

M. D. HIGLEY & D. L. COLUMBIA.

Automatic Raking and Binding Attachment for Harvesting Machines.

No. 57,714.

Patented Sept. 4, 1866.

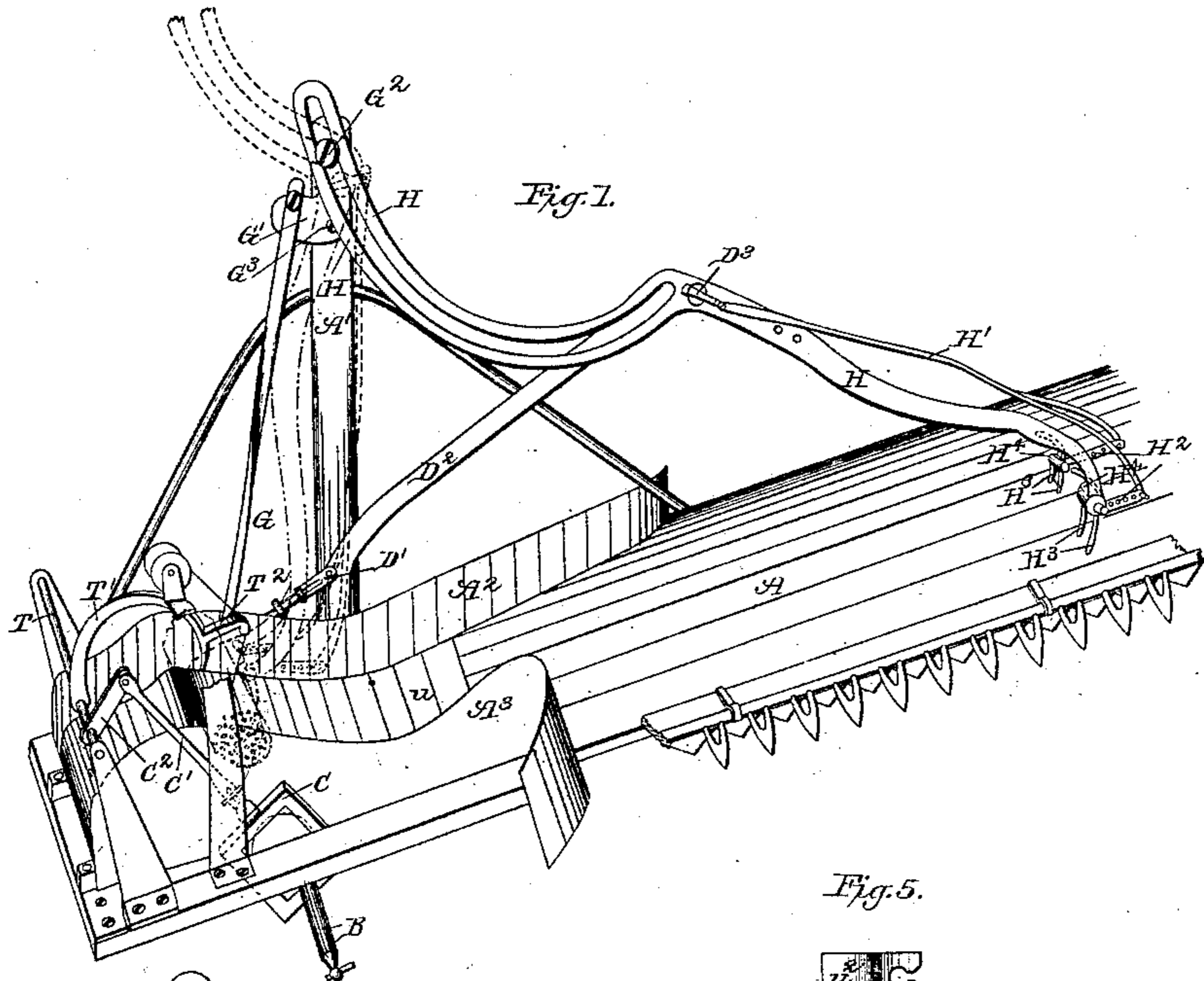


Fig. 5.



Fig. 4.

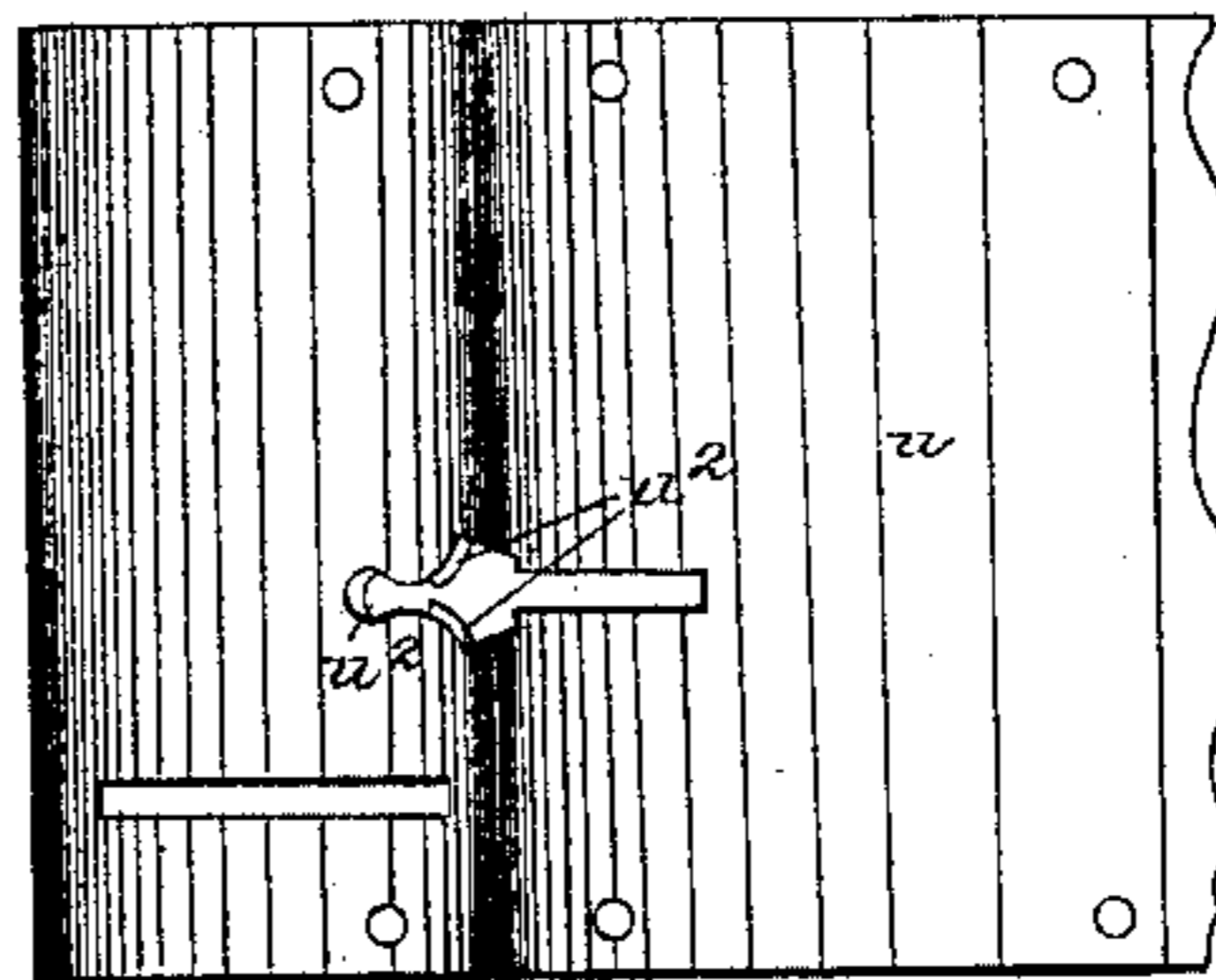


Fig. 6.

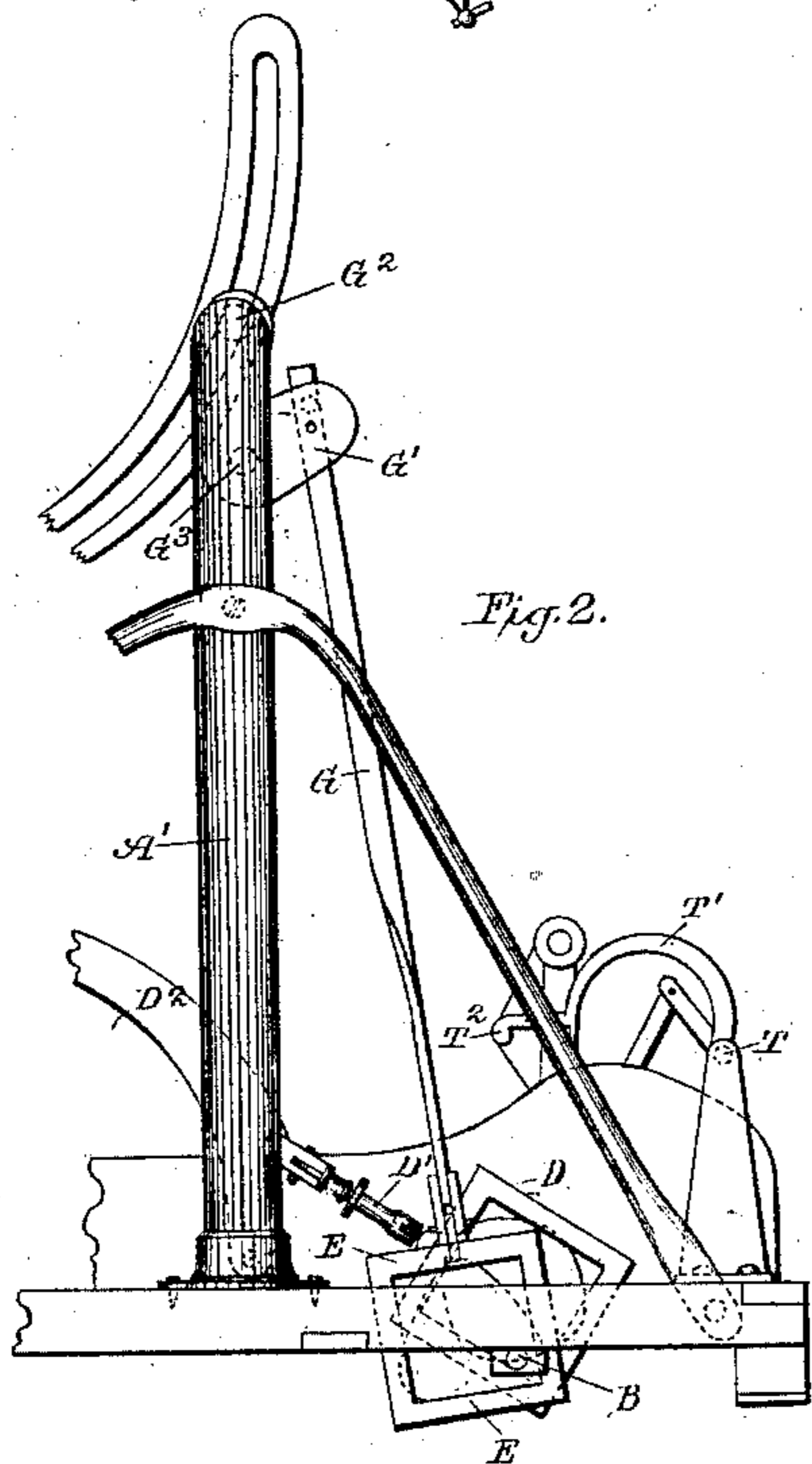


Fig. 2.

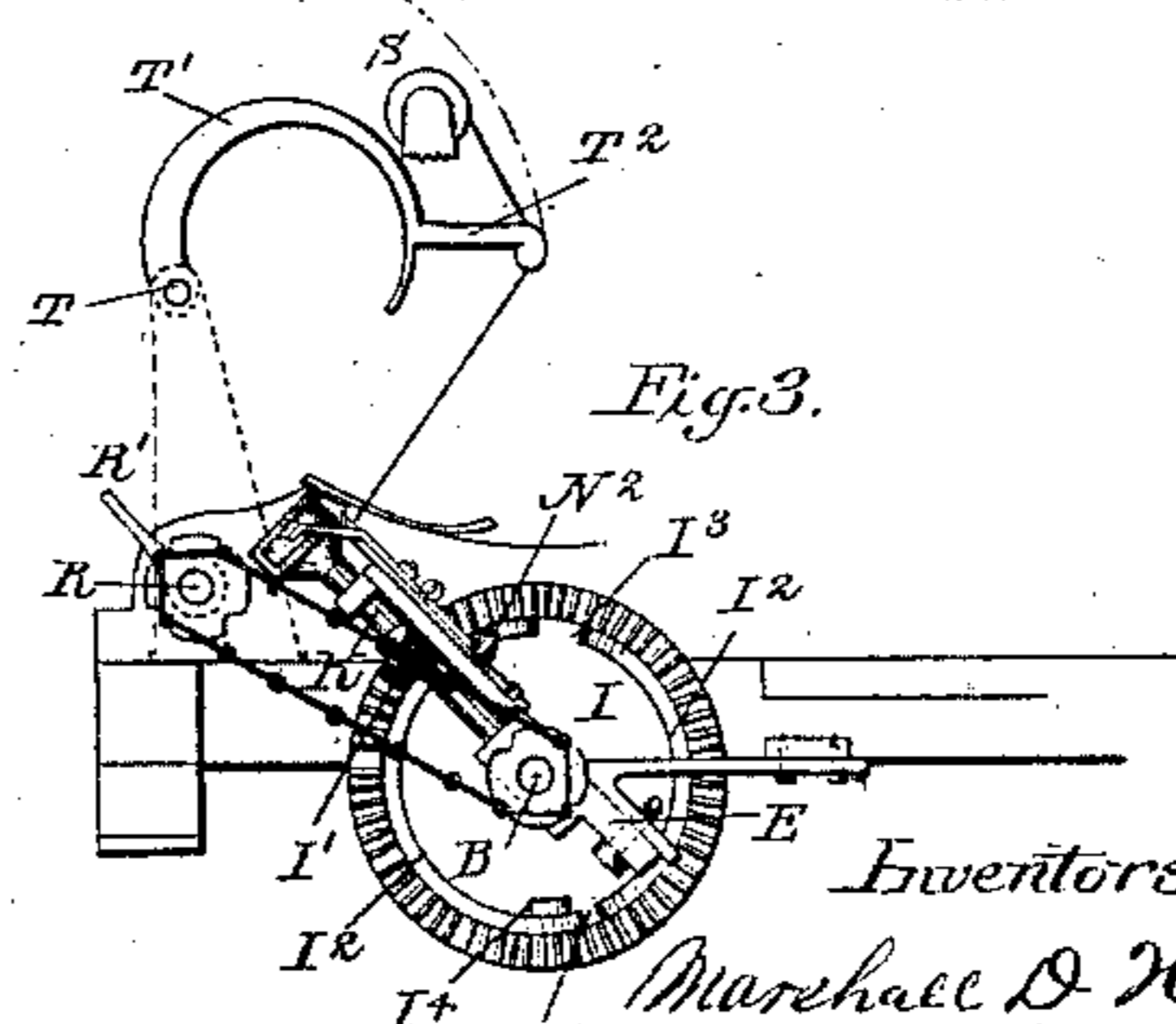


Fig. 3.

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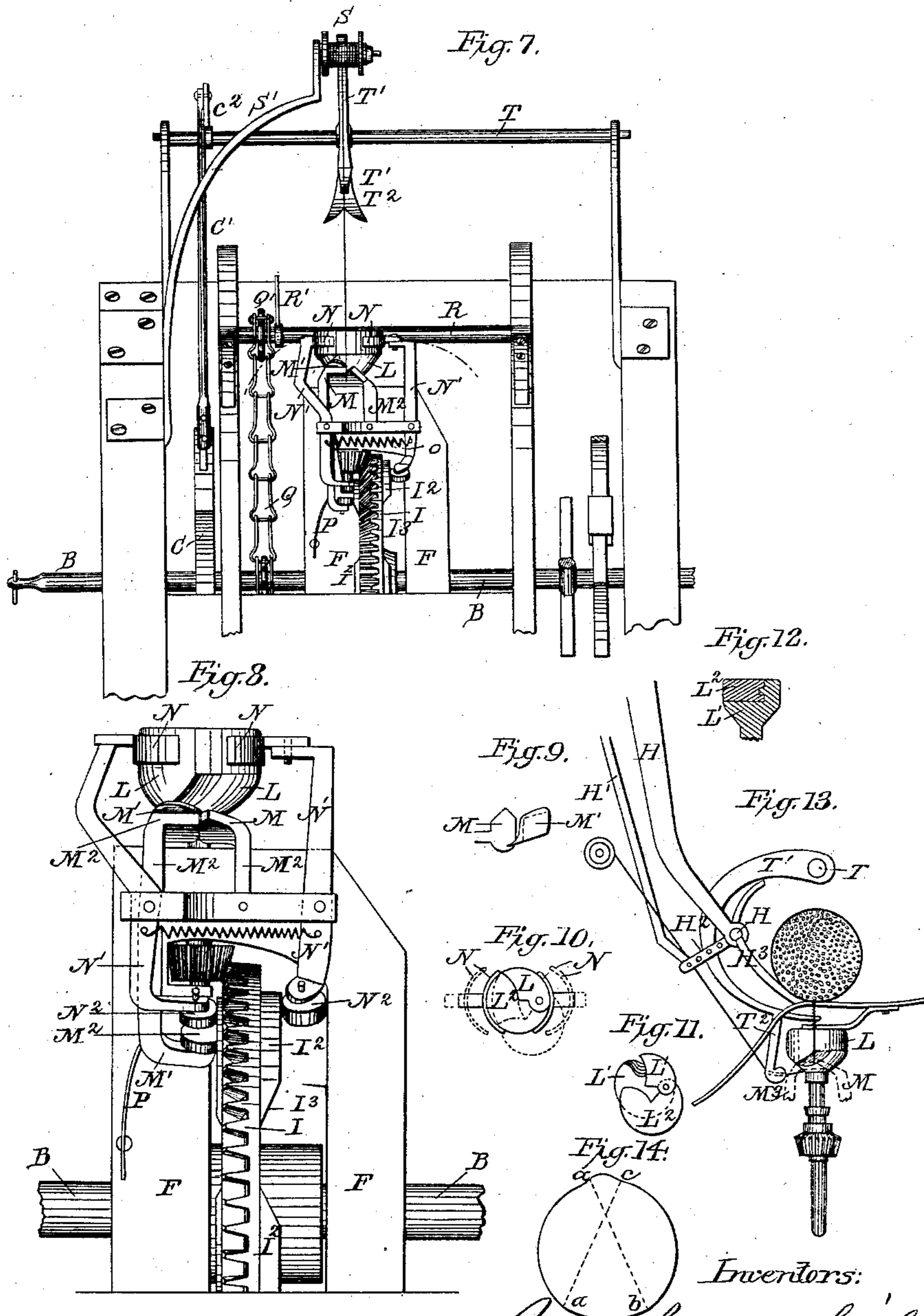
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UNITED STATES PATENT OFFICE.

MARSHALL D. HIGLEY AND DANA L. COLUMBIA, OF MORRISON, ILLINOIS.

IMPROVEMENT IN RAKING AND BINDING ATTACHMENTS TO REAPERS.

Specification forming part of Letters Patent No. 57,714, dated September 4, 1866.

To all whom it may concern :

Be it known that we, MARSHALL D. HIGLEY and DANA L. COLUMBIA, of Morrison, in the county of Whitesides and State of Illinois, have invented a new and useful Improvement in Raking and Binding Attachments to Harvesting-Machines; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, made part of this specification, in which—

Figure 1 is a perspective of the platform of a harvester with our improvements attached, as seen from the front. Fig. 2 is a partial elevation as seen from the rear. Fig. 3 is an elevation, showing the arrangement of the machinery of the binding apparatus. Fig. 4 is a plan of the shield covering the binding apparatus. Fig. 5 is a view of the guide attached underneath the shield. Fig. 6 is a vertical section of the same. Fig. 7 is an elevation as seen from above the platform, the shield being removed. Fig. 8 is an enlarged elevation of parts of the mechanism from the same point as in Fig. 7. Fig. 9 is a top view of the pinchers. Fig. 10 is a top view of the twist-head. Fig. 11 is another view of the same. Fig. 12 is a section of the same, and Fig. 13 is a section showing the connection of the twist-head.

In the several figures the same letters indicate identical parts.

In the case illustrated in this application the binding apparatus is represented as placed on the platform of a reaping-machine extended immediately behind the main frame. This we regard as the most convenient location, but do not restrict our claims to this position, though in this specification we shall refer to the various parts in reference to this position.

A is the platform of a reaping-machine, which is extended in rear of the main frame, and so adjusted as to receive the raking and binding apparatus, which is supported in rear of the main frame and driving mechanism.

Motion is communicated to the raking and binding attachments from a bevel-wheel on the main axle of the reaper by a tumbling-shaft of ordinary arrangement to the driving-shaft B, which is attached by suitable boxes to the frame of the platform.

Near the rear end of the shaft B are the two three-sided eccentrics D and E. These eccentrics are duplicates. They are equilateral curvilinear triangles, used to receive the shaft B, to which they are keyed near one of the angles, and are set on the shaft at different angles, so as, respectively, to communicate the motion to their rods, that will be hereafter described.

The eccentrics are set in square straps, working in central internal grooves. To the strap of eccentric E is attached the connecting-rod G, the upper end of which is attached by a pivot to the arm of the bell-crank G¹, which is attached by a pivot, G³, at its elbow to the post A¹. On the opposite arm of the bell-crank G¹ is the stud G, on the wrist of which is set the slot in the curved arm of the rake-arm H, which slides freely on said wrist.

To the strap of eccentric D is attached the rod D¹, which is pivoted to the lever D² near the base of the latter. The bent lever D² is pivoted to the post A¹ at its base, and, extending upward after receiving the rod D¹, it is rigidly attached to the crank D³, the axle of which passes through the rake-arm H near the end of the slot. To the wrist-pin of the crank D³ is pivoted the end of the parallel rod H¹.

The rake-teeth H³ are securely fastened to the wrists H⁴, set in eyes in the bifurcated extremity of the rake-arm H, in which they turn with the movement of the rake. The parallel rod H¹, likewise bifurcated, is adjustably attached to levers H², attached to the wrists H⁴, so that the rake-teeth H³ shall, by the action of the rake-arm H and the parallel rod H¹, through all parts of their movement, maintain a perpendicular or nearly a perpendicular position.

The eccentrics are so set that when the rake-arm H is extended to the standing-grain end of the platform, the rod D¹ shall be fully projected and the rod G and bell-crank G¹ drawn down to their lowest position. With the revolution of the shaft B, as the rake-arm H is drawn back by the lever D², the rod G is raised, and with it the bell-crank G¹, until the arm carrying the stud-pin G² is nearly vertical. The relation of the eccentric E and its yoke is now such that little or no motion is communicated to the bell-crank until the gavel has been drawn into the binder, when the

crank is rapidly drawn down and the rake-arm projected, when it again remains stationary until the process of retraction commences.

The binding apparatus receives motion from the bevel-wheel I, which is keyed to the driving-shaft B. The frame F is attached to the said shaft by boxes, within which suitable journals turn freely, and also to the frame of the platform by the brace F'.

The bevel-wheel I has within the circle formed by its teeth a raised track, I², having at two points depressions, the relative positions of which are shown at I³, Fig. 3. It has also a depression cut in its face within the circle of the track I². (Shown at I⁴, Fig. 3.) The central portion of the wheel is not cast with arms, but solid.

The wheel I drives the bevel-pinion I¹, which is fastened to the shaft K, which turns in suitable boxes attached to the frame F. To the upper end of the shaft K is attached the twist-head L, which turns with the shaft. The twist-head L is constructed in two pieces, L¹ and L², of which the piece L² is so constructed as to turn upon a pivot on a face perpendicular to the axis of revolution, so as to open the twist-head for the reception of a wire, as will be hereinafter explained.

The jaws of the twist-head are opened by the action of the wire, and are closed by the clutches N N. The clutches embrace the twist-head on each side, so as to compress the jaws, which have a rib and corresponding depression on their opposed faces, as shown in Fig. 12, so as to bind and consequently more firmly to retain the inclosed wire. They are actuated automatically by the levers N¹, which are pivoted on the frame F, and have on their lower ends friction wheels N², running on the tracks I², with which they are kept in contact by the tension of the spiral spring O, which unites their lower arms. The tracks I² keep the clutches closed until the wheels N² reach the depressions I³, when, the lower arms being drawn together, the clutches are withdrawn and the jaws L¹ and L² are permitted to open. As there are two depressions I³, this will occur twice during each revolution of the wheel I—once to permit the wire to enter the jaws, and again for the discharge of the sheaf. As a longer interval is required between the time when the wire is received and the discharge of the sheaf than between the latter and the former, the depressions I³ are not placed opposite to one another, but properly portioned in distance to the required object. As the jaws are closed, except in the instant during which the wire is received and discharged, the danger of catching foreign substances is diminished.

Below the twist-head are pinchers M M¹, of which the jaw M is stationary, and the jaw M¹ movable. The jaw M is attached to the frame F at M², and the movable jaw M¹ is actuated by a lever pivoted to the frame, and has on its lower arm a friction-wheel, M², which runs on

the face of the wheel I within the track I², against which it is pressed by the spring P. The pinchers will open when the friction-wheel M² reaches the depression described in the face of the wheel I at I⁴, and close again on rising out of the depression. This depression is so placed that the pinchers will open an instant after the jaws in the twist-head have opened to receive the wire, and, closing again immediately, they seize the wire, and at the same time cutting it above the pinchers by the action of the shear-plate, (shown in Fig. 9,) attached to the movable jaw M¹.

C is an eccentric, the peculiar shape of which is shown in Fig. 14, the peculiarity in the construction of which is, that it is so shaped that between the points *a b* it is formed as a circle, of which the center of the driving-shaft B is the center, the effect of which is, that while the cam is traversing that distance in the yoke opposite to the point of attachment no vertically-reciprocating motion is communicated to the rod C¹. As the yoke is square, the reduced diameter on the side *a b* must be added on the opposite side *c d*, to prevent the cam escaping from the yoke. The rod C¹, pivoted to the arm C², communicates a reciprocating oscillation to the counter-shaft T, to which is rigidly attached a semicircular binding-arm, T¹. This arm has a notched termination, (shown in Fig. 7,) and a projecting arm, T², the extremity of which bears a small sheave over which passes the wire, entering through an aperture above the sheave.

The wire is wound upon a spool, S, and is hung upon a pin on the extremity of the standard S', immediately above the binding-arm and twist-head. The wire passes from the spool through the orifice and over the sheave in the arm T², and is held below by the pinchers. The revolution of the spool S is regulated by a set-screw, so as to preserve a proper degree of tension in the wire.

Q is a pulley on the shaft B, driving the linked belt Q¹, which passes also over the pulley Q² on the counter-shaft R, which revolves with each revolution of the shaft B, carrying with it the arm R', by which the sheaf is at the proper time thrown from the platform.

A² and A³ are guards placed on each side to control the gavel as gathered by the rake. Between them is the shield or binding-seat U, over which the gavel passes, and on which it is held while the sheaf is being bound, resting upon the portion marked U¹. The piece U² is riveted to the bottom of the shield U, below the slot through which the wire passes. It receives the wire and guides it unerringly to the twist-head, immediately above which it is attached, and to the pinchers. A slot through the shield permits the arm R' to act upon the sheaf.

The operation of the machine is as follows: The rake sweeping the gavel from the platform, carries it back against the wire, which extends from the spool through the end of the

arm, T^2 down to the pinchers, where the end is held. The binding-arm T^1 , descending, seizes and compresses the sheaf against the wire. The forked end of the arm coming in contact with both ends of the wire, forces them against the twist-head, which, opening at the instant, receives and seizes them between the jaws L^1 and L^2 , and immediately afterward the pinchers open and close, severing the wire below the twist-head and retaining the ends. The revolution of the twist-head twists the two ends of the wire, securing it around the sheaf, and then the jaws L^1 L^2 open, and the arm R' casts the sheaf from the platform and entirely out of the way of the horses on their next round. It will be observed that the peculiar shape of the cam C holds the binding-arm T^1 immovable over the twist-head during all the space of time necessary for the completion of the operation of locking and cutting the wire.

Having fully explained the construction and operation of our improvements, what we claim as our invention, and seek to secure by Letters Patent, is—

1. In an automatic rake for a harvester, the combination of the eccentrics D and E , connecting-rods G and D^2 , bell-crank G^1 , and oscillating rake-arm H , said parts being respectively constructed substantially as described.

2. The oscillating rake-arm H and parallel end H^1 , adjustably attached to the levers H^2 , when used in combination with the eccentric D and connecting-rod D^2 , substantially as set forth.

3. The wheel I , with the track I^2 and depressions I^3 and I^4 , when used for actuating the levers N^1 and M^3 , respectively, substantially as and for the purpose set forth.

4. The twist-head L , when constructed in two parts, L^1 and L^2 , the part L^2 being arranged to turn on a pivot, the opposed faces of the parts being perpendicular to the axis of rotation, and the said parts being constructed and arranged substantially as set forth.

5. In combination with the twist-head L , the two clutches N N , attached to levers N^1 N^1 , which have their fulcrums near the center, and are opened and closed by a spring, O , and cam I , substantially as set forth.

6. In combination with the twist-head L , the nippers M and M^1 , one being fixed and the other movable, when they are respectively constructed, and the movable one actuated, substantially as set forth.

7. In combination with a device for binding the sheaf, the revolving arm R' , for throwing the sheaf from the platform, substantially as set forth.

8. The cam C , having a dead point, a b , when used in combination with and for the purpose of giving motion to the binding-arm T^1 , substantially as set forth.

9. The shield U and guide U^2 , when used in combination with an automatic binding mechanism, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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