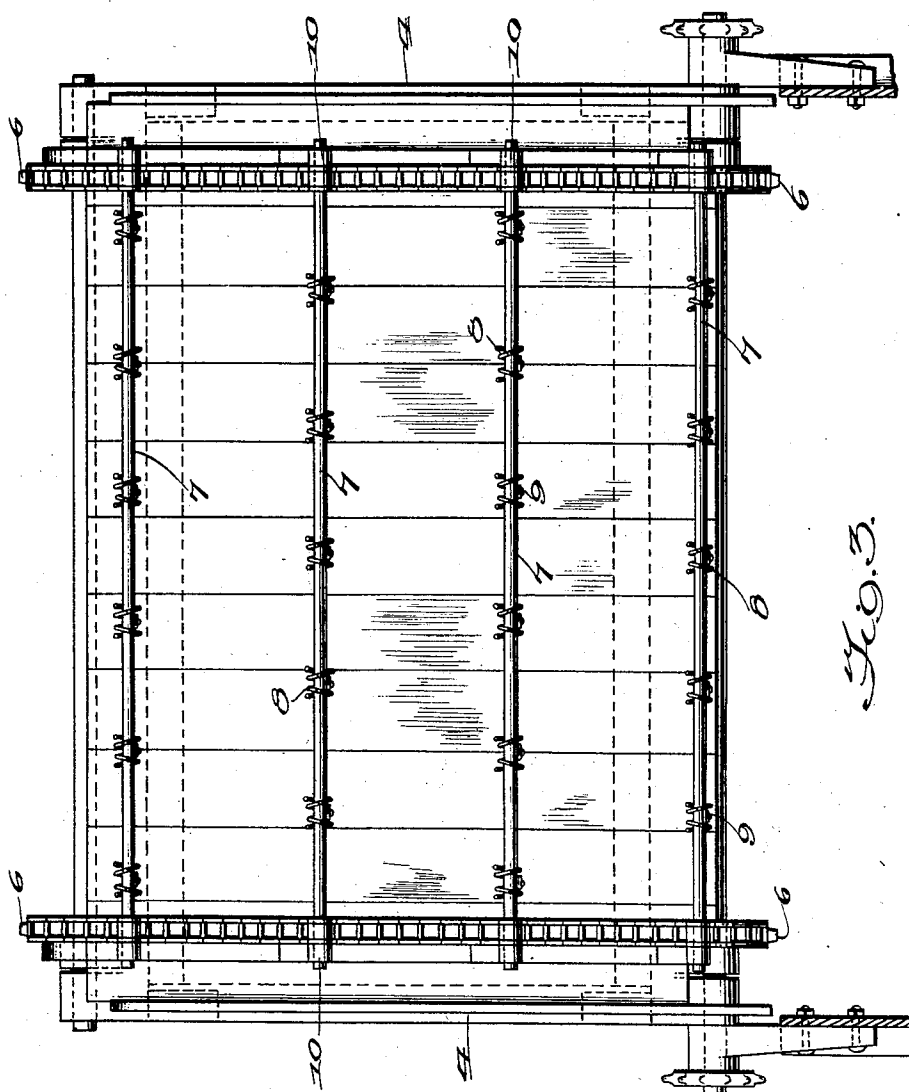


Fig. 3.

Inventor
Lloyd Markt

By *Paulie Davis Harris Edmunds*
Attorney

June 2, 1931.

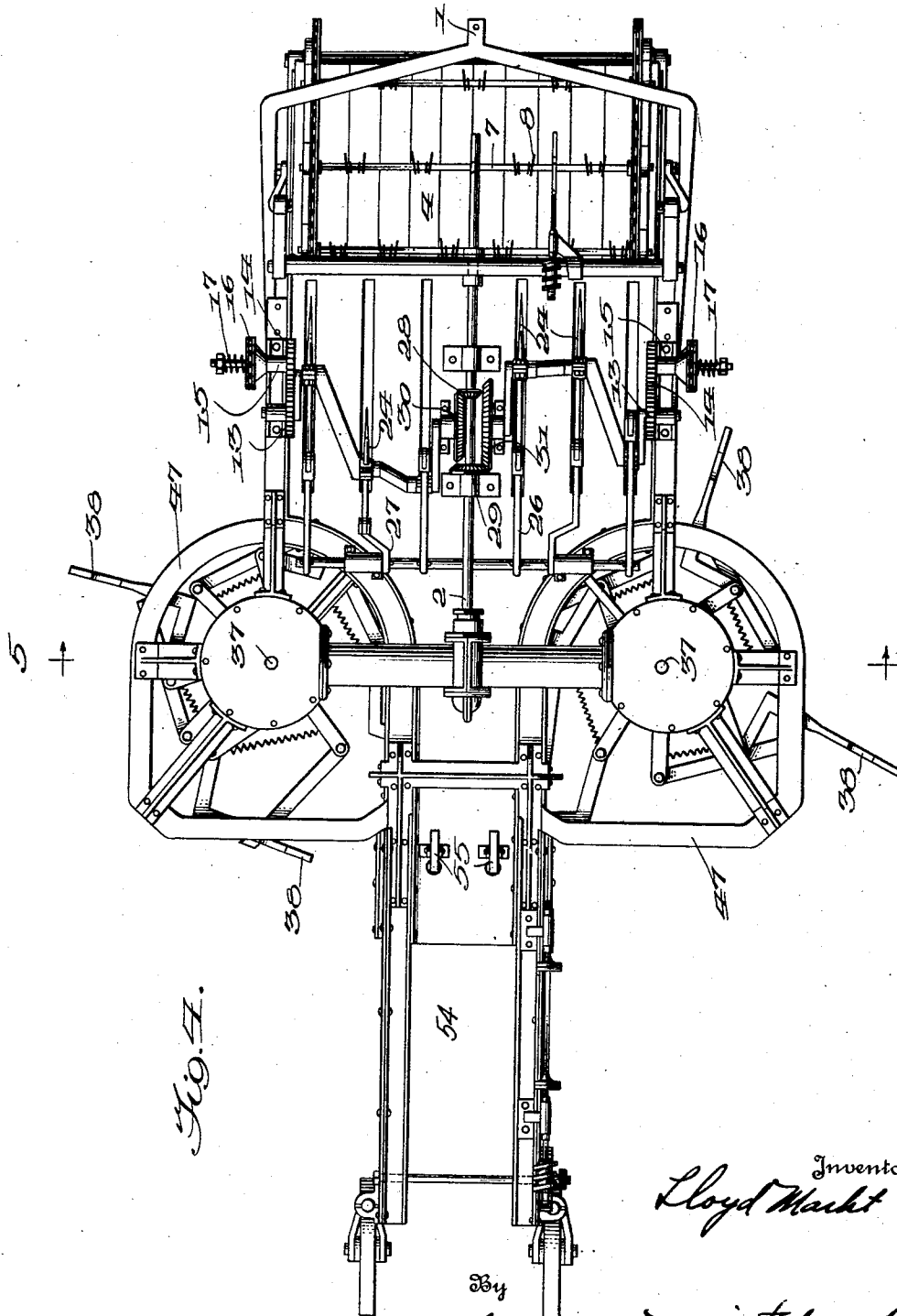
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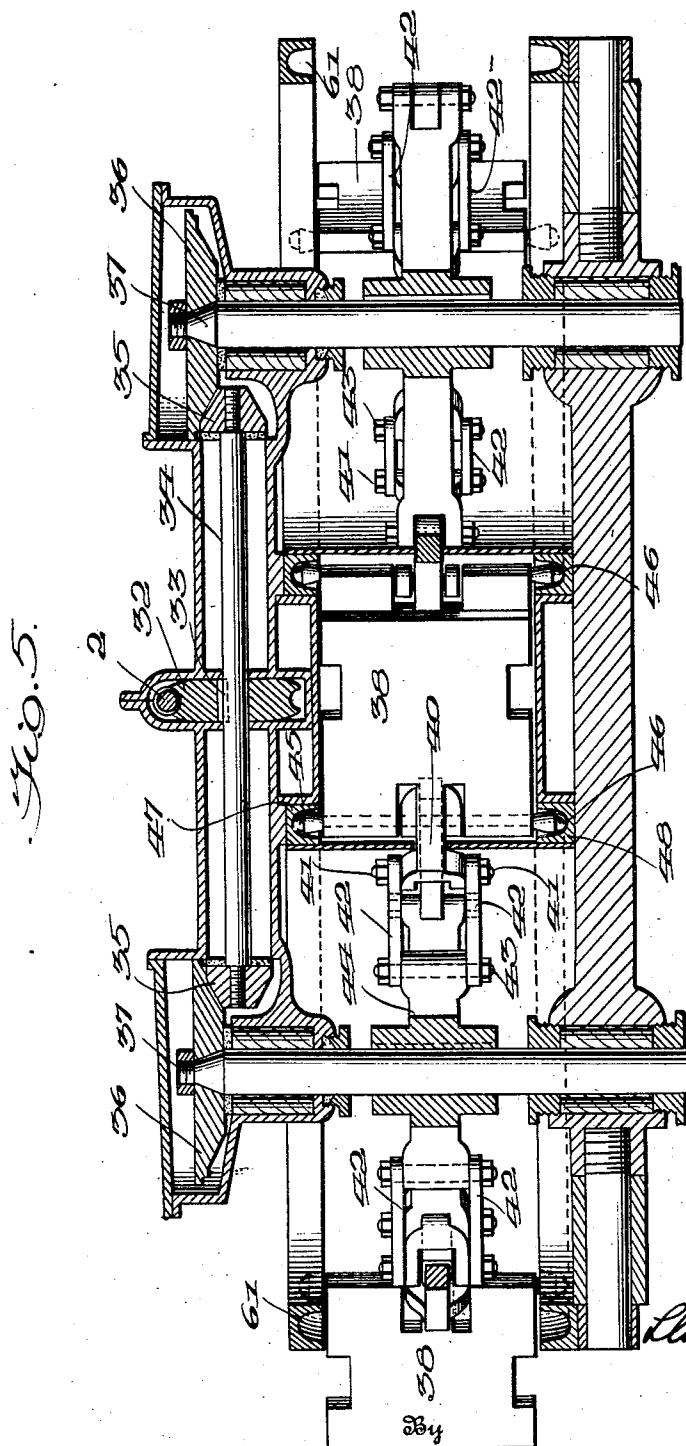
L. MARKT

1,808,425

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Inventor
Lloyd Markt

Reuben Davis Martin | *Edmunds*
Attorney

June 2, 1931.

L. MARKT

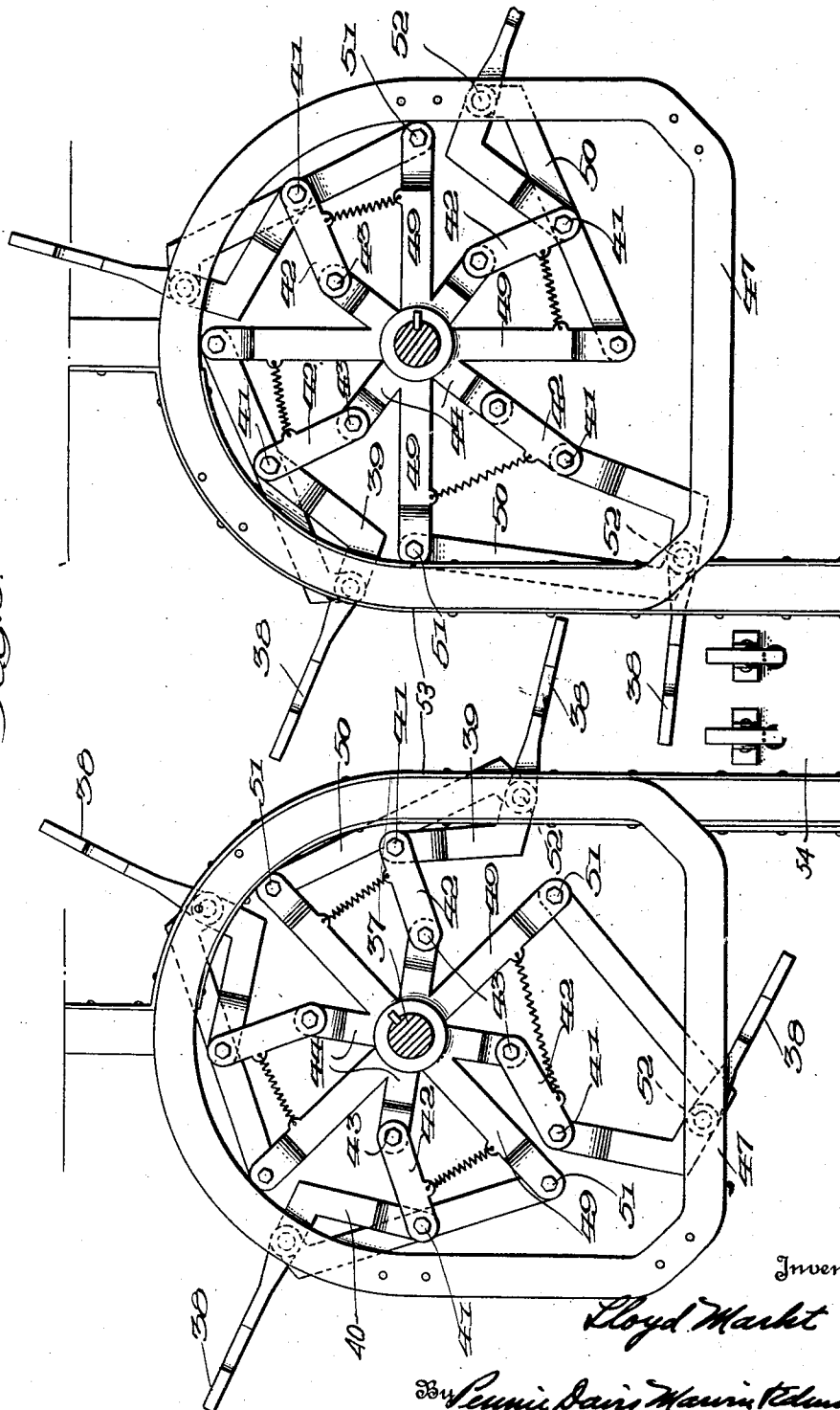
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Fig. 6.



Inventor

Lloyd Markt

334 Lemuel Davis Marvin Edmunds

Attorney

June 2, 1931.

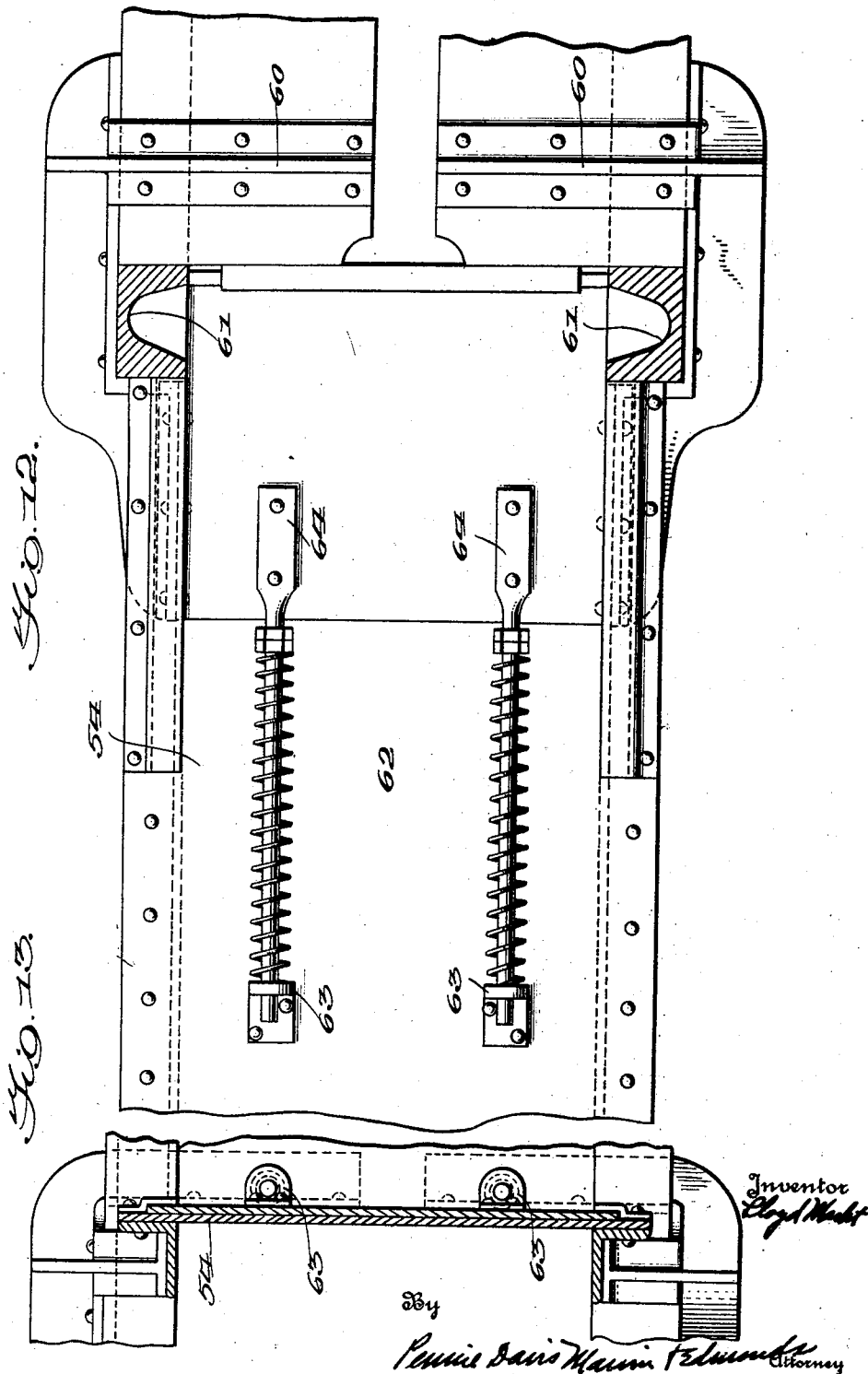
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Fig. 15.

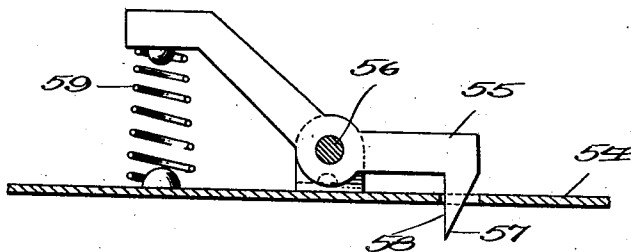
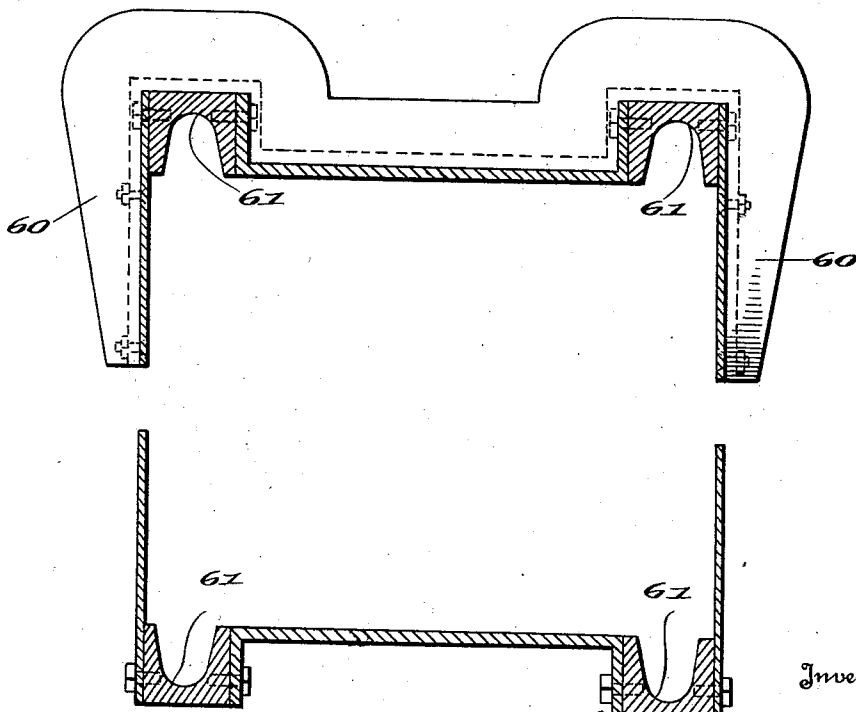


Fig. 14.



Inventor

Lloyd Markt

By *Pennie Davis Martin & Edwards*
Attorney

UNITED STATES PATENT OFFICE

LLOYD MARKT, OF OREGON, MISSOURI

BALING PRESS

Application filed July 7, 1930. Serial No. 466,285.

The invention relates to improvements in baling presses and more particularly to mechanism adapted for use in the baling of hay or materials capable of being baled like hay.

It is an object of the invention to provide a press, such as a hay press, of increased efficiency and capable of ease and simplicity in the gathering and compressing of hay from windrows. The invention embodies in its design novel operating mechanism with resulting benefits not heretofore attained.

An embodiment of the invention is shown in the accompanying drawings wherein Fig. 1 illustrates the hay gathering and baling machine in vertical section.

Fig. 2 is an enlarged view of the conveyor and fork mechanism shown in Fig. 1.

Fig. 3 is a plan view of the conveyor.

Fig. 4 shows a horizontal section through the machine, particularly illustrating the operation of the fork mechanism and the compressing elements.

Fig. 5 is a view taken across the line 5—5 of Fig. 4 and showing means for driving the compression elements.

Fig. 6 illustrates the operation of the compressing elements.

Figs. 7, 8, 9 and 10 are illustrative of details of the conveying mechanism employed in feeding material to the machine.

Fig. 11 represents an enlarged detail of the tension release members shown in Fig. 4.

Fig. 12 illustrates a section through the baling end of the machine.

Fig. 13 is a section at right angles thereto.

Fig. 14 is a section taken across the baling chamber and

Fig. 15 is a dog to hold the hay against return movement.

Referring to Fig. 1, the machine is adapted to be mounted on wheels as illustrated and is preferably propelled by a tractor to which it may be attached by a suitable coupling device, 1. The tractor, or other power device, is also utilized to furnish power to operate the hay baling mechanism, and for this purpose, power is supplied from the prime mover to a shaft 2 terminating in a head 3 adapted for connection with the prime mover. The shaft 2 supplies the force necessary to operate the

several parts of the baling machine and the essential parts will now be described in the order of their operation.

Conveyor

The baling machine is provided with a conveyor generally designated by the numeral 4 provided with sides 5 and a trough formed thereby. Running within the trough, and in a counter-clockwise direction as illustrated in Figs. 1 and 2, are a pair of chains 6—6, one such chain being positioned on each side of the conveyor. Connecting the pair of chains, and adapted for operation thereby and running at right angles thereto are cross bars 7, a plurality of cross bars being employed and spaced a convenient distance apart. Mounted on each of the cross bars are a number of tongs 8 as clearly illustrated in Fig. 3. These tongs may be of a heavy steel wire, secured to the cross bars in an appropriate manner, for example by one or more turns around the cross bar and fastened thereto as shown at 9 in Figs. 7 and 8.

The chains 6 are caused to move, by suitable drive mechanism to be described, within the body of the conveyor in a direction toward the machine and complete the cycle outside of the conveyor as shown in Figs. 1 and 2. The cross bars are secured to the chains in a pivotal manner and their axes are rigidly connected to arms 10, illustrated in detail in Fig. 9.

Upon the exterior of the conveyor and at the under side thereof is a cam track 11, positioned as shown in Figs. 1 and 2. During the complete cycle of the movement of the chains 6, the arms 10, in their passage exterior of the conveyor, are tripped by the cam track 11 and the surface 12 of the arms 10 rides on the cam track 11 and due to the rigid securing of the arm 10 to the cross bars, the cross bars are held in fixed relation to the surface of the cam track, thereby maintaining the position of the tongs at a desired angle to the track. The angle is approximately a right angle, or about normal to the cam track as shown in the drawings. A suitable method of securing linkage between the elements of the chain 6 and the cross

bars 7 is shown in Fig. 10. Accordingly, it will be seen that in operation, the chains effect movement of the cross bars throughout their cycle and, during that portion of the passage in which the arms run upon the cam track 11, the tongs 8 are held at a position about normal to the track and so in effective position to gather or receive the hay and convey it through the trough toward the baling machine. Upon delivering hay to the machine, the arms and tongs are free to assume a natural angle. Provision is made for a suitable tension device such as the shaft and roller 12 shown in Fig. 2.

In order to operate the conveyor mechanism, power is taken off of the shaft 2, through the fork cranks to be described, and supplied to a gear 13 in mesh with another gear 14. By means of a shaft 15, power is transmitted to a gear wheel 16 provided with suitable clutch mechanism tensioned by a spring 17 and the gear wheel 16 has teeth adapted to drive a chain 17 which, in turn, drives a gear wheel 18 situated at the delivery end of the conveyor mechanism and this gear wheel 18, in turn, effects operation of the conveyor chains about itself and opposed gear wheel 19.

An embodiment of the clutch above referred to is illustrated in Fig. 11, wherein it will be seen that the shaft 15 extends outwardly and, by a suitable nut 20 effects pressure of a spring 21 on the gear wheel 16 holding it in mesh with a member 22 keyed, as at 23, to the shaft 15. The tension of the spring is adjusted so that a breaking load on the conveyor would permit disengagement of the clutch and let the drive mechanism run idle without damage to the machine.

Delivering mechanism

The material, such as hay, is thus brought to the body of the machine and is delivered to the baling mechanism by forks generally indicated at 24 in Figs. 2 and 4. The forks consist of a plurality of arms 25, pivotally and angularly mounted to shafts 26 which, in turn, are pivoted as at 27 to a cross bar secured to the machine. As illustrated in the drawings, the forks are arranged for an eccentric movement whereby, upon their feeding stroke, the forks protrude downward into the mass of the material to be baled and thence move the material toward the baling compartment. Upon the completion of their cycle the forks are withdrawn angularly through the material at an angle more or less acute to the direction of travel of the material and thus avoiding tendency to retract the hay or other material being delivered. A suitable crank arrangement for this purpose is clearly shown in the drawings referred to.

In order to effect the operation of the forks, power is taken off of the shaft 2 by way, for

example, of pinions 28 and 29 suitably secured to the shaft. The pinion 28 is meshed with a bevel gear 30 and the pinion 29 with a bevel gear 31, and each of these bevel gears in turn are mounted on a stub shaft driving the cranks on the respective sides of the main drive shaft 2. In order to effect uniform rotation of the cranks and forks it is desirable that the angular velocity of the bevel gears 30 and 31 be the same and, for this purpose, the gear ratio of the respective pinions to the bevel gears is the same, that is, a small pinion is caused to drive a small gear and a large pinion is caused to drive a larger gear. A ratio between pinions and their corresponding bevel gears is conveniently 1 to 5.25.

Baling mechanism

The baling mechanism about to be described is an entirely new departure in the art so far as I am aware. Power to operate the baling mechanism is taken from the main shaft 2, preferably by a screw and worm connection as indicated in Fig. 5 wherein the end of the shaft 2 terminates in a screw and drives a worm gear 32 keyed, as at 33, to a shaft 34. The shaft 34 extends in both directions laterally of the machine and each end is toothed as at 35 meshing with respective bevel wheels 36 of which a pair are employed. The bevel wheels 36 are mounted upon and secured to vertical shafts 37 which shafts, in turn, drive the baling mechanism. As the baling mechanisms are symmetrical, only one such element need be described but it will be understood that the two mechanisms are employed and that they operate in directions counter to each other and in the directions to compress material into the baling chamber.

The improved baling mechanism is illustrated in Figs. 1, 4, 5 and 6 and, with particular references to Figs. 5 and 6, it will be noted that the mechanism consists in the utilization of a plurality of plates 38 adapted to move the hay into the baling chamber and exert a compressing action thereon. As shown in Fig. 6, the two compressing elements are so arranged that the plates of the separate mechanisms follow each other in sequence without tendency to an interlocking action and this effect, in addition, performs a continuous compression on the material being baled. The compressing plates 38 are elbowed from an arm 40 which is pivoted as at 41 to a stub arm 42 and this, in turn, is pivoted as at 43 to an arm 44 fixed to the shaft 37.

A compressing plate 38 carries vertically knobs 45, 46 adapted to run in respective upper and lower cam tracks 47 and 48.

Mounted also on the axis 37 are radial arms 49 to which are pivoted connecting arms 50 pivoted as at 51. The arms 50 are angularly disposed and in turn pivoted, as at 52, to the

compressing plate 38, preferably at the knobs 45 and 46. Thus it will be seen that the rotation of the shaft 37 effects the dual application of movement to the compression plates 38 by reason of the connecting arms 49, 50, and the toggle arms 40, 42, 44. The cam tracks 47 and 48 are disposed as shown in Fig. 6 and the effect thereof causes the knobs 45 and 46, moving within their respective cam tracks, and due to the combined connecting arms of the compressing plates 38, to move in such a manner that the compressing plates are normal to the cam tracks during the compressing or baling stroke. Thus, it will be seen that the maximum power is exerted during the baling operation and that the withdrawal of the compressing plates from the stream of hay is at such an angle as to avoid interference with the compression.

Baling chamber

The compressing plates 38, in the course of their movement, sweep the hay in the direction toward the chamber wherein the hay is baled. The entrance to the baling chamber is between the cam tracks 47 and 48 and along a tangential portion of the cam tracks designated by numerals 53 in Fig. 6. It will also be noted, by inspection of Fig. 6, that the plates 38 are in a plane substantially normal to the tangential faces of the cam tracks during this baling operation and that the plates extend a distance approximating the width of the space between the respective tracks. Thus the plates assure the movement of the hay into the baling chamber. Moreover, the plates of each of the pair of mechanisms are staggered so that they fall intermediate of each other during the baling operation as clearly shown in Fig. 6. The hay is thus forced into baling chamber 54 which is provided with an abutment at its rear end and against which the hay is delivered and compacted by succeeding portions of hay introduced into the chamber. The chamber 54 is provided with dogs 55 located as shown in Fig. 6 and of a type illustrated in Fig. 15. The dogs are pivoted at a suitable point as at 56 and have a tooth bevelled on one face as at 57 and having another face 58 normal to the direction of the hay. The dogs are spring actuated as by an expansion spring 59 designed to tend to maintain the dogs in fixed position.

The baling chamber is subjected to heavy compression and is braced by T-iron construction as shown in Fig. 14. The top casting has arms 60 extending downward on each side of the brace 61 to which it is bolted. A bottom casting may be similarly employed.

The chamber 54 is provided with a door 62 provided with locking means of a suitable type, for example of a socket and rod type such as designated by numerals 63 and 64.

It is contemplated that provision be made

for the wiring of the bales and it is also contemplated that provision be made for the use of division blocks but as these elements are well known in the art it is not necessary to specifically describe the same.

Operation

In operation the machine heretofore described is attached to a tractor or similar source of power by means of a coupling as at 1 and a suitable connection to the prime mover is made to the shaft 3. Thus the machine is drawn or propelled over the ground and power is applied to effect operation of the various parts. Hay is gathered or pitched on to the conveyor which conducts the hay into the body of the machine. The conveyor may be elevated or lowered a desired amount by suitable mechanism as indicated in Fig. 1. The action of the conveyor is positive and the tongs assure the elevating and carrying of the hay to the body of the machine.

Upon the elevation of the hay, the forks pick it from the conveyor and toss or move it into the paths of the plates 38 where the hay is caused to pass in the channel provided by the tangential faces of the cam tracks and so into the baling chamber. The hay is thus subjected to a continuous compression and the degree of compression is increased as the hay is compacted into the chamber. In passing into the chamber the hay passes beneath the dogs 55 and the arrangement of the dogs is such as to permit the passage into the chamber but to prevent the reverse movement of the material as will be apparent from inspection of Fig. 15 and the foregoing description.

When the hay is compacted to a sufficient degree or when a standard bale is realized, the operation of the compressing mechanism may be interrupted and the bale thus formed may be suitably wired and withdrawn from the chamber in a well known manner.

I claim:

1. A baling press comprising in combination, means for receiving material to be baled and means for compressing such material, said compressing means comprising a pair of opposed rotary elements each provided with a plurality of plates adapted to exert compression upon the material being baled during the rotation of the elements and so arranged that the compressing effects of the plates are exerted in staggered relationship on the material and during the compressing operation.

2. A baling press comprising in combination, means for receiving material to be baled and means for compressing such material, said compressing means comprising a plurality of rotary elements, each provided with a plurality of pressing plates, said plates being mounted axially of the elements and being connected to the axis by a plurality of connections lying in substantially the same plane, said elements also being provided with

a perimetrical cam track, and means connecting the plates and track for guidance of the plates during their movement.

3. A baling press comprising in combination, means for receiving material to be baled and means for compressing such material, said compressing means comprising a plurality of rotary elements, each provided with a plurality of pressing plates, said plates being mounted axially of the elements and being connected to the axis by a plurality of connections lying in substantially the same plane, said elements also being provided with a pair of perimetrical cam tracks and means connecting the plates and the tracks for guidance of the plates during their movement.

4. A baling press comprising in combination, means for receiving material to be baled and means for compressing such material, said compressing means comprising a plurality of rotary elements, each provided with a plurality of pressing plates, said plates being mounted axially of the elements and being dually connected to the axis, the dual connection of the plates including a radial rod and an arm connecting the same to the plate adapted to exert a thrust thereon and including also a toggle connection between the plate and another radial connection whereby to effect a sweeping movement of the first plate in a direction substantially normal to the cam track during its compressing stroke while permitting an angular withdrawal of the plate upon the completion of that stroke.

5. A baling press comprising in combination, means for receiving material to be baled and means for compressing such material, said compressing means comprising a plurality of rotary elements, each provided with a plurality of pressing plates, said plates being mounted axially of the elements and being dually connected to the axis, the cam track of each of the compressing elements being tangential for a portion of its length and the pair of compressing elements being so arranged that the tangential portions of the respective cam tracks define walls in substantial alignment with the walls of the baling chamber.

In testimony whereof I affix my signature.
LLOYD MARKT.