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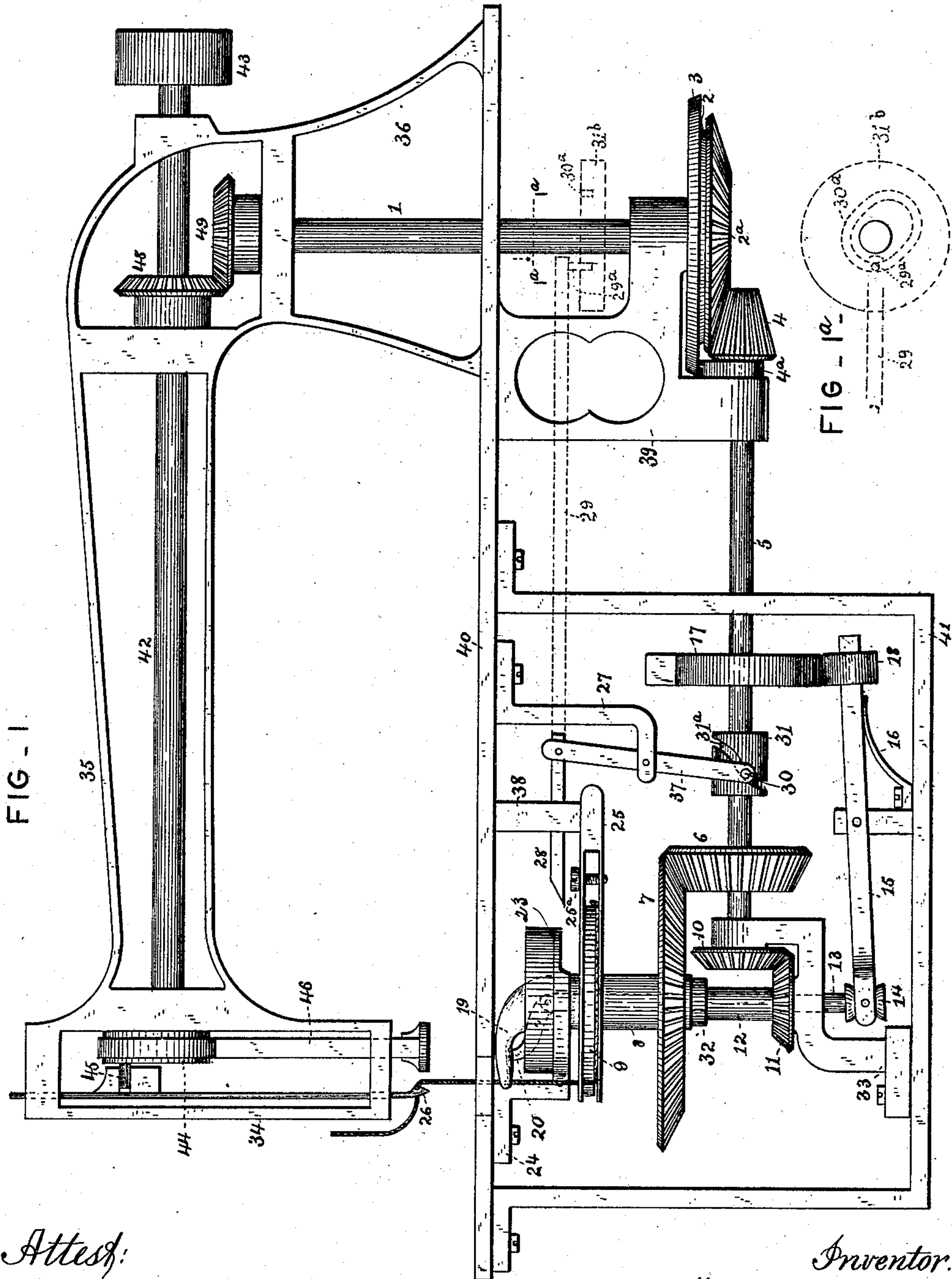
4 Sheets—Sheet 1.

W. M. PIATT.

GRAIN BINDER.

No. 384,072.

Patented June 5, 1888.



Attest:
Jas. H. McEachern,
Walter Allen.

Inventor:
William M. Piatt.
By Smith & Bros.
attys.

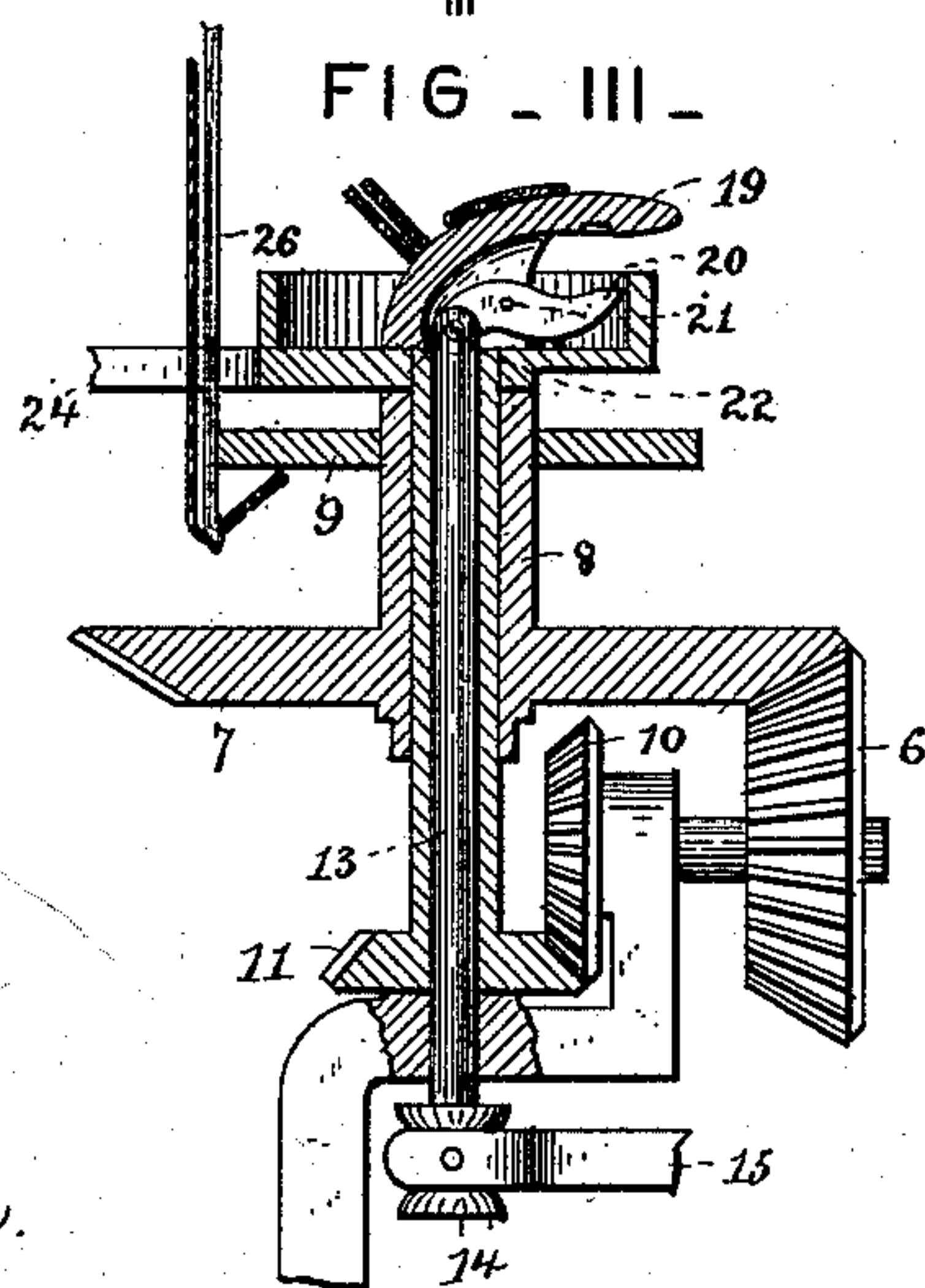
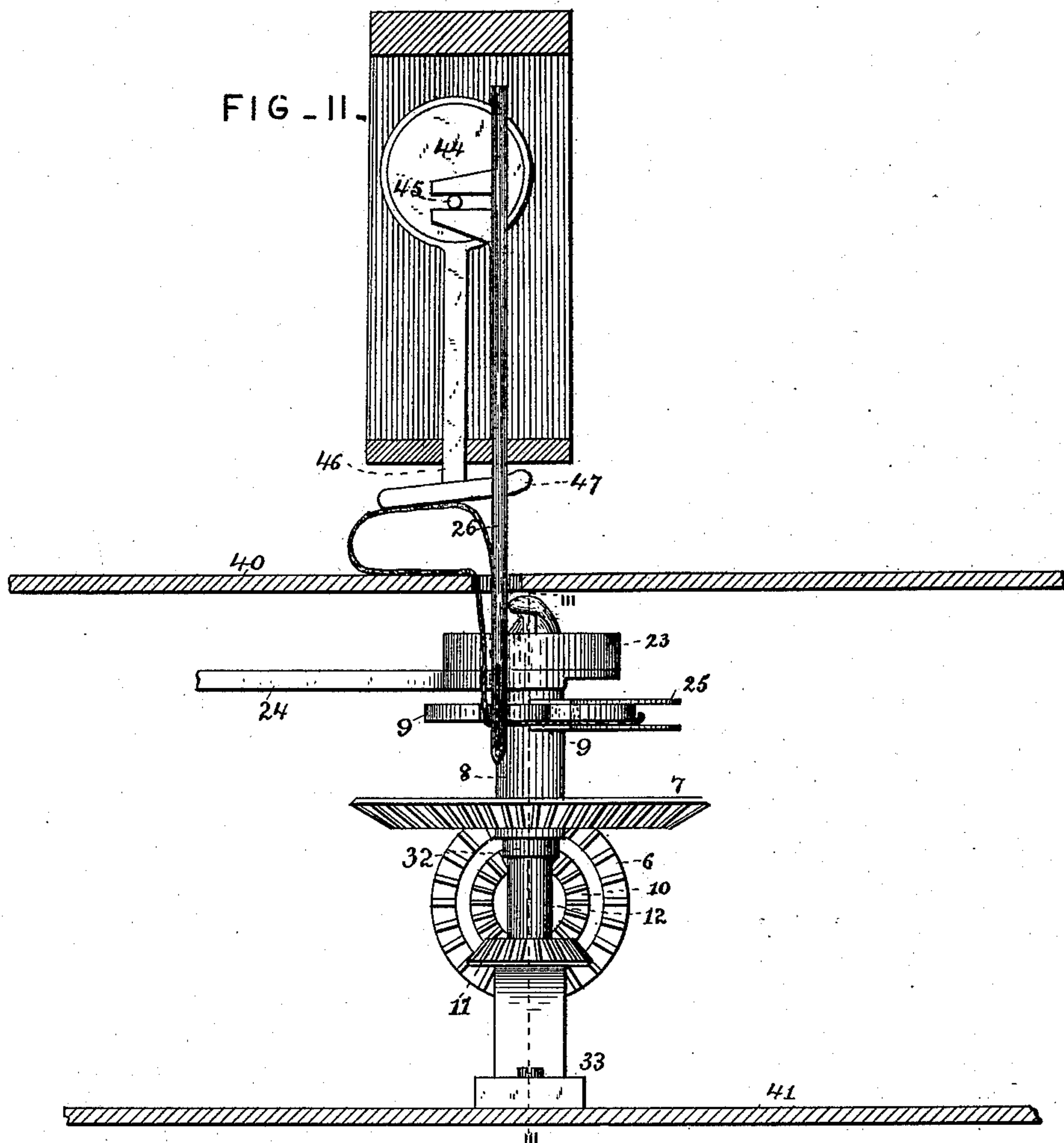
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GRAIN BINDER.

No. 384,072.

Patented June 5, 1888.



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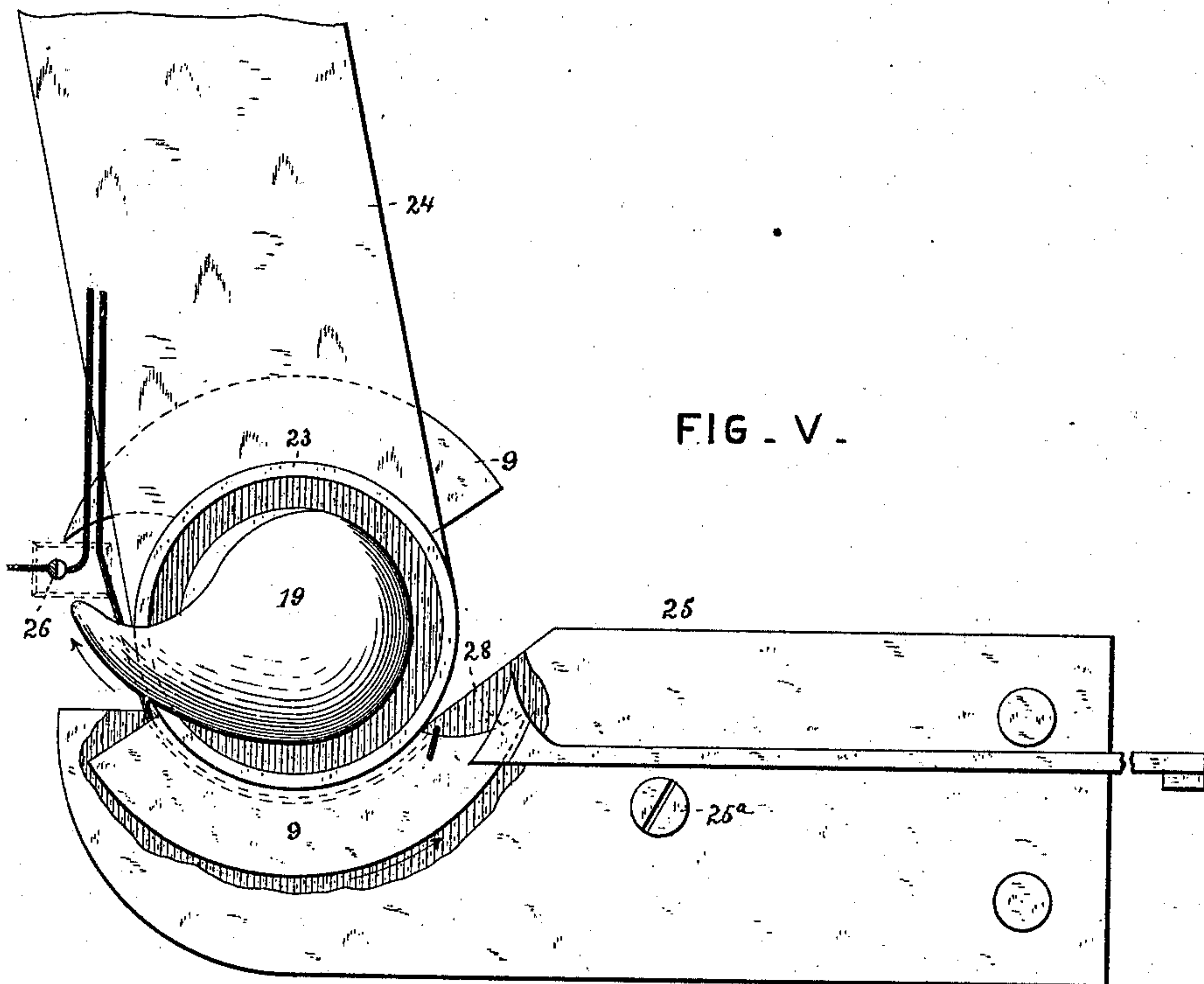
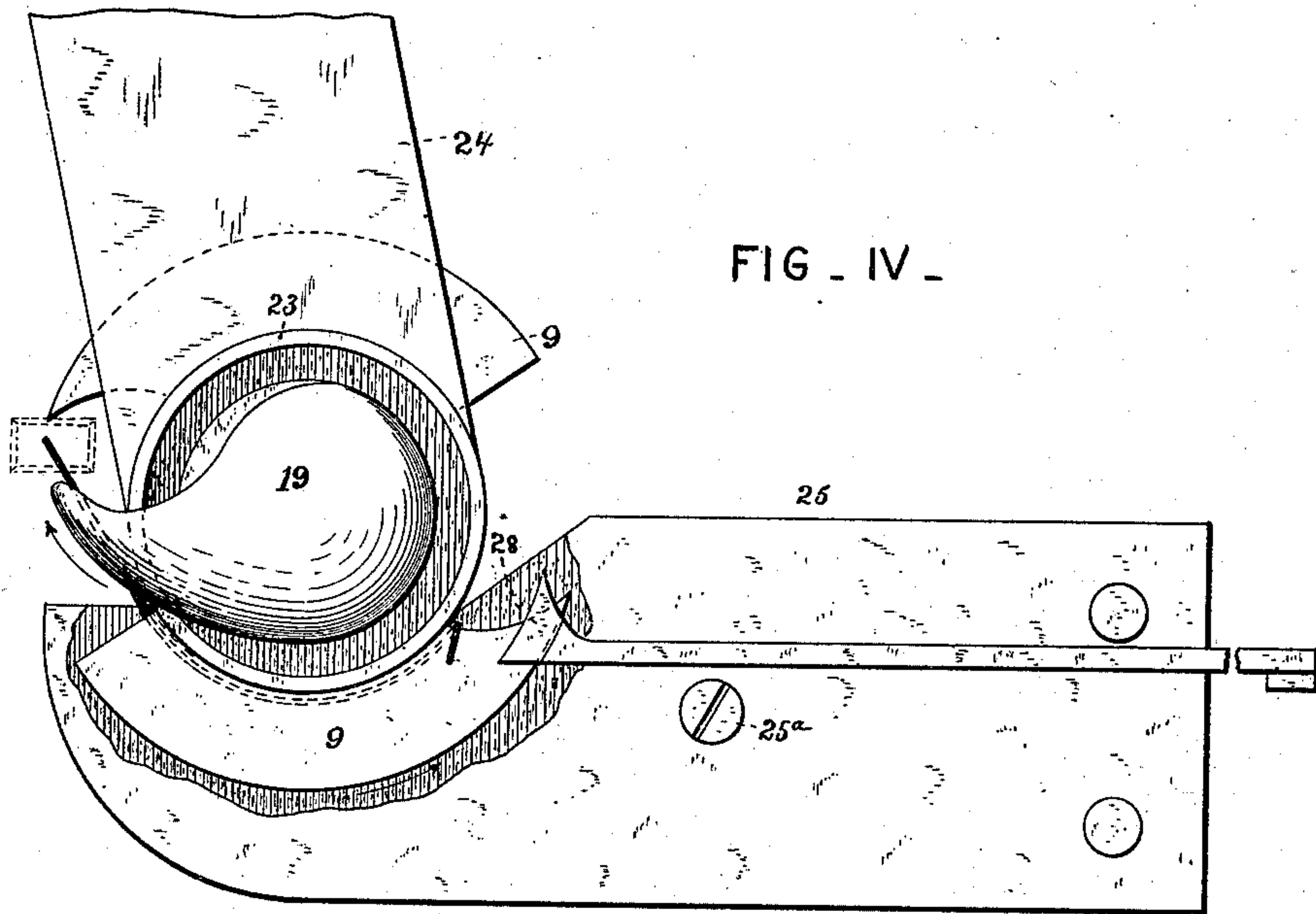
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W. M. PIATT.

GRAIN BINDER.

No. 384,072.

Patented June 5, 1888.



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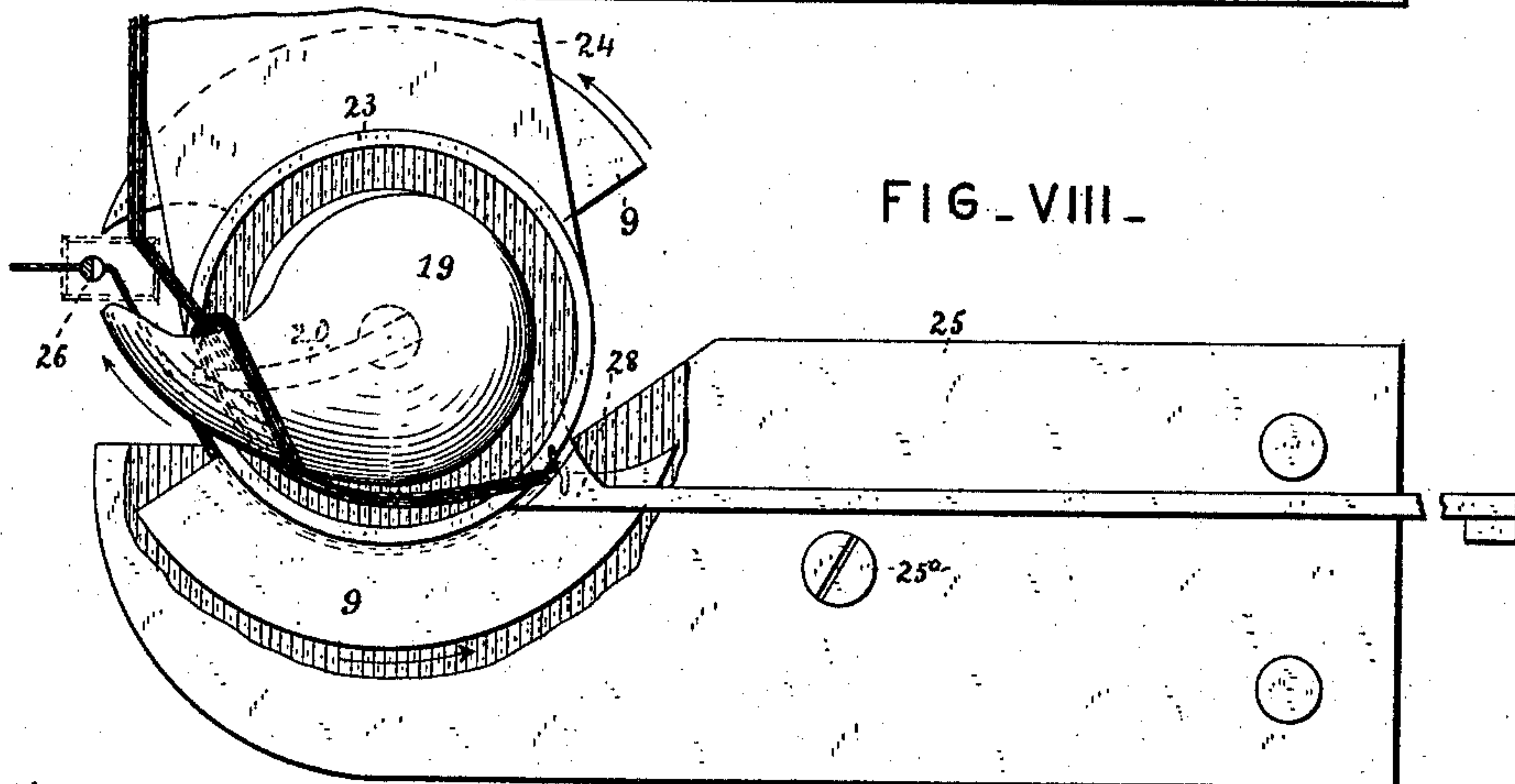
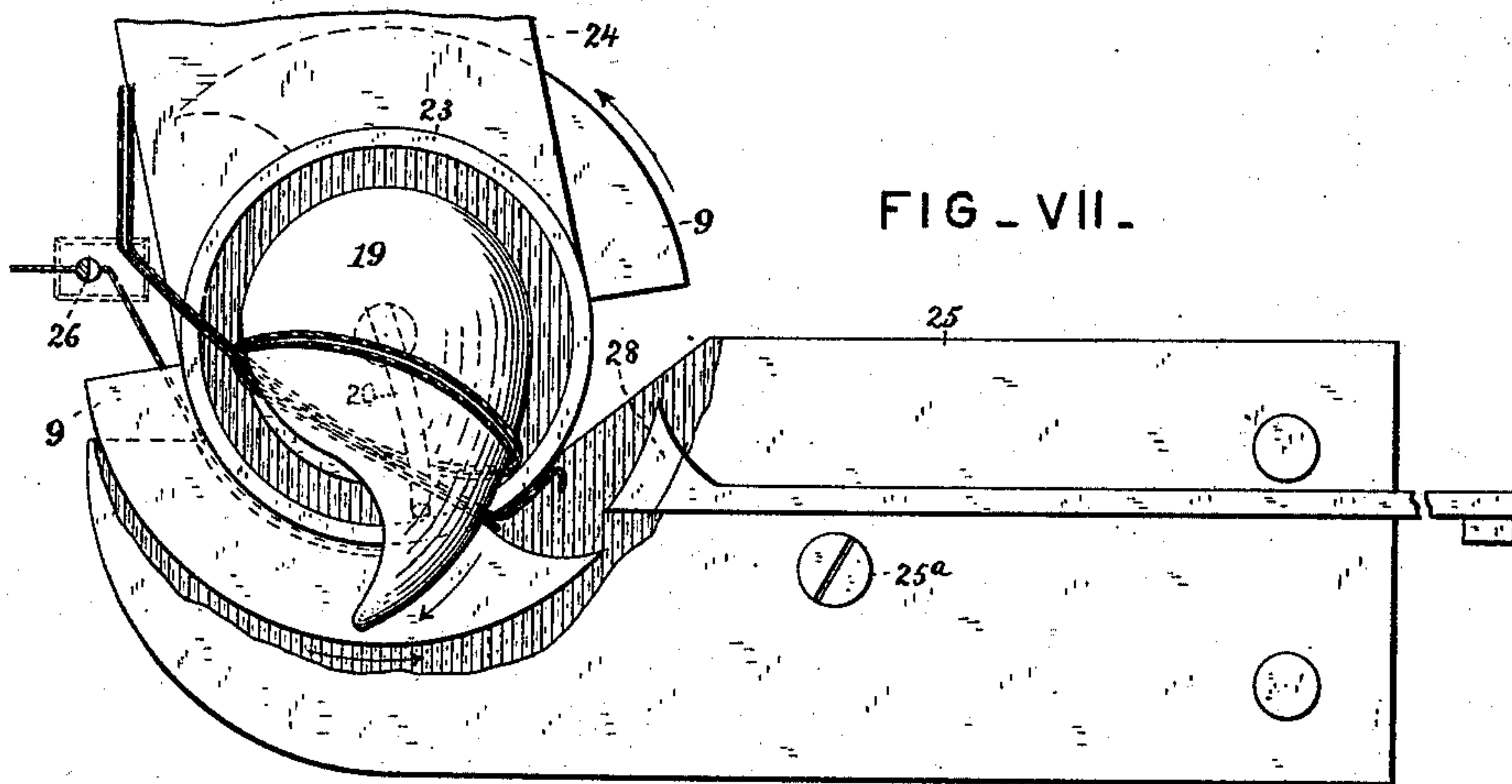
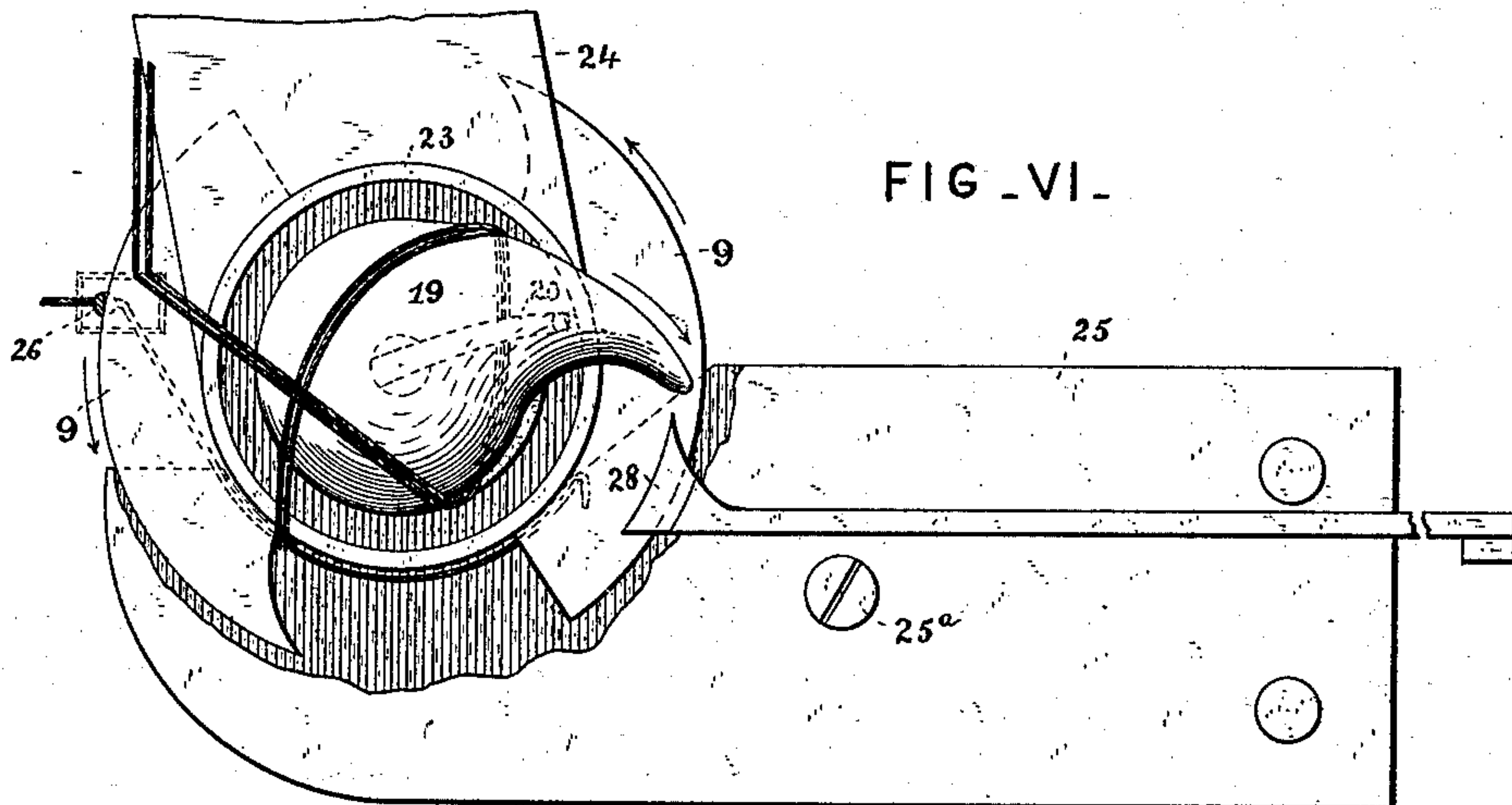
(No Model.)

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W. M. PIATT.
GRAIN BINDER.

No. 384,072.

Patented June 5, 1888.



Attest:
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UNITED STATES PATENT OFFICE.

WILLIAM M. PIATT, OF MAC-O CHEE, OHIO, ASSIGNOR OF ONE-THIRD TO
BENJAMIN P. RUNKLE, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 384,072, dated June 5, 1888.

Application filed June 14, 1886. Serial No. 205,183. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. PIATT, a citizen of the United States, and a resident of Mac-o-chee, in the county of Logan and State of Ohio, have invented new and useful Improvements in Grain-Binders, of which the following is a specification.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a side elevation of a grain-binding machine provided with my improvements, the parts being shown in normal position ready to receive the incoming grain. A modification in the means for operating the cutter or knife is shown in dotted lines. Fig. I^a is a detail section of the modification in dotted lines on the line I^a I^a, Fig. I. Fig. II is an end elevation, the needle having placed the binding-cord around the bundle and dwelling in its lowest position. Fig. III is a detail vertical section on the line III III, Fig. II, the knotter being at half-rotation and the gripper at a quarter-rotation, approximately. Fig. IV is a plan view, on a larger scale, of the knotting devices in their normal position, the end of the cord being clamped and extending from the place where it is held under the gripper hook and knotter up between the knotter and the other gripper-hook to the needle, the needle being omitted. Fig. V is a plan view of the knotting devices in their normal position, the needle being down, having placed the binding-cord around the bundle. Fig. VI is a plan view of the knotting devices as they appear when the knotter has been moved forward one-half of a rotation and the gripper one-quarter of a rotation in the opposite direction. Fig. VII is a plan view of the knotting devices as they appear when the knotter has been moved forward about three-quarters of a rotation and the gripper about three-eighths of a rotation in the opposite direction. Fig. VIII is a plan view of the knotting devices as they appear when the knotter and gripper are completing their movements and the knife has advanced and severed the cord. The arrows in Figs. IV to VIII indicate the direction of rotation of the gripper and knotter, respectively.

1 is the vertical driving-shaft, to which is keyed at its lower end a wheel, 2, formed with a bevel rack-segment, 2^a, and a rim or flange, 3.

4 is a bevel-pinion on the outer end of a shaft, 5, with which the rack-segment engages. In rear of the pinion is a cam or delay-shoe, 4^a, on which the rim or flange bears to arrest the movement of the wheel 2. Keyed to the inner end of the shaft 5 are the bevel gear-wheels 6 and 10.

7 is a horizontal large bevel gear-wheel meshing with the wheel 6 and secured to a sleeve, 8, carrying the gripper 9, which is formed with two hooks.

11 is a horizontal bevel gear-wheel meshing with the wheel 10 and secured to a hollow stem, 12, passed through the sleeve 8 and carrying the beak or upper jaw, 19, of the knotter.

13 is the shank of the hinged or lower jaw, 20, sliding in the hollow stem and provided with a swivel-joint, 14, at its lower end, by which it is connected to one end of a lever, 15, for support. The other end of the lever is upheld by a spring, 16, and carries a friction-roller, 18, on which a cam, 17, (on shaft 5,) bears for controlling the movement of the lever. The lower jaw of the knotter is hinged to the shank at 22 and pivoted to the beak or upper jaw, 21.

23 is a guard or shield for the lower jaw, secured to the bracket 24, forming the bearing for the beak. The gripper-hooks rotate between gripper-clamps 25, whose pressure on the hooks is adjusted by means of a set-screw, 25^a.

26 is the needle-bar supported in the head 34 of the arm 35 of the standard 36. Pivoted to a bracket, 27, is a lever, 37. To the upper end of this lever is hinged a sliding knife, 28, for severing the cord after the upper portion of the bend made by the gripper has been seized and held by the lower or hinged jaw against the beak or upper jaw. The knife is operated by means of a cam-wheel, 31, on the shaft 5, having cam-groove 31^a, in which travels a pin or stud, 30, secured to the lower end of the lever 37.

38 is a bracket by which the gripper-clamps are supported and in which the knife has bearing.

In Figs. I and I^a, I show in dotted lines a

modification in the means for operating the knife, comprising a rod, 29, extending toward the vertical shaft and provided with a stud or pin, 29^a, engaging in the groove 30^a in a cam-wheel, 31^b, on the vertical shaft. 33 is a bracket supporting the inner end of the shaft 5, and also the knotter-stem 12. The sleeve 8, with its adjacent parts, is supported on a collar, 32, on the stem 12.

39 is a bracket supporting the lower end of the vertical shaft 1, and also the rear end of the shaft 5. 40 is the binding-platform or table.

41 is the frame of the knotting devices. Within the arm 35 of the standard is the needle-shaft 42, carrying at its outer end a driving-pulley, 43, and at its inner end an eccentric, 44, having a wrist-pin, 45, by which the needle-bar 26 is reciprocated. Supported on the eccentric 44 is a rod, 46, having a compressor, 47, secured to its lower end. On the needle-shaft is a bevel gear-wheel, 48, which meshes with a bevel gear-wheel, 49, on the vertical shaft 1, for imparting motion to the latter.

The operation of the binder is as follows: The parts being in normal position ready for binding a bundle of grain, the extreme end of the cord is held between the gripper-hook in rear of the needle and the clamp-plates, and extends from that place under the hook and knotter (the hinged jaw of the knotter being closed) up in front of the knotter through the needle-slot in the binding-table and through the eye of the needle, the needle-bar being in its highest position, as shown in Fig. I. The incoming grain is piled against the binding-cord, pressing the latter in rear of the path of the needle. When sufficient grain to form a gavel is built up against the cord, (see Fig. II,) the needle-bar is caused to descend to its lowest position, (see Figs. II, III, and V), and there dwell with the eye of the needle beneath the clamp-plates until the knotting of the binding-cord is completed. During the knotting operation the compressor gradually compacts the bundle to permit the cord needed for the knot to be taken from around the bundle. The needle in descending places the cord around the bundle and down through the needle-slot alongside the upwardly-extending portion. (See Figs. II and V.) The end portions of the binding-cord are now together beneath the binding-table and between the knotter and a gripper-hook. These portions of cord are now ready for knotting, which is accomplished by the simultaneous movement of the knotter and the gripper. The knotter being given a complete rotation and the gripper a one-half rotation in the opposite direction, and the rack-segment wheel having performed a complete rotation, a knot will have been tied, as now stated. A gripper-hook comes against the end portions of the binding-cord and bends and lays the needle end of the cord alongside the clamped end of the cord, which action lifts the clamped end onto the top of the hook and

clamps a portion of the needle-cord underneath. The knotter, coming against the end portion of the binding-cord, forms a loop around itself under the hinged jaw, and the strands gradually climb over the shield and up the base of the upper jaw toward the point of the latter. When the knotter has made about a half-rotation and the gripper about a quarter-rotation, (see Fig. VI,) the hinged jaw of the knotter is dropped within the shield, and at the point where the hook and knotter meet the lower jaw passes under and the upper jaw passes over the portions of the binding-cord extending from the gripper to the knotter, and when placed in the jaws the lower jaw is raised to retain said portions. (See Fig. VII.) The needle end of the cord is now secured in the clamp-plates by the completed movement of the gripper and becomes the clamped end of the next binding-cord, the knife is advanced and severs the binding-cord above the needle-eye between the clamp-plates and the shield, the knotter completes its movement, the rack-segment wheel is arrested by the delay-shoe, the gavel is discharged, causing the knotter portion of the binding-cord to pass from the knotter over the gripper portion within the knotter, thus forming the knot, and the gripper portion is pulled away from the knotter. (See Fig. VIII.) The needle being elevated to its normal position, the cord is paid out in the space between the knotter and a gripper-hook ready for the reception of another bundle of incoming grain.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of a knotter adapted to tie the knot in one complete rotation, a gripper having two oppositely-disposed radial hooks mounted to rotate on the same center as the knotter, and mechanism for imparting for each single rotation of the knotter a one-half rotation to the gripper in the opposite direction for completing the knot, substantially as described.

2. The combination of a knotter adapted to tie the knot in one complete forward rotation, a gripper having two oppositely-disposed hooks adapted to rotate on the same center as the knotter, a guard over which the knotter operates and beneath which the gripper rotates, and mechanism for imparting for each single rotation of the knotter a one-half rotation to the gripper in the opposite direction for completing the knot, substantially as described.

3. The combination of a knotter adapted to tie the knot in one complete forward rotation, a gripper having two oppositely-disposed hooks adapted to rotate on the same center as the knotter, a guard over which the knotter operates and beneath which the gripper rotates, a knife for severing the cord between the gripper and the guard, and mechanism for imparting for each single rotation of the knotter a one-half rotation to the gripper in the oppo-

site direction for completing the knot, substantially as described.

4. The combination of a knotter adapted to tie the knot in one complete forward rotation, comprising the stem 12, an upper jaw, 19, a gear-wheel, 11, a shank, 13, sliding within the stem, and a lower jaw, 20, pivoted to the upper jaw and hinged to the shank, a gripper rotating on the knotter, comprising the sleeve 8, gear-wheel 7, and two oppositely-disposed hooks, 9 9, and mechanism for imparting a single rotation to the knotter-wheel and a one-half rotation to the gripper-wheel in the opposite direction for completing the knot, substantially as described.

5. The combination of the shaft 5, having bevel-pinion 4 and bevel-pinions 6 and 10, shaft 1, the bevel-wheel 2, having rack-segment 2^a, engaging the pinion, the stem 12, provided with bevel gear-wheel 11, upper jaw, 19, and lower jaw, 20, the shank 13, to which the lower jaw is hinged, having an operating-lever, and the sleeve 8, rotating on the stem, having the large bevel gear-wheel 7 and hooks 9 9, substantially as described.

WILLIAM M. PIATT.

Witnesses:

G. P. BLYSTEN,
JULIA K. PIATT.