4 Sheets—Sheet 1.

A. W. TUCKER.

MACHINE FOR BINDING GRAIN.

No. 169,743. Patented Nov. 9, 1875.

Fig. 1

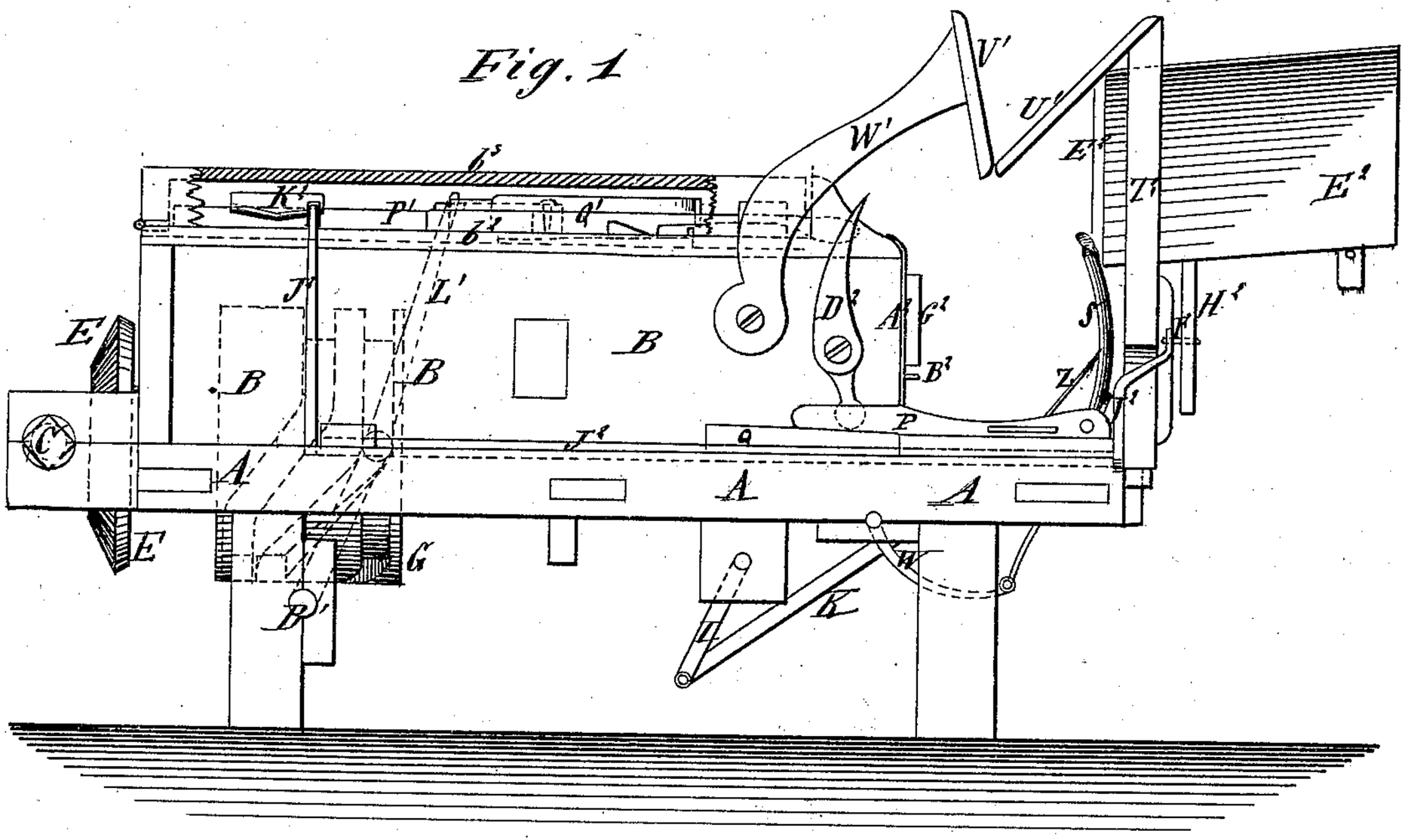

Fig. 2

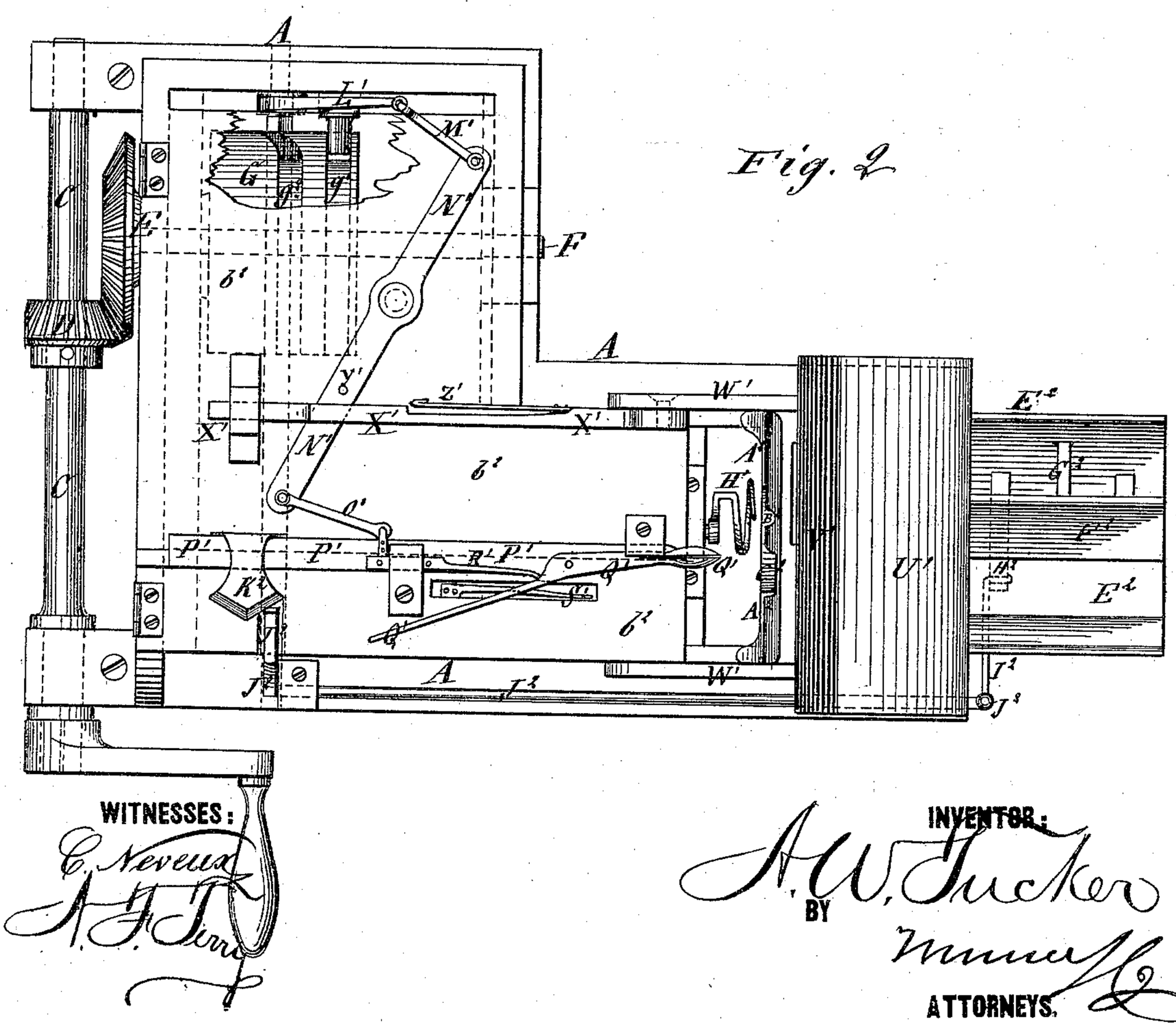

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Fig. 3

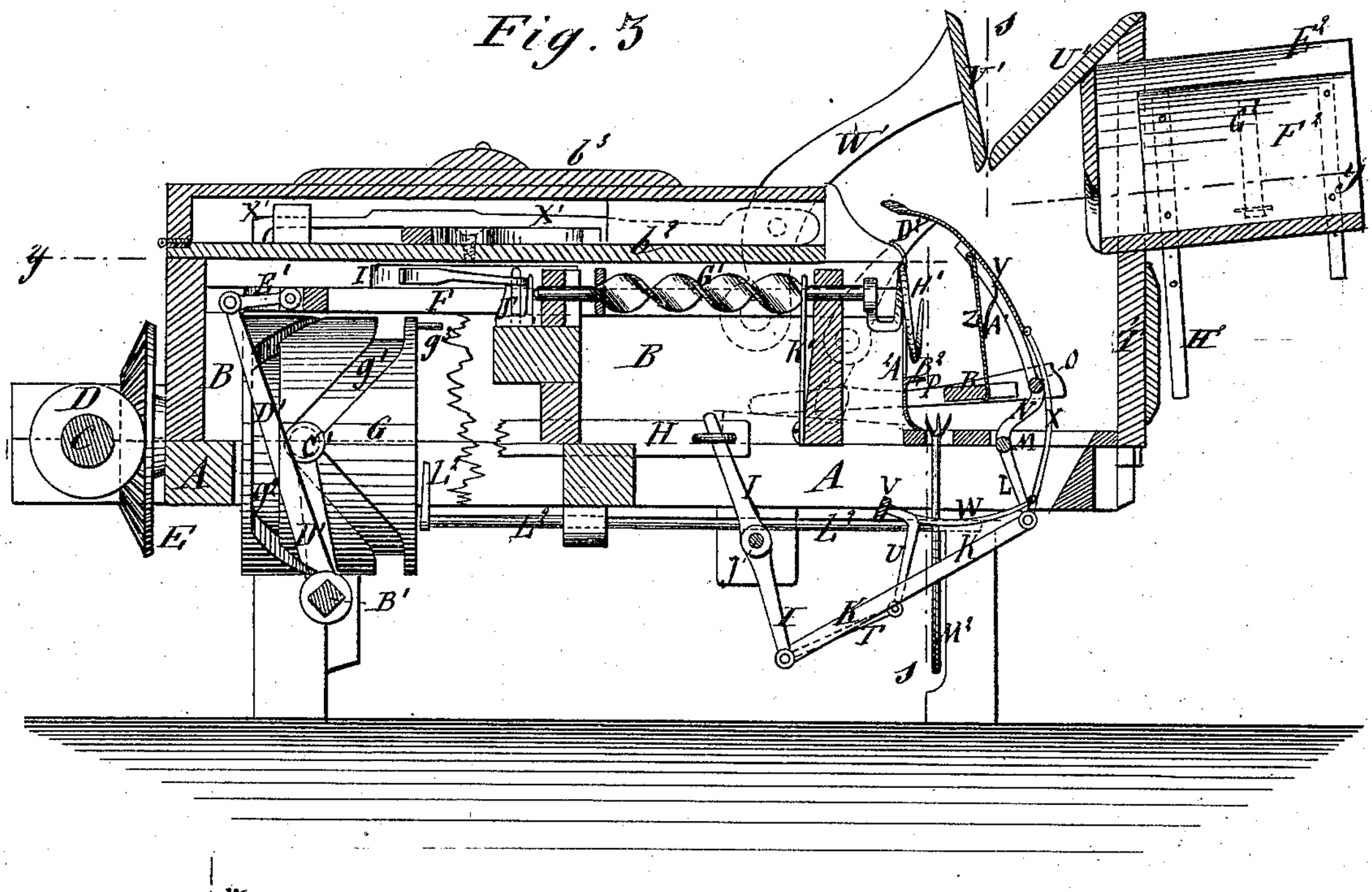

Fig. 4

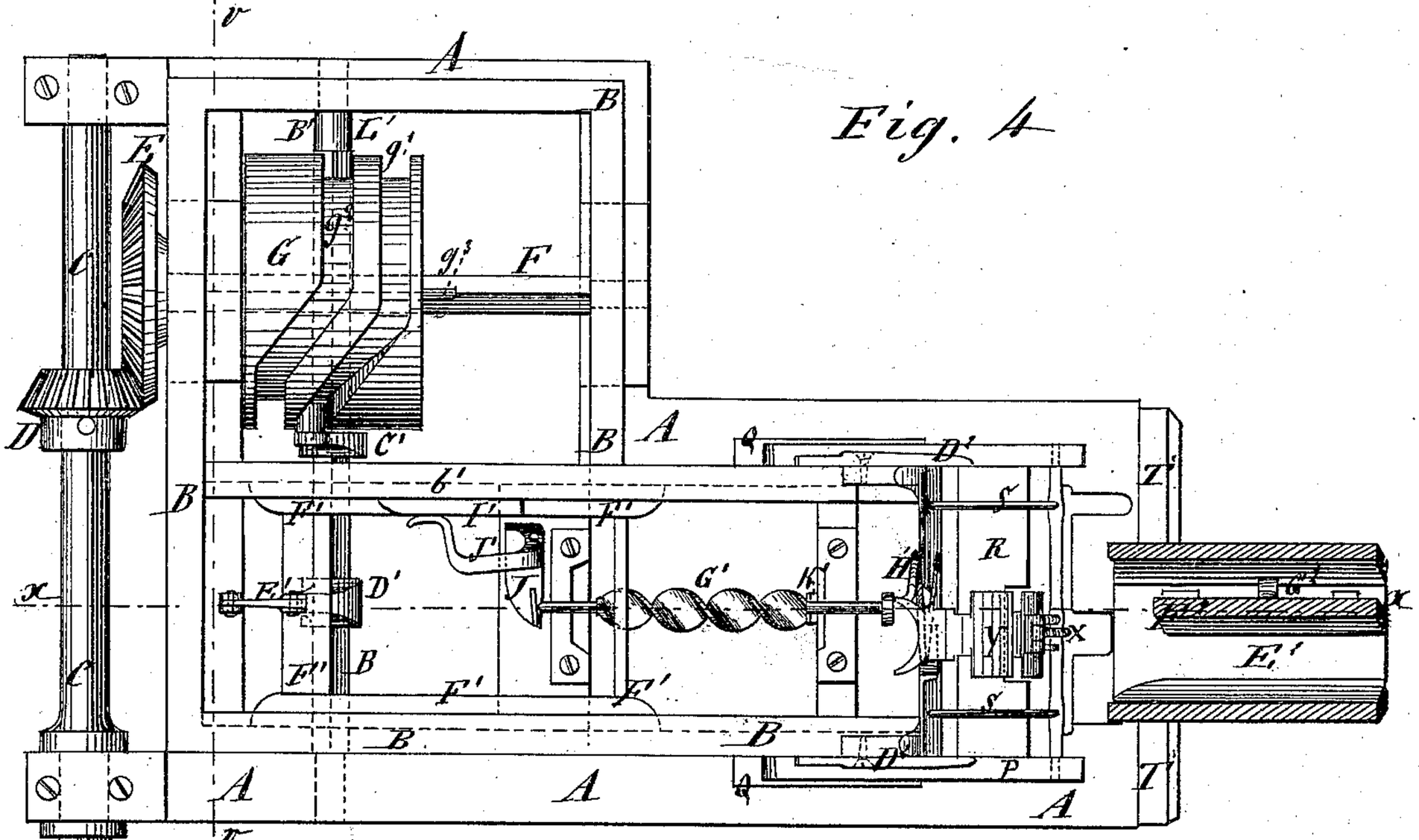

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Fig. 5

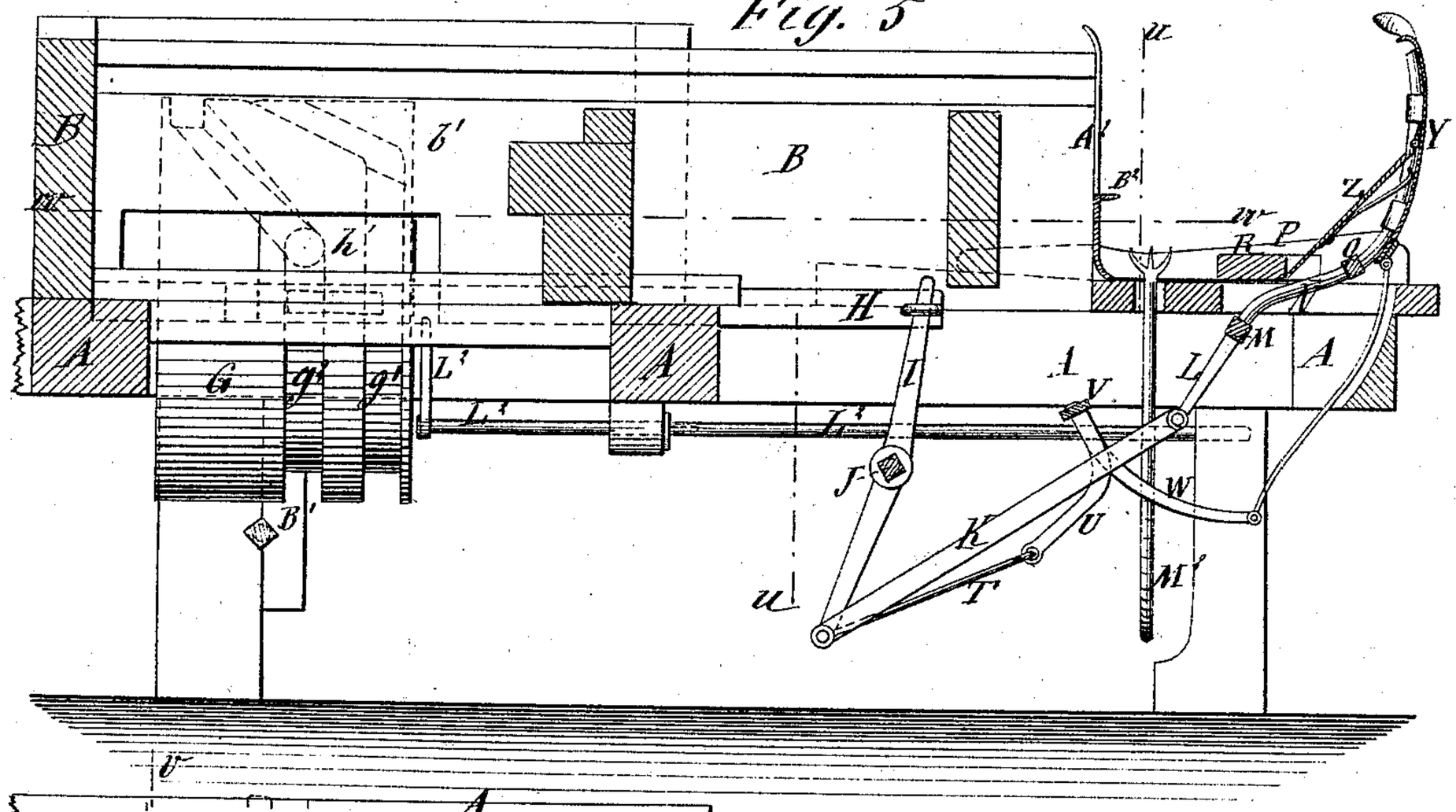
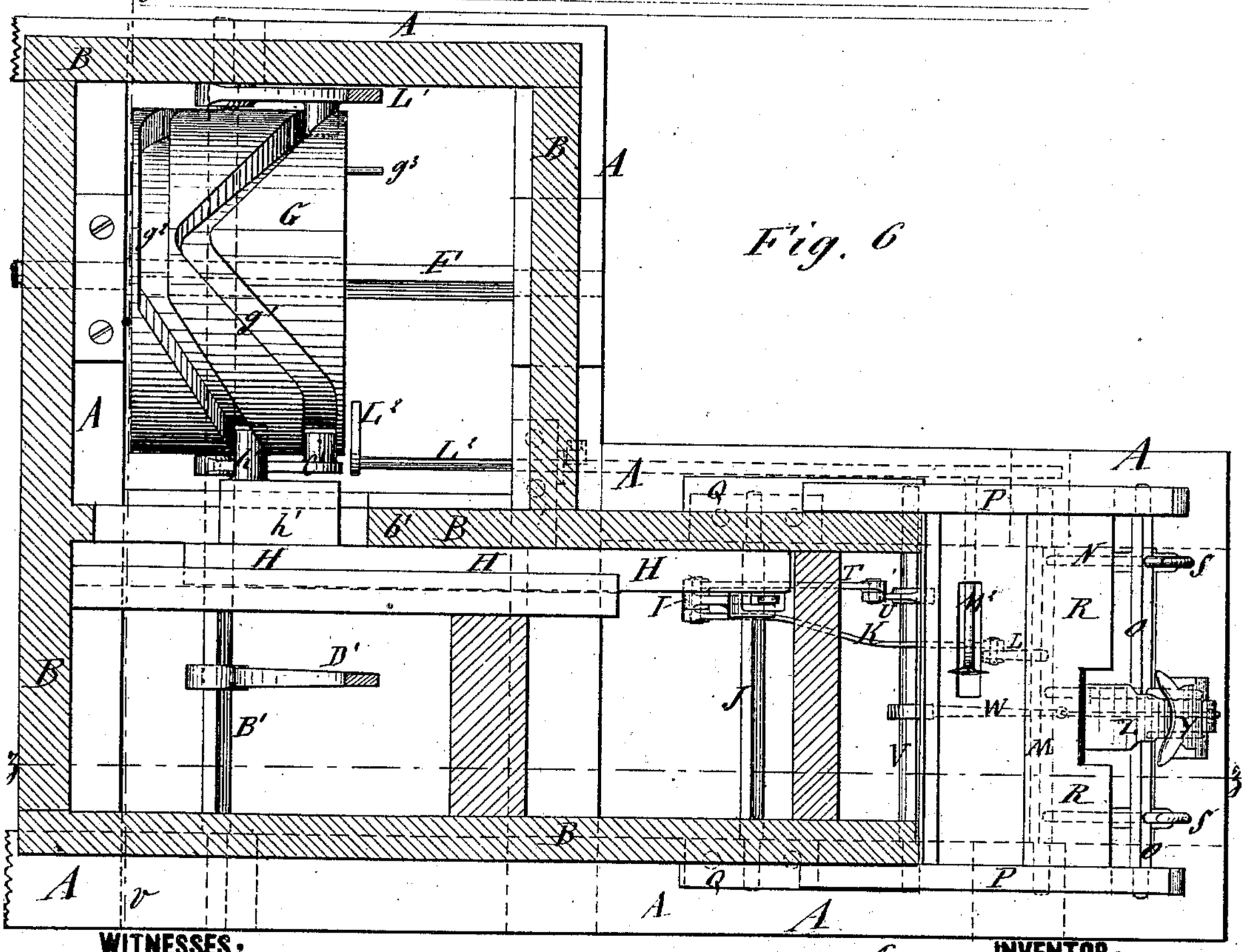


Fig. 6



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MACHINE FOR BINDING GRAIN.

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Fig. 7

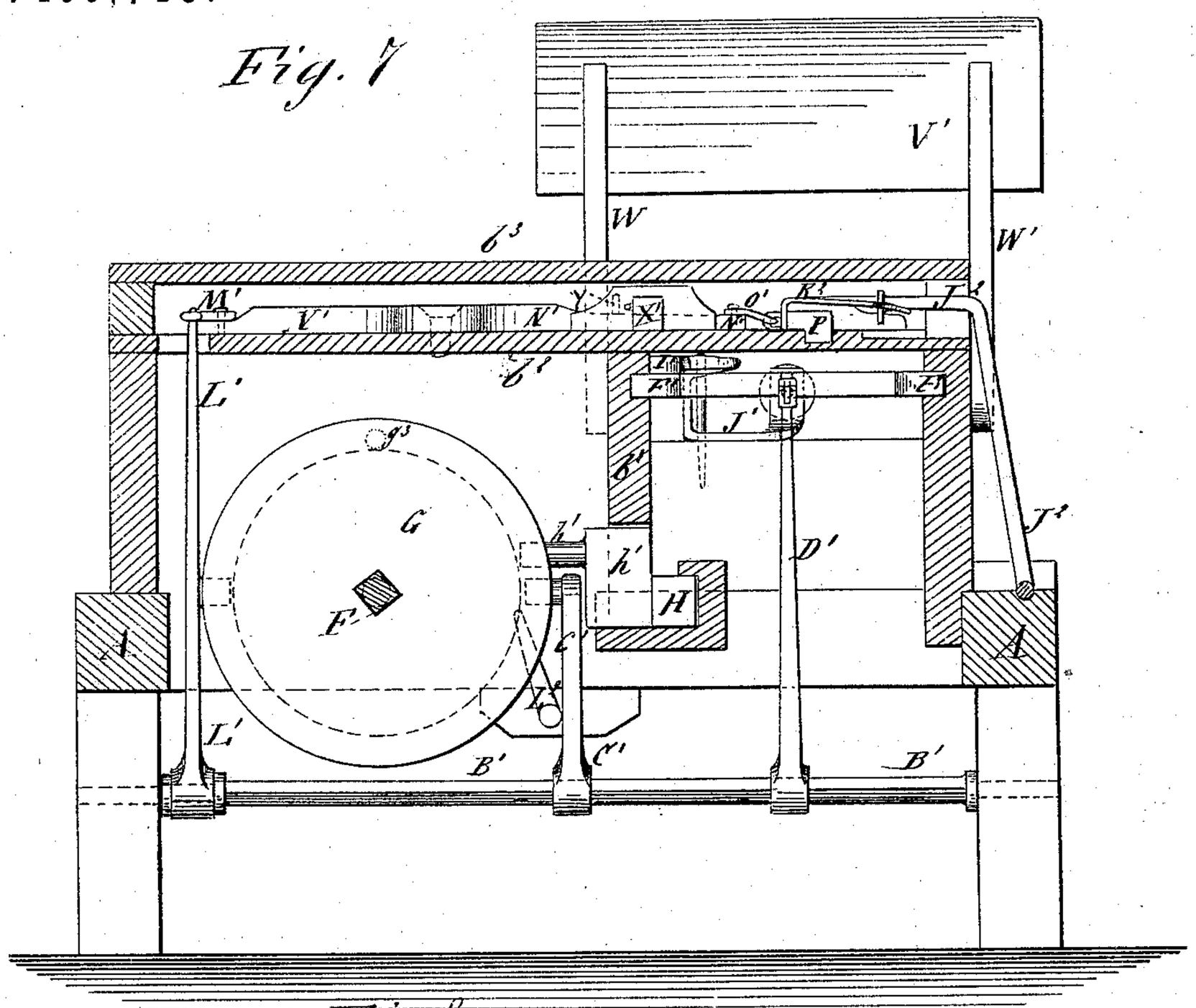


Fig. 8

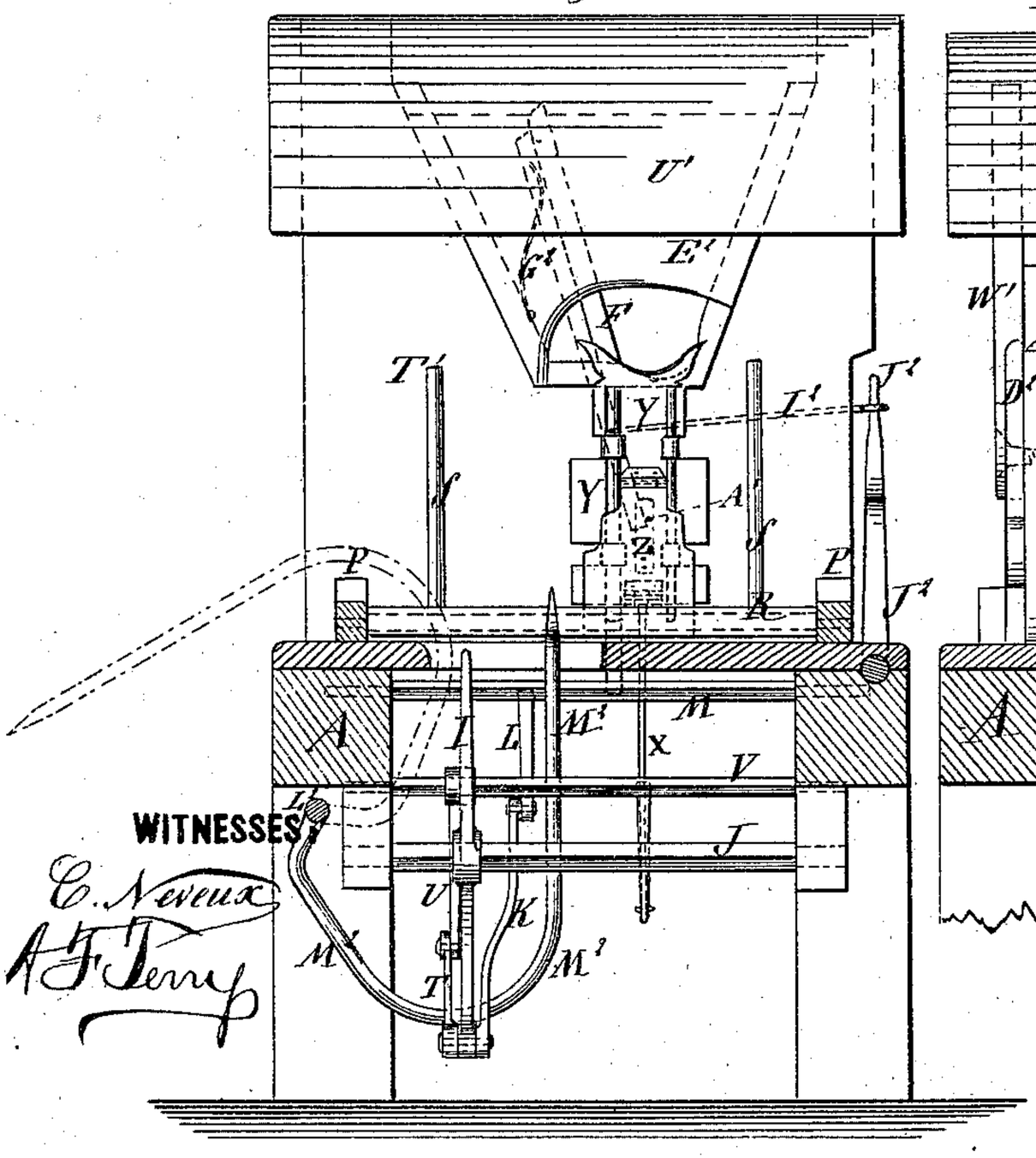
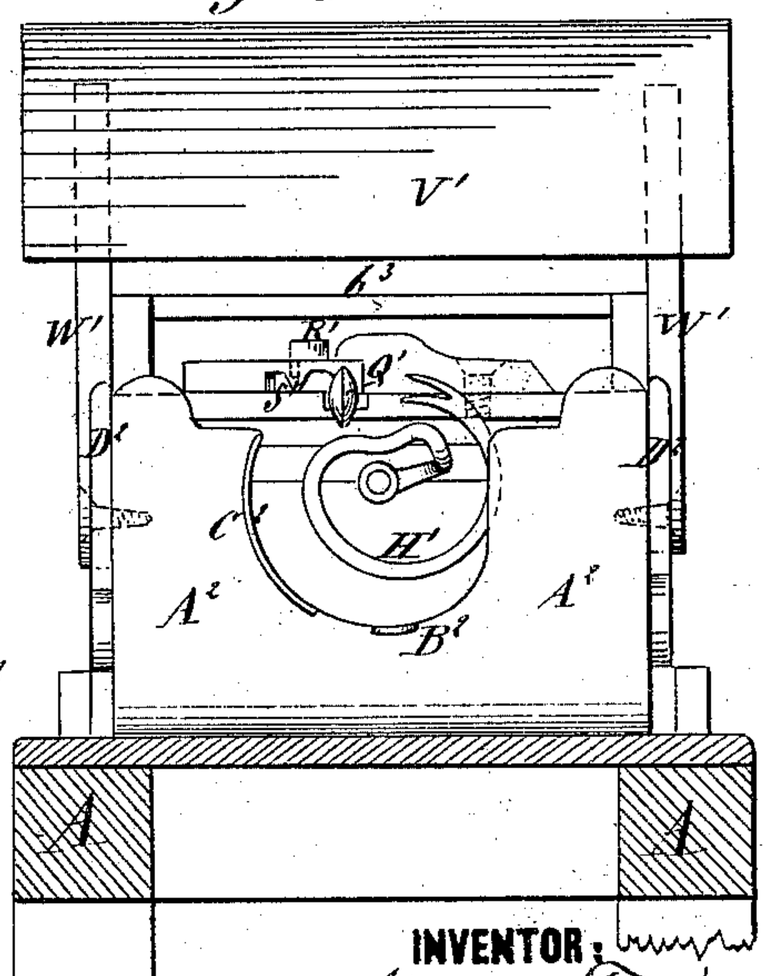


Fig. 9



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UNITED STATES PATENT OFFICE.

ARGYLE W. TUCKER, OF WAXAHACHIE, TEXAS, ASSIGNOR TO HIMSELF AND L. J. STROOP, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR BINDING GRAIN.

Specification forming part of Letters Patent No. **169,743**, dated November 9, 1875; application filed February 13, 1875.

To all whom it may concern:

Be it known that I, ARGYLE W. TUCKER, of Waxahachie, in the county of Ellis and State of Texas, have invented a new and useful Improvement in Grain-Binders for Reapers, of which the following is a specification:

Figure 1, Sheet 1, is a side view of my improved binder, part being broken away. Fig. 2, Sheet 1, is a top view of the same, the upper cover being removed, and part of the lower cover being broken away. Fig. 3, Sheet 2, is a vertical longitudinal section taken through the line *x x*, Fig. 4, part of the vertical partition being broken away. Fig. 4, Sheet 2, is a horizontal section of the same, taken through the line *y y*, Fig. 3. Fig. 5, Sheet 3, is a vertical section of the same, taken through the line *z z*, Fig. 6. Fig. 6, Sheet 3, is a horizontal section of the same, taken through the line *w w*, Fig. 5. Fig. 7, Sheet 4, is a vertical cross-section of the same, taken through the line *v v*, Figs. 4 and 6. Fig. 8, Sheet 4, is a vertical cross-section of the same, taken through the line *u u*, Fig. 5. Fig. 9, Sheet 4, is a vertical cross-section of the same, taken through the line *s s*, Fig. 3.

Similar letters of reference indicate corresponding parts.

The invention will first be fully described, and then pointed out in the claims.

A represents the frame-work of the binder, which is to be connected with or formed upon the frame of the reaper, and which is made in the form of a rectangle with one corner cut out, as shown in Figs. 2, 4, and 6. To the frame A is attached a box, B, which is made of the same width and of the same general form as the frame A, but shorter than said frame, as shown in Fig. 6. In bearings attached to the rear part of the frame A revolves a shaft, C, which is designed to be driven from the driving mechanism of the reaper by a belt or other gearing, as may be desired. To the shaft C is attached a bevel-gear wheel, D, the teeth of which mesh into the teeth of a larger bevel-gear wheel, E, attached to the rear end of the shaft F. The shaft F revolves in bearings attached to the outer or L-part of the frame A, and to it, within the box B, is attached a cylinder or drum, G. In the convex face of the cylinder G are formed two grooves, g^1 g^2. The forward groove g^1 passes around the cylinder G, near its forward end, for about two-thirds the circumference of the said cylinder. For the other third of the circumference it is bent into V shape, its point or angle extending nearly to the other or rear end of the said cylinder. The other groove g^2 is made with two straight parts connected by two inclined parts. The longer straight part is parallel with and at a little distance from the straight part of the groove g^1, and extends about halfway around the cylinder G. The other straight part of the groove g^2 is close to the other or rear end of the cylinder G, is directly opposite the point or angle of the V of the groove g^1, and extends about one-quarter of the distance around the said cylinder. The ends of the straight parts of the groove g^2 are connected by inclines, as shown in Figs. 2, 3, and 6, the inclination of which is a little less than the inclination of the inclines of the groove g^1, as shown in Fig. 6. H is a bar sliding in ways attached to the frame A, and to its rear end is attached an arm, h', which enters the rear groove g^2 of the cylinder G, so that the bar H may be moved forward and backward by the inclines of the said grooves g^2 as the cylinder G revolves. I is a lever, the upper end of which works in a keeper attached to the end of the sliding bar H, so that the said lever may be oscillated by the movements of the said bar. The lever I is attached to the shaft J, that works in bearings attached to the frame A. To the lower end of the lever I is pivoted the rear end of the connecting-bar K, the forward end of which is pivoted to the end of the downwardly-projecting arm L, attached to the shaft M. The shaft M works in bearings attached to the frame A, and to it are attached the lower ends of two or more arms, N, the upper ends of which are attached to the shaft O, the ends of which work in bearings in the ends of two bars, P. The rear ends of the bars P slide upon inclined slides Q, attached to the frame A, at the sides of the forward end of the box B.

The bars P are attached to the ends of a board, R, upon which the gavel rests to be bound, and which is raised to press the gavel together while being bound by the slides Q

and the upward movement of the shaft O. To the shaft O are attached four or more upwardly-projecting curved fingers, S, some or all of which may be prolongations of the arms N. To the lower end of the lever I is also pivoted the rear end of a second connecting-rod, T, the forward end of which is pivoted to the lower end of the downwardly-projecting curved arm U. The upper end of the curved arm U is rigidly attached to the shaft V, which works in bearings attached to the frame A. To the shaft V is also attached a forwardly-projecting curved arm, W, to the end of which is pivoted the lower end of a connecting-rod, X, which passes up in front of the shafts M and O, and its upper end is connected with the lower end of a plate, Y. The plate Y is curved to correspond with the curvature of the fingers S, and is provided with eyes or keepers, sliding upon the middle fingers S. The upper edge of the plate Y is concaved, and is provided with small scroll-shaped ears, which serve as continuations of the said concavity, as shown in Figs. 4, 5, 6, 8. To the rear or concave side of the sliding plate Y is hinged the upper end of a plate, Z, the lower end of which is held forward by a spring, A^1, attached to its lower part, and interposed between it and the plate Y. The plate Z is designed to secure uniform pressure upon the sheaf while being bound. B^1 is a shaft placed beneath the grooved cylinder G, and the ends of which work in bearings in the lower part of the frame A. To the middle part of the shaft B^1 is rigidly attached an arm, C^1, which has a pin formed upon or attached to its upper end, which enters the forward groove g^1 of the cylinder G, so that the arm C′ may be oscillated, and the shaft B^1 rocked by the revolution of the said cylinder G. To the rock-shaft B^1 is rigidly attached a second arm, D^1, the upper end of which is pivoted to the rear end of a short connecting rod or link, E^1, the forward end of which is pivoted to the rear cross-bar of the frame F^1. The side bars of the frame F^1 slide in grooves or ways in the inner surface of the box B. In the forward cross-bar of the sliding frame F^1 is formed a slot to receive the spiral bar G^1, the spiral of which is so formed that the said spiral bar may be revolved forward by the rearward movement of the frame F^1, and revolved backward by the forward movement of the said frame F^1. The journals of the spiral bar G^1 revolve in bearings in supports attached to the frame A or box B, and are made long, so that the said spiral bar G^1 may have a longitudinal as well as a reciprocating rotary movement. To the forward end of the spiral bar G^1 is attached the needle H^1, which is bent into the shape shown in Figs. 2, 3, and 9, and has a notch or slot formed in its forward end to adapt it to take hold of one end of the band, and twist it around the other end of said band. To one of the side bars of the frame F^1 is attached an incline, I^1, which, as the said frame F^1 moves to the rearward, strikes against the end of the crooked lever J^1. The lever J^1 is bent into the form shown in Figs. 3, 4, and 7, is pivoted to the rear support for the spiral bar G^1, and its other end rests against the rear end of the said spiral bar G^1, so as to give the needle H^1 a forward movement as it is completing its forward revolution, to cause it to tuck the end of the band beneath the body of said band. As the lever J^1 is released from the incline I^1, and the needle H^1 begins its backward revolution, the spiral bar G^1 is pushed to the rearward to withdraw the needle H^1 from the band by a spring, K^1, attached to the forward support for said spiral bar, and the upper end of which is notched or slotted to receive the forward journal of said spiral bar, as shown in Fig. 3.

L^1 is a lever, the lower end of which rides upon the shaft B^1, which serves as a fulcrum for said lever. To the middle part of the lever L^1 is attached a pin, which enters the forward groove g^1 of the cylinder G, so that the said lever may be oscillated by the revolution of the said cylinder. To the upper end of the lever L^1 is pivoted the end of a short connecting-rod, M^1, the other end of which is pivoted to the end of the lever N′. The lever N′ is pivoted to the lower cover or horizontal partition b^2 of the box B, and to its other end is pivoted the end of a short connecting-rod, o', the other end of which is pivoted to the side of the bar P′ that slides in bearings attached to the said cover or partition b^2. To the forward end of the sliding bar P′ is attached the rigid jaw of the band-procurer Q′, and to said bar P′, at or near its forward end, is pivoted the movable jaw of said band-procurer Q′. The jaws of the band-procurer Q′ are forced and held together to grasp and draw out the straw for a band by a spring, R′, attached to the sliding bar P′, and which presses against the inner side of the rearwardly-projecting end of the movable jaw of the said band-procurer Q′. As the sliding bar P′ moves forward the jaws of the band-procurer Q′ are opened to enable them to grasp the straw for a band by a spring-stop, S′, attached to the partition or inner cover b^2. and against which the outer side of the rearwardly-projecting end of the movable jaw of said band-procurer Q′ is pressed by the spring R′. The under side of the forward part of the rearwardly-projecting end of the movable jaw of the band-procurer Q′ is notched, so that when moving back and drawing out the straw for a band it may pass over the spring-stop S′ without being affected. To the forward end of the frame A is attached a vertical frame or plate, T′, to the rear side of the upper end of which is rigidly attached an inclined apron, U′, which, in connection with the movable apron V′, forms a trough or receptacle to receive the cut grain from the elevator of the reaper. The movable apron V′ is attached to the upper ends of two arms, W′, the lower ends of which are pivoted to the box B. To one of the arms W′ is pivoted the forward end of a sliding bar, X′, the rear

end of which works in a keeper attached to the partition or lower cover b^2. The lower side of the rear part of the sliding bar X′ is notched to enable it to pass over the lever N′ without interfering with the movement of the said lever N′, and without having its own movement interfered with. To the upper side of the lever N′ is attached a pin, Y, which, in the rearward movement of the said lever, strikes against a spring-catch, Z′, attached to the side of the bar X′, so as to slide the bar X′ to the rearward, and draw back the movable apron V′ to allow the gavel to drop upon the board R as soon as the band has been drawn into place by the band-procurer Q′. The front plate A^2 of the box B is deeply notched from its upper edge, as shown in Fig. 9, to give space for the movement of the end of the band while being twisted and tucked in by the movement of the needle H^1. To the plate A^2, at the bottom of its notch or recess, and a little at one side of the vertical plane, passing through the axis of the band-procurer Q′, is attached a projection or flange, B^2, to keep the band from slipping while its end is being tucked in. To the side edge of the notch or recess of the plate A^2 is attached a flange, C^2, to hold the gavel back to prevent the needle H′ from catching upon it while making the downward part of its movement. The gavel, while being bound, is pressed down and back from the upper part of the plate A^2 by the levers D^2, which are pivoted to the box B, and the lower ends of which are rounded off to fit into notches in the inner sides of the rear ends of the bars P, so that the levers may be operated by the said bars.

To the upper part of the vertical frame or plate T′, and below the stationary apron U′, is attached a trough, E^2, to receive the straw for the bands, and in the lower part of the rear or inner end of which is formed a hole for the band-procurer Q′ to enter to grasp enough straw for a band, and through which the said straw is drawn out.

In the straw-receiver or trough E^2 is hinged a plate, F^2, which is held forward against the straw by a spring, G^2. To the plate F^2 is attached an arm or lever, H^2, which projects through a hole in the bottom of the trough E^2, and to the lower part of which is pivoted the inner end of the short connecting-rod I^2. The outer end of the connecting-rod I^2 is pivoted to the end of the bent or crank-lever J^2, the body of which works in bearings attached to the frame A, and the other end of which projects upward and inward, so as to be struck by a cam, K^2, attached to the sliding bar P′, that carries the band-procurer Q′. By this device the straw in the trough E^2 will be jarred at each movement of the bar P′, so that the band-procurer Q′ may always grasp enough for a band.

To one end of the grooved cylinder G is attached a pin, g^3, which, at each revolution of the said cylinder G, strikes against the upwardly-projecting end of a rock-shaft, L^2. The shaft L^2 rocks in bearings attached to the frame A, and to its forward part is attached a curved arm, M^2, which passes up through the frame A in front of the plate A^2. The pin g^3 is so arranged as to strike the arm of the shaft L^2 just as the binding has been completed, and the parts that compressed the gavel have retired to their former positions. The movements of the shaft L^2 cause the fork M^2 to rise and move outward, raising the bound sheaf from the machine, and pitching it to the ground. The upper mechanism of the binder is covered and protected by the second or upper cover b^3.

In using the machine the order of the movements is as follows: The band-procurer Q′ moves forward into the band-trough E^2, grasps enough straw for a band, and draws it out. As the band-procurer approaches the end of its rearward movement the movable apron V′ is moved back, allowing the gavel to fall upon the band, and upon the cross-board R and the bars P. The cross-board R and bars P move rearward and upward, the levers D^2 swing forward and downward, and the fingers S, and their attached plates Y Z, swing rearward and downward, compressing the gavel. At the same time the free end of the band is carried over the gavel by the notched plate Y, and held in such a position that it may be caught by the notched or forked end of the needle H^1. The needle H^1 now begins to move, takes the free end of the band and carries it once and a half times around the stationary end of the said band. As the needle H^1 makes its last half revolution it draws the stationary end of the band out of the jaws of the band-procurer Q′, and moving forward tucks the free end of the band beneath the body of said band. The needle H^1 then moves back the cross-board R, bars P, levers D^2, and the fingers S, and their plates Y Z return to their former position, leaving the sheaf free. The fork M^2 then moves upward and outward, raising the sheaf from the machine and pitching it to the ground.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of cross-board R, fingers S, bar T, shaft having arms U V W, bar X, sliding plate Y, hinged plate *z*, and spring A^1, substantially as and for the purpose specified.

2. The combination of the levers L^1 N′, the connecting-rods M^1 O′, the sliding bar P′, and the band-procurer Q′, provided with its spring R′, and spring-stop S′, with each other, the grooved cylinder G, and the frame-work of the binder, for withdrawing straw for the bands from the band-trough E^2, substantially as herein shown and described.

3. The combination of the shaft and fingers O S, the cross-board R, side bars P, and levers D^2, with each other, for compressing the gavel and holding it while being bound, substantially as herein shown and described.

4. The combination of the sliding bar H, the

lever I, the connecting-bar K, the arm L, the shaft M, and arms N, with the grooved cylinder G, and with the shaft O, fingers S, cross-board R, side bars P, and levers D^2 of the gavel-compressing device, substantially as herein shown and described.

5. The combination of the levers C^1 D^1, the rock-shaft B^1, and the sliding frame F^1, with the grooved cylinder G, and with the spiral shaft G^1, and needle H^1, substantially as herein shown and described.

6. The combination of the sliding bar X′, the spring-catch Z′, and the pin Y′, with the lever N′ that operates the band-procurer, and with the arm W′ of the movable apron V′, substantially as herein shown and described.

7. The combination of the cam K^2, the bent lever J^2, the connecting-bar I^2, the lever H^2, and the hinged or pivoted board F^2, and its spring G^2, with the band-trough E^2, and with sliding bar P′ that carries the band-procurer Q′, substantially as herein shown and described.

8. The notched or recessed plate A^2, provided with the projections or flanges B^2 and C^2, in combination with the needle H^1 and the gavel-compressing device O S R P, substantially as herein shown and described.

9. The combination of the incline I^1, and the bent lever J^1, with the sliding frame F^1, and the spiral shaft G^1 of the needle H^1, substantially as herein shown and described.

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Witnesses:
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