No. 887,378. PATENTED MAY 12, 1908.

M. W. CHARLTON.

PLATFORM REAPER AND BINDER.

APPLICATION FILED SEPT. 13, 1902.

3 SHEETS—SHEET 1.

Fig. 4.

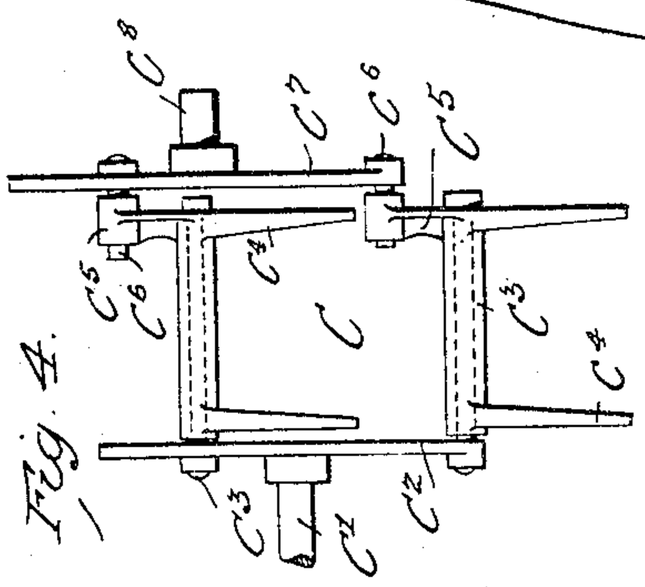

Fig. 1.

Fig. 3.

Witnesses:
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3 SHEETS—SHEET 2.

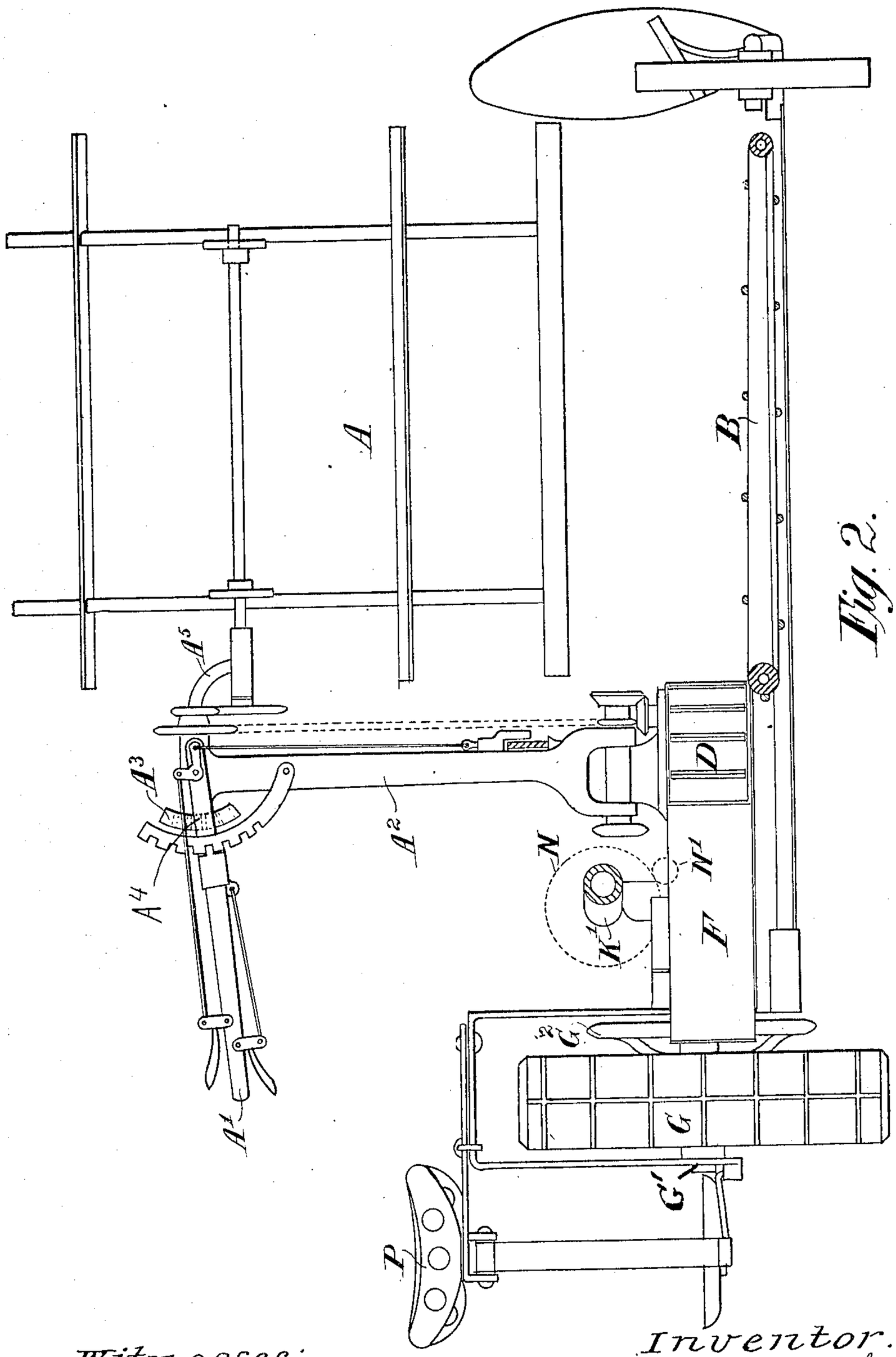

Fig. 2.

Witnesses:
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3 SHEETS—SHEET 3.

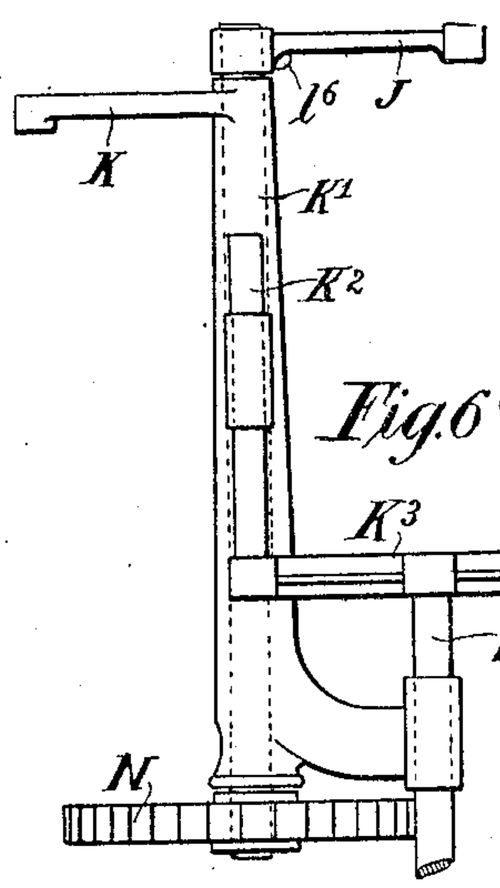
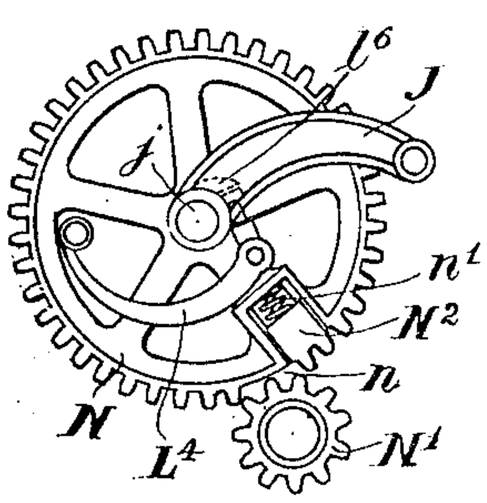


Fig.6a.

Fig.6.



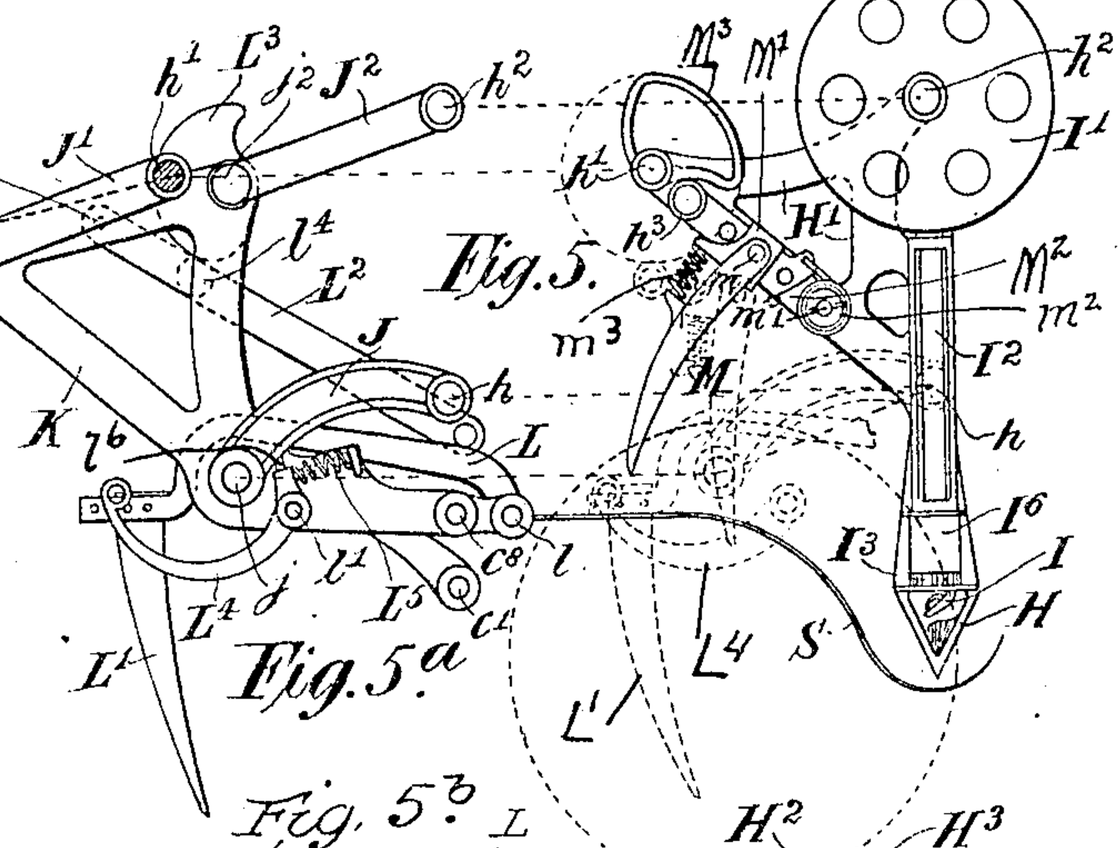


Fig.5a.

Fig.5.

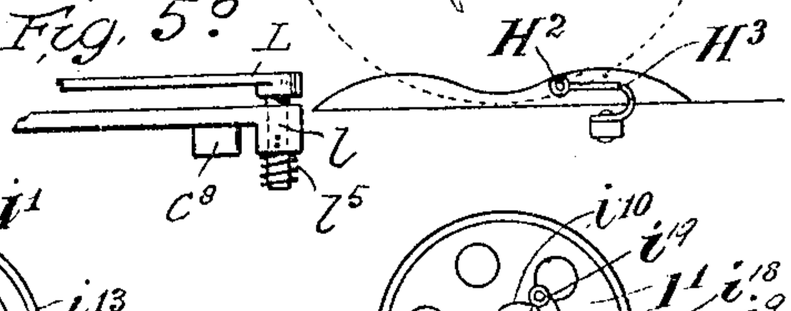


Fig.5b.

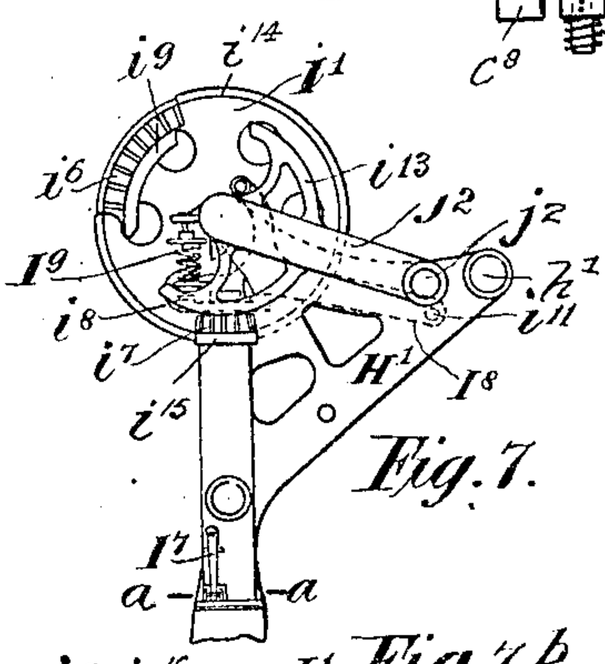


Fig.7.

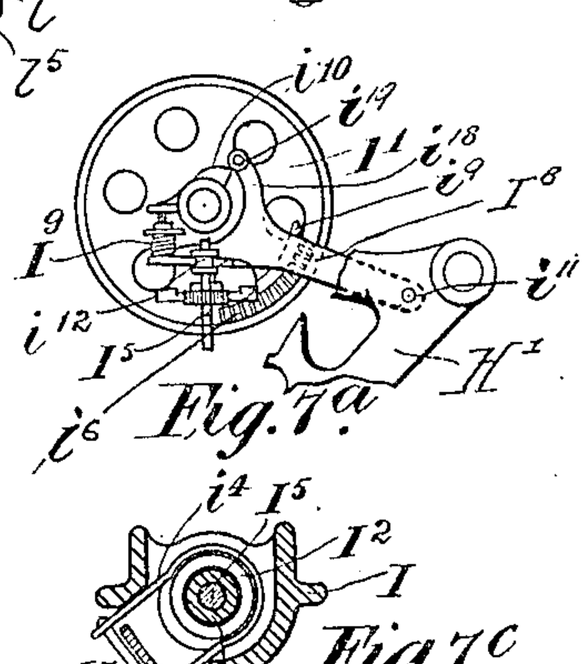


Fig.7a.

Fig.7c.

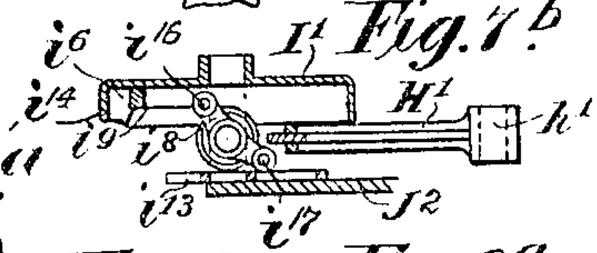


Fig.7b.

Fig.8. Fig.8a.

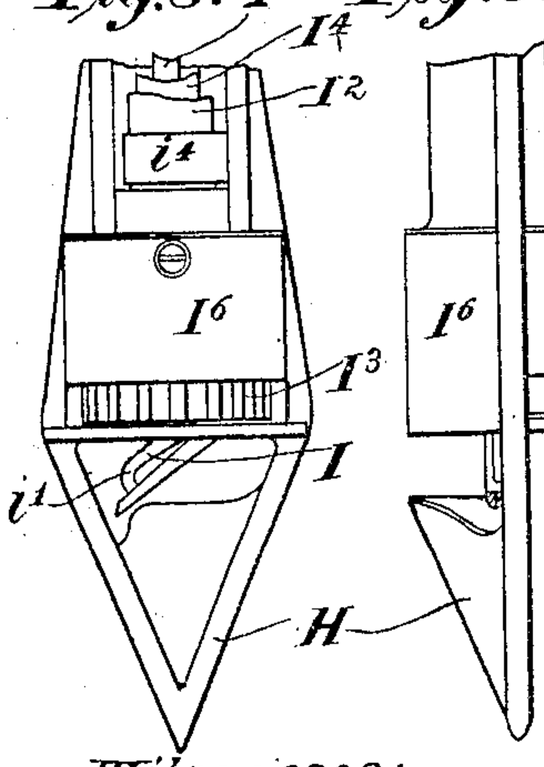


Fig.9.

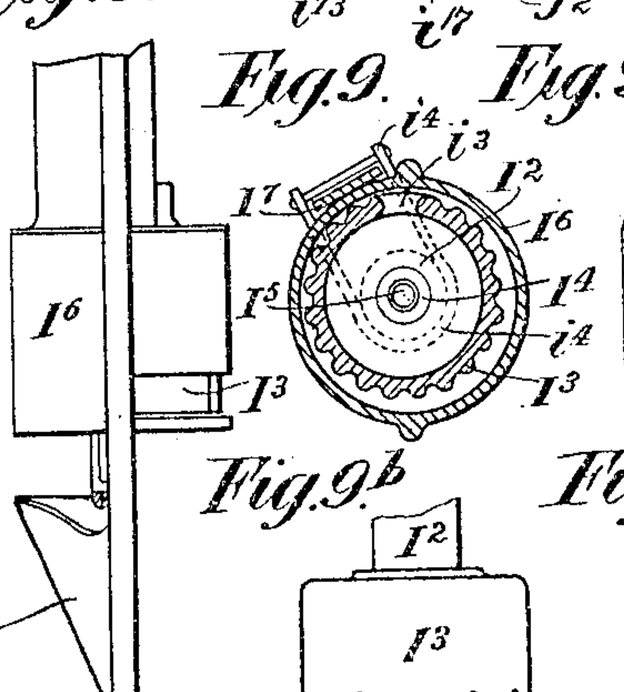


Fig.9a.

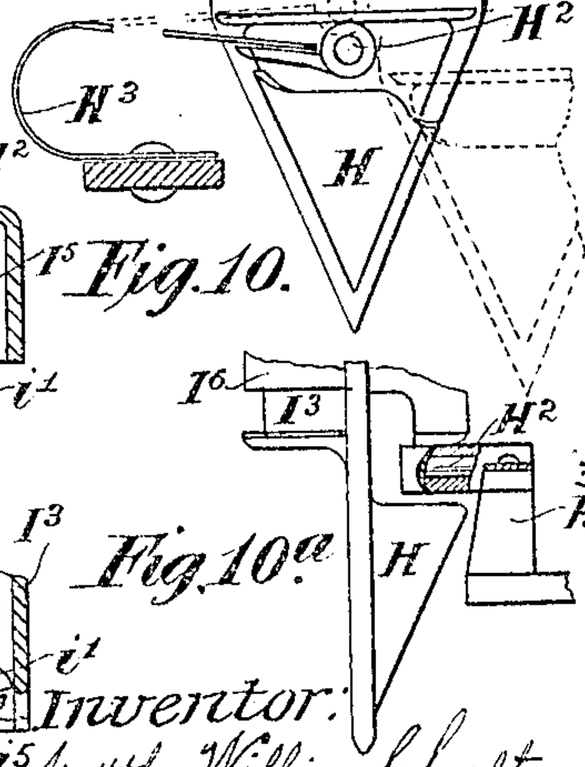


Fig.10.

Fig.9b.

Fig.9c.

Fig.10a.

Witnesses:
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UNITED STATES PATENT OFFICE.

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PLATFORM REAPER AND BINDER.

No. 887,378. Specification of Letters Patent. Patented May 12, 1908.

Application filed September 13, 1902. Serial No. 123,309.

To all whom it may concern:

Be it known that I, MATTHEW WILLIAM CHARLTON, a subject of the King of Great Britain and Ireland, residing at Hall street, Spottiswoode, in the State of Victoria, Commonwealth of Australia, engineer, have invented a new and useful Platform Reaper and Binder, of which the following is a specification.

This invention relates to a platform reaper and binder wherein the center of the main traveling wheel is placed directly or nearly in line with the finger bar and having the main gear spindle in front of the traveling wheel while the cut grain is conveyed to the packers without being elevated and there is no binding mechanism under the table.

The main novel features consist in the binding mechanism as will be hereinafter explained.

The invention will now be described aided by a reference to the accompanying sheets of drawings in which:—

Figure 1 is a general plan, Fig. 2 a rear elevation and Figs. 3 and 4 show side and front views of the packers. Figs. 5 and 5^a show side views of the binding mechanism, the parts shown in Fig. 5^a lying when in position immediately behind the parts shown in Fig. 5 as shown in dotted lines in Fig. 5. Fig. 5^b is a plan view of portion of Fig. 5^a. Fig. 6 shows a side view of the trip gear and Fig. 6^a the bracket, both of the binding mechanism. Figs. 7, 7^a and 7^b show the gear for operating the knotter while Fig. 7^c is a section at *a a* Fig. 7, showing the spring and clip of the twine retainer. Figs. 8 and 8^a show the needle point and the knotter gear together and Figs. 9, 9^a 9^b and 9^c, details of the knotter gear while, Figs. 10 and 10^a show the needle point and twine guide.

The grain when cut is delivered by the reel A on to a moving canvas apron or conveyer B and carried direct to the packers C without any elevation whatever. A small revolving apron butter D is placed at the delivery end of the conveyer and at an angle across the finger bar E, so as to operate on the butt or cut end of the grain, and move it backwards sufficient to clear the end of a butter board F which is also fixed at a sufficient angle to the finger bar as to deliver the bundles clear of the projecting half of the traveling wheel G, which is supported on a short axle G^1 having a sprocket wheel G^2 on it which imparts motion by chain belt to a sprocket R^1 on the main gear spindle R.

The packers C receive the grain directly off the end of the conveyer B and are composed of a horizontal driver spindle c^1 having a wheel or disk c^2 attached to its end, this wheel being provided with three or more studs c^3 which lie parallel with said spindle c^1 and equi-distant on the outer edge of wheel. The sleeves of the packer fingers c^4 are made to fit loosely on said studs c^3 and are connected by link arms c^5 with studs c^6 attached to a second idler wheel or disk c^7 revolving on a journal c^8 placed at a distance out of or above a direct line from the driver spindle c^1 corresponding with the length of the connecting links c^5 so that a rotary motion given to the driver spindle and wheel imparts a corresponding rotary motion to the idler wheel through the medium of studs c^3 and packer fingers c^4 and at same time the packer fingers are kept in a vertical parallel position while a circular motion is imparted to them as indicated by the dotted line in Fig. 3.

c^9 are pressure pieces formed at the top part of the packer fingers c^4.

The needle H and knotter I as assembled form the main parts of the binding mechanism, the knotter mechanism being operated by means of a driver or power crank J while also there are two other cranks marked J^1 and J^2 respectively, the centers *j* j^1 and j^2 of said three cranks being so situated as to form the extremities of a triangle. The needle arm is also worked from three similar centers *h* h^1 and h^2 and forming a corresponding triangle to that of the knotter gear, and the said two pairs of triangularly arranged centers are connected together by the aforesaid cranks marked J J^1 and J^2 and thus every part of the needle and knotter is kept in a parallel position while they travel in a circular path in a vertical plane.

K is a bracket formed at end of a sleeve K^1 and designed for carrying the bearings of cranks J, J^1 and J^2, the crank J^1 and J^2 being designed to keep the needle vertical and also to drive the knotting mechanism and the compressor, while J is the driver crank. Said sleeve bracket is supported by guide rods K^2 carried by a bar K^3 projecting up from the machine frame.

L is an arm centered at *l* on bracket K, said arm being lifted upwards by aid of a coiled spring l^5 coiled around the center

stud l as shown in Fig. 5[b] while the arm carries at its outer end the bundle divider L^1 the back end part of which is pressed upon by a small roller at end of lever L^2 which is centered at l^3 on bracket K, the lever L^2 having a small roller l^4 on it which is acted on by a cam L^3 affixed on stud j^2.

L^4 is a trip lever which is centered at l^1 on bracket K while the pivoted end of the trip lever has a boss on it which is acted on by a spring L^5, and said boss contacts with a lug l^6 on crank arm J.

M is the compressor centered to an adjustable block M^1 which may be set at either of the three or more holes m m m on the arm M^2, M^2 being centered on a stud m^1 on the bracket and needle arm H^1 and having a coil spring m^2 wound on the stud and connected to the arm M^2 for raising same, the outer end of the arm M^2 has a roller h^3 attached, which is operated by the cam M^3 attached to the end of the crank J^1.

m^3 is a compressor spring placed between projecting lugs on compressor M and block M^1.

The knotter consists of a rotary cup I^3 carried on the lower end of a tubular spindle I^2 the knotter being placed within the needle point H. The cup I^3 revolves about a bill hook i attached to a smaller tubular spindle I^4 passing through the tubular spindle I^2 of the cup a small steel rod I^5 passes through the bill hook spindle and is attached by a link i^2 to a tongue i^1 pivoted to said bill hook. The knotter cup I^3 is operated by means of gear teeth from the cam wheel I^1, these teeth mesh with a small pinion i^7, on the upper end of the tubular spindle I^2, there being sufficient teeth on a given part of the circumference of the cam wheel I^1 to give to the pinion i^7 and likewise to the knotter cup I^3 one revolution while a locking flange i^{14} engages with a flat part on the flange i^{15} on the pinion i^7 and locks the said pinion during the remainder of the revolution of the cam wheel I^1. The outer surface of the knotter cup I^3 is fluted as shown in section Fig. 9 and the lower bearing of its tubular spindle is sufficiently slotted or made oblong to allow the cup to be pressed against the inclosing case I^6 by means of a spring I^7 (Fig. 7) the spring is attached to the needle bracket H^1 at its upper end while its lower end is attached to a clip i^4 passing round the lower end of tubular spindle I^2. The bill hook i and tongue i^1 are oscillated by a rock cross head i^8 attached to the upper end of tubular spindle I^4. On each end of cross head i^9 is a small roller i^{16} and i^{17} (Fig. 7[b]) the cam i' on wheel I^1 and the cam I^{13} on crank J^2 coming into contact alternately with the rollers i^{16} and i^{17}, gives to the cross head and tubular spindle I^4 and thence to the bill hook an oscillating motion of about one fourth of a revolution backwards and forwards.

The tongue i^1, pivoted in the bill hook, is opened and closed by means of a steel rod I^5 connected to the tongue by a link i^2 the rod I^5 passing through the center of the tubular spindle I^4, the upper end of this rod is threaded to receive a grooved nut or collar I^{12}. A lever I^8 is pivoted to the needle arm H^1 at i^{11}, while to the opposite end of this lever a spring I^9 is connected from a lug over the needle arm H^1 so as to press the lever downwards while two lugs projecting from the side of the lever form a fork which is fitted into its grooved nut i^{12} on rod I^5 in such a manner that the pressure downwards of the spring I^9 acting on the lever I^8 and thence to the lower flange of the grooved nut i^{12} and rod I^5 closing the tongue i^1 on the bill-hook i as shown in Fig. 9[a]. The lever I^8 has a projecting arm i^{18} on its upper side to which is attached a roller i^{19}, while the cam wheel I^1 is provided with a cam i^{19} which at the right time acts on the roller i^{19} and lifting the lever I^8 as shown in Fig. 7[a] opens the tongue i^1 as shown in Fig. 9[c].

The needle point H and casing I^6 are in one piece and is screwed to the needle bracket.

H^2 is a tubular twine guide through which the twine coming from the ball passes and is carried on the end of a spring H^3 Figs. 10 and 10[a], the opposite end of the spring is bent and attached to the binder frame underneath the binding platform as at Fig. 5.

The third crank J^1 carries a cam M^1 which operates a compressing lever M which moves with the needle H as it takes its circular motion or path.

The drive crank J operating the needle etc. is attached to a spindle j which is provided at the opposite end with a spur wheel N having two or more teeth removed forming a gap n sufficient for the driving pinion N^1 to revolve without engaging the teeth of wheel. At the starting side of this gap a safety spring block N^2 is provided having one or more of the spur wheel teeth attached, and this block is acted on by a coiled spring n^1. The trip lever L^4 locks the spur wheel N, so that the pinion N^1 revolves freely in the gap n until sufficient grain has been packed against the lever L^4 to release it when the pinion engages with the spring teeth of the wheel giving it one revolution carrying the needle with the knotter downwards through the grain, compressing the bundle tying the knot, and at same time moving the bundle outwards with its parallel circular motion. The packers C continue packing for the next bundle behind the needle as it moves the bundle being tied outwards then the needle in its backward motion passes over the top of the bundle being packed insuring a continuous flow of the grain to the binding mechanism.

The binding mechanism and packer spindle c^1 are placed at an angle to the cutting finger bar E and at about right angles to the butter board F thus moving the butts of the bundles

in advance of the heads at the rear of the machine and discharging the bundle behind and clear of the main traveling wheel G or on to a bundle carrier O constructed with a light frame carrying rollers and belts or canvas apron. These belts or canvas apron may be operated when discharging their load either by means of the driver's foot, or by means of an attachment to the gearing of the machine.

The driver's seat P is fixed outside of the main traveling wheel. The reel A is operated by one lever A^1 having a double action for raising or lowering or moving backwards or forwards as required the reel and its mechanism being supported on a standard A^2.

A^3 is a toothed quadrant affixed to lever A^1 and said quadrant gears with a pinion A^4 to which the arm A^5 carrying the reel is secured and hence it is by rotating the pinion that the height of the reel spindle is adjusted.

E^1 is an eccentric connected by pitman E^2 with the cutting knife said eccentric being driven as shown from main spindle R. E^3 are bevel gears for conveying motion from said main spindle to the pinion N^1 of the binding mechanism.

E^4 is a sprocket on main spindle for driving the reel A and the butter D.

S is a breast plate to bear upon the grain bundle while being packed and bound.

While the bundle is being packed against the divider arm L^1, the cranks J—J^1 and J^2 operating the binding mechanism are locked by means of the trip arm L^4 in the position shown in Fig. 5^a, and the relative positions of the needle point H, breast plate S, divider arm L^1, trip arm L^4 and twine guide H^3 when locked are shown at Fig. 5. The packers move the cut grain underneath the needle point and between the breast plate S and the lower platform to which the twine guide H^3 is attached and is packed against the divider arm L^1 until sufficient has accumulated to lift the trip arm L^4 so as to release the lock at L^6 Fig. 6. When the lock has been released, the weight of the needle bracket and knotter is sufficient to start the cranks and move the wheel N until the teeth of the driver pinion N^1 engage with the teeth of the spring block N^2 thus starting the binding mechanism. The starting of the binding mechanism causes the needle point H to move in the dotted circle indicated at Fig. 5, passing through the space cleared by the packers' fingers downwards towards the twine guide H^2. The twine guide H^2 passes through the gap in the needle point as shown in Figs. 10 and 10^a, the guide being so set that the needle point presses it down from the position indicated by the dotted outline Fig. 10, after the needle has moved sufficiently in its course to pass the twine guide, the spring H^3 to which the guide is attached raises the guide again to the position indicated by the dotted outline while the needle point has moved on the dotted circle to the position of dotted outline Fig. 10.

The twine as it is drawn from the ball passes through the twine guide H^2 from the outside away from the needle the cut end of twine being held in the retainer situated in the needle point H. As the needle point H passes downwards towards the twine guide H^2 it will be seen on reference to Fig. 5 that the point of the compressor M, will also travel downwards in the track of the divider arm L^1 while the cam M^3 acting on the roller h^3 will gradually close the compressor towards the needle, the bundle being compressed between the compressor arm M and the side of needle bracket or arm H^1 so that when the needle point H has passed by the twine guide H^2 the bundle is compressed and encircled by the twine ready for tying the knot, at this time the cam L^3 having passed over the roller l^4 the coil spring l^5 comes into operation and raises the arm L until the point of the divider L^1 is clear of the bundle being tied and discharged. The knotter cup I^3 is provided with a notch i^3 in its lower edge, and after the twine guide H^2 has passed through the opening in the needle point and reached the position indicated by dotted lines in Fig. 10, it will be seen that the action of its spring H^3 and the downward motion of the needle will press the twine passing through the tubular twine guide upwards into the notch i^3 in cup I^3. Just at this moment the cam i^9 comes into contact with the roller i^{16} on the cross head i^8 and turns the bill hook i until the tongue i^1 is brought crosswise underneath the twine. The gear teeth i^6 now engages with the pinion I^7 starting the knotter cup I^3 carrying the loop of the twine lying in the notch i^3 with it. When the knotter cup I^3 has given part of its revolution the cam i^{10} comes into contact with roller i^{19} on lever I^8 and opens the tongue i^1 as shown in Fig. 9^c the twine being above the tongue and deflected into the cup. As the knotter cup I^3 completes its revolution it carries the inner twine round the bill hook i while the outer twine is wound on the knotter cup I^3 and between the cup I^3 and its casing I^6 the pressure of the cup against the casing acting as the retainer. It will be seen on reference to Fig. 9^c that the tongue i^1 opens just past the bottom of the notch I^3 so that as the cup I^3 completes its revolution the notch i^3 carries the ends of the twine to be cut also the end being released from the retainer between the open tongue i^1 and the bill hook point i. The knotter cup I^3 has now completed its revolution and is locked by means of the flanges on the cam wheel I^1 and pinion i^7 and the cam i^{10} having passed by the roller i^{19} the spring I^9 acting through the lever I^8 and rod I^5 closes the tongue i^1 on the twine between

it and the bill hook i as shown at Fig. 9a. One knot is now completed and the cam i^{13} on crank J^2 coming into contact with the roller i^{17} on cross head i^8 brings the bill hook i and tongue i^1 (also a cutting knife i^5 attached with a screw to the bill hook i as shown) back into their original position with the bill hook pointing towards the bundle just being discharged the backward motion of the cutting knife i^5 severing the end of the twine against the notch i^3 in the cup I^3. The cam M^3 having now passed the roller h^3 the compression is released and the coil spring m^2 lifts it back to its original position, thus releasing the compression of the bundle while the continued motion of the needle, strips the knot from the bill hook i and the cam L^3 coming into contact with the roller l^4 presses the divider arm L^1 downwards in the track of the needle point and behind the bundle just tied and into position for the next bundle being packed and the needle having completed its circular course is again locked by the trip arm L^4 until another bundle has been packed against it. It will be seen from this description that the needle acts also as the discharge arm and that the knot is being tied while the bundle is being discharged and that the packers are continually taking the grain from the conveyer.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a platform reaper and binder, a vertical needle, a casing I^6 thereon, spindles I^4 and I^5 within the needle and one within the other, a bill hook i and tongue i^1 assembled on the lower ends of said spindles and a spindle I^2 surrounding the aforesaid spindle carrying a cup I^3 at its lower end, and said cup having a roughened exterior surface, substantially as described.

2. In a platform reaper and binder, knotter devices consisting of a bill hook i, a tongue i^1 pivoted thereto, a spindle I^4 carrying said bill hook, a reciprocating rod I^5 passing through the spindle I^4 and being connected to the tongue i^1, a tubular spindle I^2 surrounding the spindle I^4, a casing I^6 surrounding the lower end of the spindle I^2, a needle H carried by said casing, means for yieldingly holding the spindle I^2 against one side of the casing I^6, a knife i^5 connected to the bill hook, a pinion i^7 on the upper end of the spindle I^2, a disk wheel I^1 having teeth I^6 which engage with the pinion i^7, a rock cross head i^8 secured to the upper end of the bar I^5, said disk wheel I^1 having a cam i^9 thereon engaging with the said rock cross head and lever J^2 having a cam i^{13} also engaging with the rock cross head.

3. In a platform reaper and binder the binding mechanism consisting of the combination of the sleeve bracket K—K^1, crank-levers J, J^1, and J^2, lever L^2, cam L^3, trip lever L^4, spring L^5, pivoted arm L bundle divider L^1 carried thereby, in combination with the needle H bracket H^1 and the pivoted compressor arm M cam M^1 and the disk and gear wheel I^1 carried by the bracket H^1 all substantially as described and shown.

In witness whereof I have hereunto set my hand in presence of two witnesses.

MATTHEW WILLIAM CHARLTON.

Witnesses:
BEDLINGTON BODGCOMBS,
W. J. S. THOMPSON.