(No Model.) 2 Sheets—Sheet 1.

W. M. HOLMES.

GRAIN BINDER.

No. 406,907. Patented July 16, 1889.

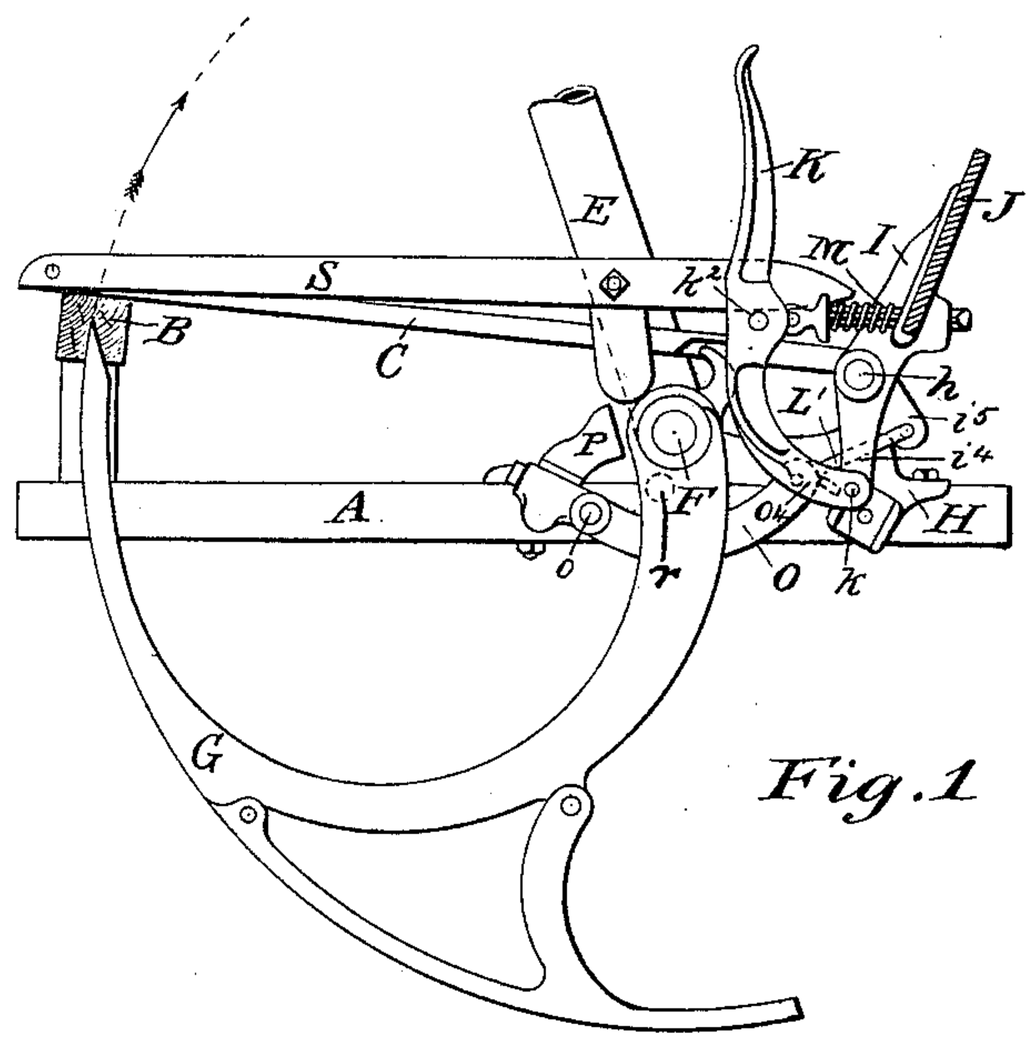

Fig. 1

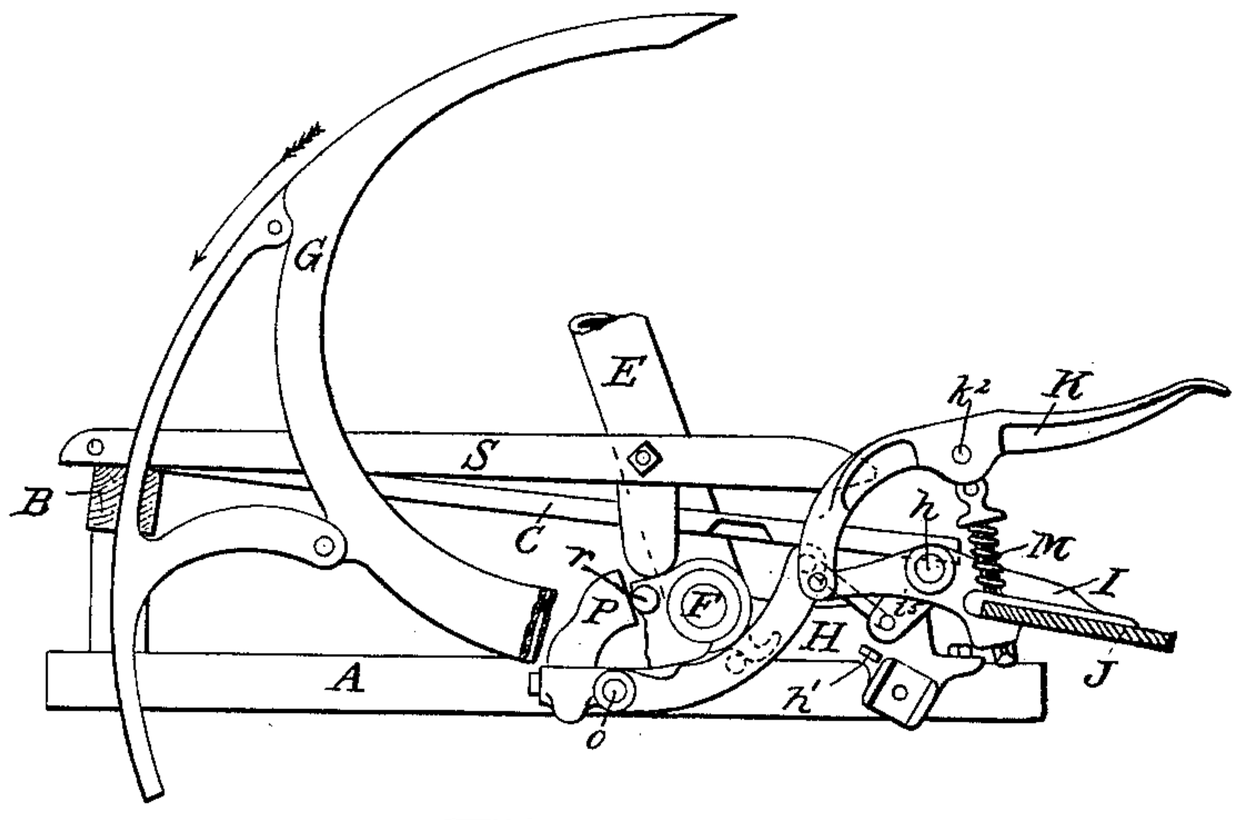

Fig. 2

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his attorney.

(No Model.) 2 Sheets—Sheet 2.

W. M. HOLMES.

GRAIN BINDER.

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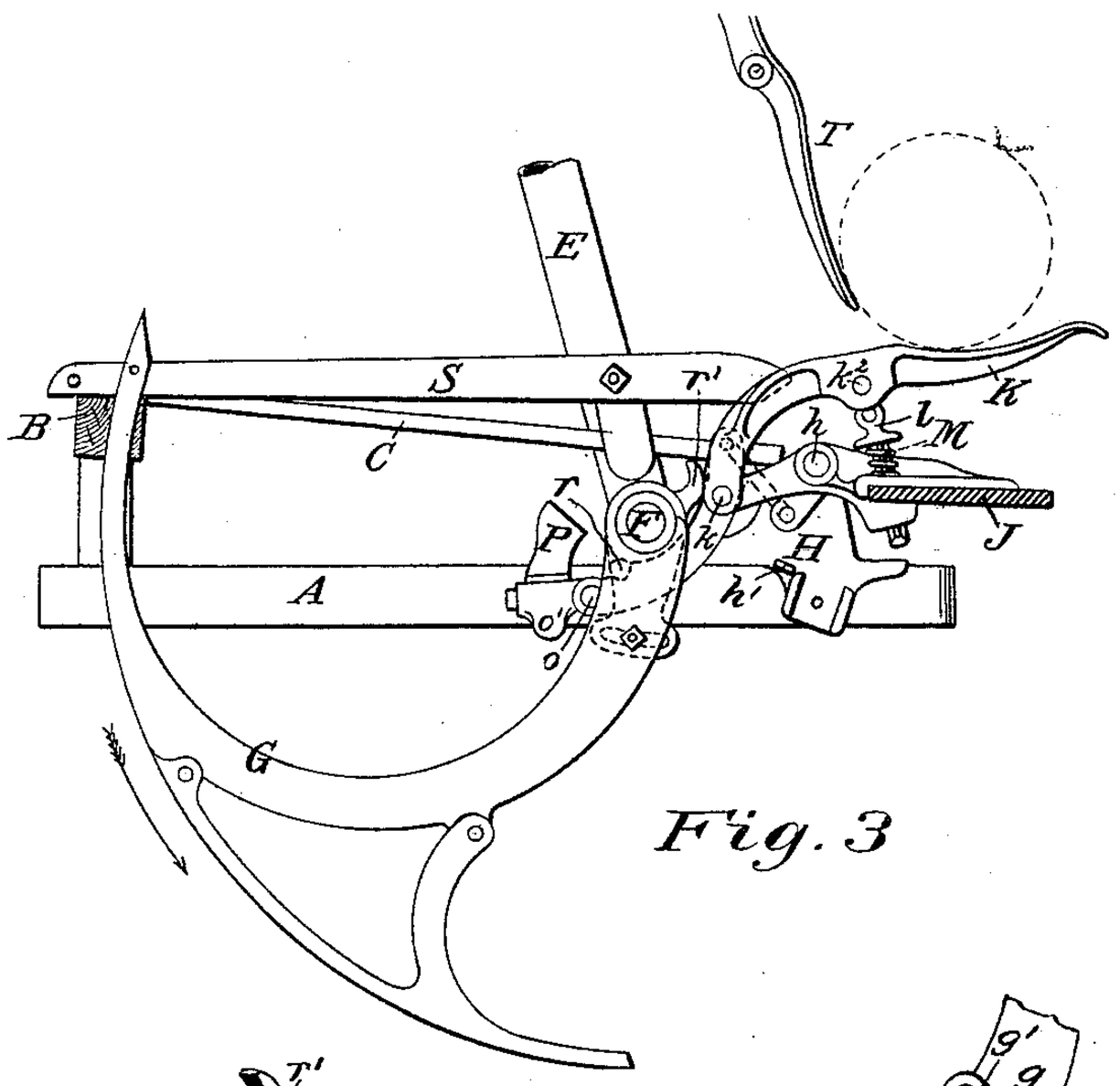

Fig. 3

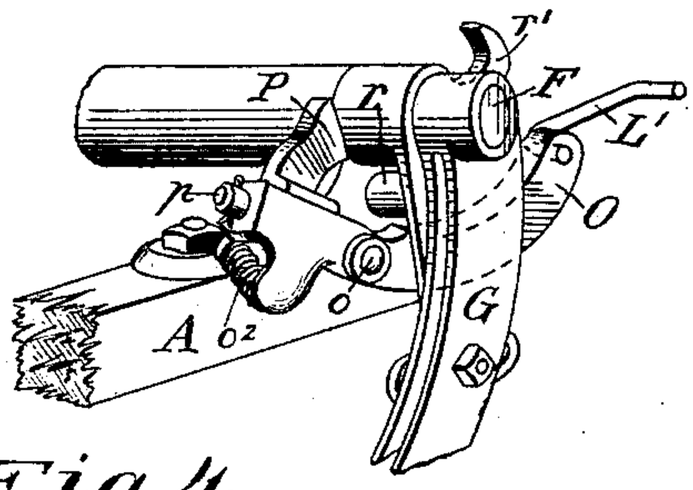

Fig. 4

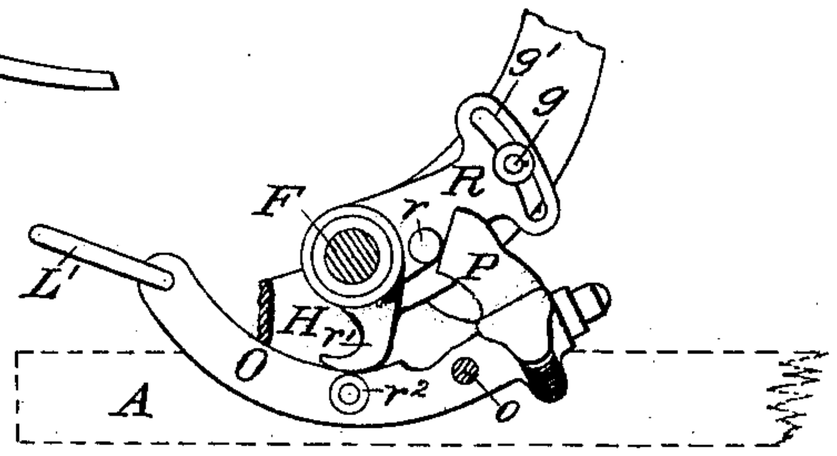

Fig. 5

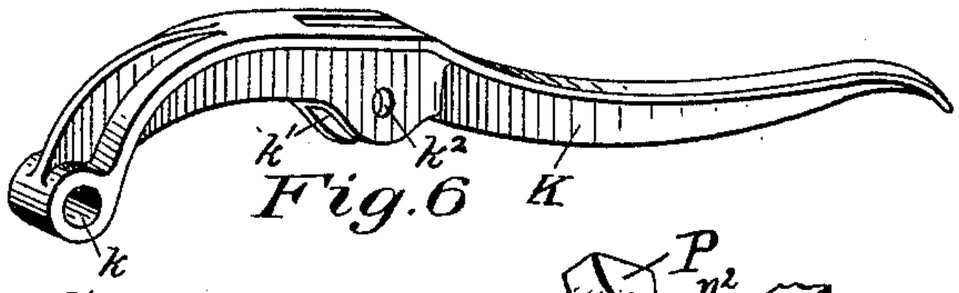

Fig. 6

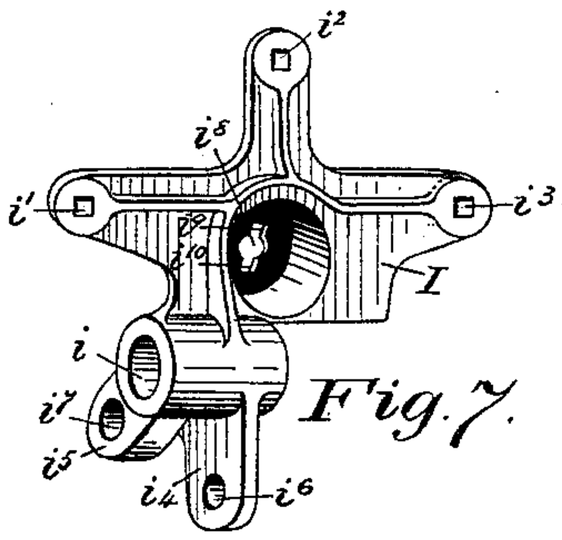

Fig. 7.

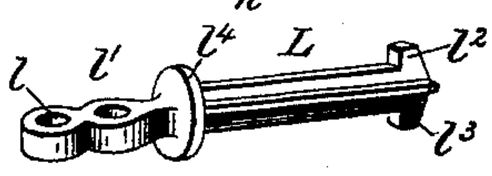

Fig. 8

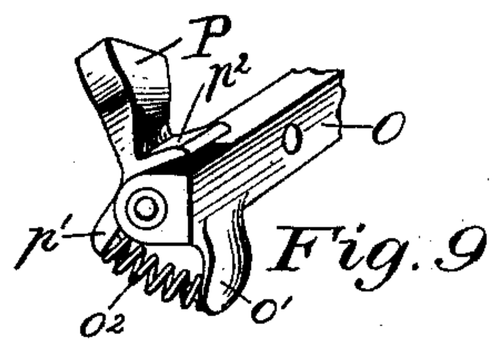

Fig. 9

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UNITED STATES PATENT OFFICE.

WATSON M. HOLMES, OF HOOSICK FALLS, NEW YORK.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 406,907, dated July 16, 1889.

Application filed January 9, 1888. Serial No. 260,265. (No model.)

To all whom it may concern:

Be it known that I, WATSON M. HOLMES, a citizen of the United States, residing at Hoosick Falls, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention consists in certain novel mechanism for holding the compressor, as well as the "drop-board" at the outer edge of the binding-receptacle, in an upright position during the formation and binding of the bundle, which holding mechanism is overcome by the descent of the needle-arm to permit the discharge of the bundle, and is again locked in position by the further descent of the needle-arm for the succeeding bundle. The compressor is mounted opposite the needle-arm, and is adapted to sustain the force exerted against it by the needle-arm in placing the band around the bundle, and the drop-board extends along the outer edge of the binding-receptacle, and its function is to hold the heads and butts of the bundle upon the binding-receptacle. In many machines now in use the compressor, as well as the drop-board, is mounted upon a rock-shaft, and the requisite motions are imparted thereto through the medium of a pitman-connection with the binder-driving mechanism, in which case some power is necessary to maintain the compressor in an upright position during the formation and binding of the bundle. In my device the compressor and drop-board are independently mounted and are locked in an upright position during the formation and binding of the bundle, and in this way power is economized.

In the accompanying drawings only so much of an automatic binder is shown as necessary to illustrate my invention.

Similar letters of reference in the various figures indicate like parts.

Figure 1 is a rear elevation, the compressor and drop-board being in the position they occupy during the formation and binding of the bundle, and the needle-arm being in a position of rest beneath the binding-platform. Fig. 2 is a rear elevation, the needle-arm being shown as descending and the compressor and drop-board being shown as having partly fallen. Fig. 3 is a rear elevation of the needle-arm, compressor, and drop-board during the discharge of the bundle. Figs. 4, 5, 6, 7, 8, and 9 are detail views.

E is the vertical post of the usual binder-frame, in the lower horizontal limb of which the needle-arm shaft F has its bearings. Secured to the rear end of the shaft F is the needle-arm G.

C is the binder-platform, and S a hinged cleat forming part of such binder-platform, the needle-arm ascending through a slot in the hinged cleat to place the twine in the knotter-jaws. (Not shown in the drawings.)

A is one of the cross-supports of the binder-platform C.

Firmly secured to the outer end of the sill A is the casting H, extending upwardly and supporting the binding-platform. The casting H is formed with the bearing for the short shaft h, and, extending inwardly, forms a bearing for the needle-arm shaft and the rocking arm O. (See Figs. 1, 2, and 3.)

Mounted on the shaft h, secured in casting H, is the casting I, (see Fig. 2,) which is permitted a rocking motion on shaft h, as will be hereinafter more fully explained, the bearing i passing over the shaft. Casting I is provided with the holes i' i^2 i^3, in which the drop-board J is secured to I. The compressor K (see Fig. 6) is pivoted at k to the arm i^4 of the casting I at i^6. A pin passes through the hole l in the rod L and through the hole k^2 in the compressor, which has a longitudinal slot k' for the reception of the flat head of the rod L, which extends outwardly through the hole i^8 in I. The rod L is formed with the lugs or shoulders l^2 l^3, which, being brought in register with the slots i^9 i^{10}, permit the rod L to be inserted through the hole i^8, and the lugs l^2 l^3, being turned out of register, prevent the rod L from escaping from I, permitting the rod a movement toward L by compressing the spring M, interposed between the compressor and casting I.

The pin or rod L is provided with two or more holes l l', in order to diminish or increase the size of the binding-receptacle. To the casting H at o is pivoted the rocking arm O, and

its forward end is connected to the casting I by the pitman L′, (see Fig. 4,) the pitman being secured in the hole i^7 of the downwardly-projecting ear i^5. The arm O on the inner end is provided with the spring-cam projection P. (See Fig. 4.) The spring-cam P is pivoted to the arm O by the longitudinal pivot p and is formed with the stop p^2, fitting over the arm O and limiting the movement of the spring-cam in one direction. Between a downwardly-projecting ear p' on cam P and the lug o', cast on O, is interposed the spiral spring o^2. The arm O is furthermore provided with the friction-roller r^2. (See Fig. 5.)

Secured to the needle-arm is the casting R by the bolt g and curved slot g' in R, by which construction the casting R can be adjusted in relation to the needle-arm. The casting R is on the side of the needle-arm adjacent to the rocking arm O and is formed with the downwardly-extending projection r', on the convex surface of which the roller r^2 rides, its purpose being to secure a gradual descent of the compressor and drop-board contemporaneous with the descent of the needle-arm. The casting R is also provided with the friction-roller r, which operates the rocking arm O. The casting H is formed with the stop h', against which the outer end of the rocking arm O abuts when in position shown in Fig. 1, and when in this position the attachment of the pitman L′ to arm O is below a line joining the point o and i^5, or past the center of the toggle-joint formed by O and L′, and consequently any movement of the compressor K backwardly only tends to force the forward end of the arm O against the stop h'.

It will be observed that by forming the casting H with a bearing for the needle-arm shaft, the pivot of the arm O, and for the shaft h the devices are always kept in proper position as regards one another, and are not liable to displacement.

The operation of the device is as follows: Suppose the parts to be in position represented in Fig. 1, the compressor and drop-board being locked in the position therein shown by the toggle-joint at o^4, which has been moved past the center. The grain is forced by a system of packers (not shown in drawings) against the compressor and beneath an automatic tripping-lever until sufficient has accumulated to overcome the trip, and the needle-arm G is set in motion in any well-known way and compresses the bundle against the compressor K, which is permitted a yielding movement backwardly to accommodate an unusually large bundle against the spring M. During the upward movement of the needle-arm the friction-roller r, secured to casting R, strikes against the inclined face of the cam P and forces it away from the needle-arm, compressing the spring o^2, and the lock at the joint o^4 is not disturbed. After the sheaf has been bound the friction-roller r strikes the upper edge of the cam P, moved into its path by spring o^2, and, through the cam, forces the inner end of arm O downwardly and its outer end upwardly, thereby overcoming the lock at o^4 and permitting the compressor K and drop-board J to fall; but, the roller r^2 riding on the convex surface of the projection r', the downward movement of the compressor K and drop-board J is prevented from taking place too quickly, and is made in the same time as that of the needle-arm. When the compressor and drop-board have fallen, the discharger T (see Fig. 3) ejects the bundle from the machine. As the needle-arm continues its descent after the discharge of the bundle, the friction-roller r bears upon the arm O outside its pivot o and forces it downward and locks it against the stop h', ready for the succeeding gavel.

It will be noticed that the compressor and drop-board are not connected with any of the moving parts of the binder, but are maintained in an upright position by the lock at o^4, and that no power is taken from any of the moving parts of the machine to keep them in an upright position against the force exerted by the needle-arm in compressing the bundle.

In the accompanying drawings I have shown the compressor locked in an upright position during the binding of the bundle by a toggle-joint formed by the rocking arm O and the link connecting the rocking arm at its forward end and the drop-board support to which the compressor is pivoted; but I do not wish to be understood as limiting myself herein to this particular manner of forming the toggle-joint, as it may be formed in a variety of ways without departing from the spirit of my invention.

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

1. The combination, with the pivoted compressor, of a toggle-joint to lock the compressor in an upright position, and a projection on the needle-arm adapted during the initial descent thereof to engage a rocking bar forming part of said toggle-joint on one side of its pivot to break the lock and on the further descent of the needle-arm to engage the rocking bar on the other side of its pivot to again lock the compressor in an upright position, substantially as and for the purpose specified.

2. The combination of the compressor rocking on a pivot at the outer edge of the binder-platform, a rocking arm pivoted to the machine beneath the binder-platform, intermediate mechanism between the rocking arm and the compressor and forming therewith a toggle-joint, a spring-cam projection on the rocking arm, and a roller on the needle-arm adapted to engage the spring-cam during the descent of the needle-arm, substantially as and for the purpose specified.

3. The combination, with the shaft mounted at the outer edge of the binder-platform independently of the binder-driving mechanism,

of a casting pivoted on the shaft, a crank-arm secured to the casting, a rocking arm pivoted to the machine beneath the binder-platform, a link connecting the crank-arm and the rocking arm and forming therewith a toggle-joint, the compressor pivoted to the casting, and a spring interposed between the casting and the compressor, substantially as and for the purpose specified.

4. The combination, with the compressor mounted at the outer edge of the binder-platform independently of the binder-driving mechanism and held in an upright position by a toggle-joint during the binding of the bundle, of a projection on the needle-arm to overcome the lock formed by the toggle-joint, and a heel-extension on the needle-arm to retard the fall of the compressor, substantially as and for the purpose specified.

5. The combination of the compressor, the rocking arm connected to the compressor by the toggle-joint, and a fixed stop on the machine, against which the toggle-joint is forced by the grain accumulating against the compressor, substantially as and for the purpose specified.

6. The combination, with the compressor pivoted to the drop-board mounted at the outer edge of the binder-receptacle independently of the binder-driving mechanism, of a spring interposed between the compressor and the drop-board, a rocking arm pivoted to the machine beneath the binder-platform, a crank-arm attached to the drop-board, a link connecting the crank-arm and the rocking arm and forming therewith a toggle-joint, and the needle-arm formed with a projection to engage the inner end of the rocking arm during the descent of the needle-arm to overcome the lock formed by the toggle-joint, substantially as and for the purpose specified.

7. The combination, with the needle-arm and the compressor, of a rocking arm pivoted to the machine beneath the binder-platform, intermediate mechanism interposed between the rocking arm and the compressor and forming therewith a toggle-joint, and an adjustable piece secured to the needle-arm to engage the inner end of the rocking arm to overcome the lock formed by the toggle-joint, substantially as and for the purpose specified.

8. The combination, with the compressor and the rocking arm pivoted beneath the binder-platform to the machine and intermediate mechanism interposed between the rocking arm and the compressor and forming therewith a toggle-joint by which the compressor is locked in an upright position, of a projection on the needle-arm to overcome the lock formed by the toggle-joint by engaging with the rocking arm at its inner end during a portion of the descent of the needle-arm and to again lock the compressor in position by engaging on the further descent of the needle-arm with the rocking arm at its forward end, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand this 5th day of January, 1888.

WATSON M. HOLMES.

Witnesses:
C. D. KINSLEY,
L. C. WIMER.