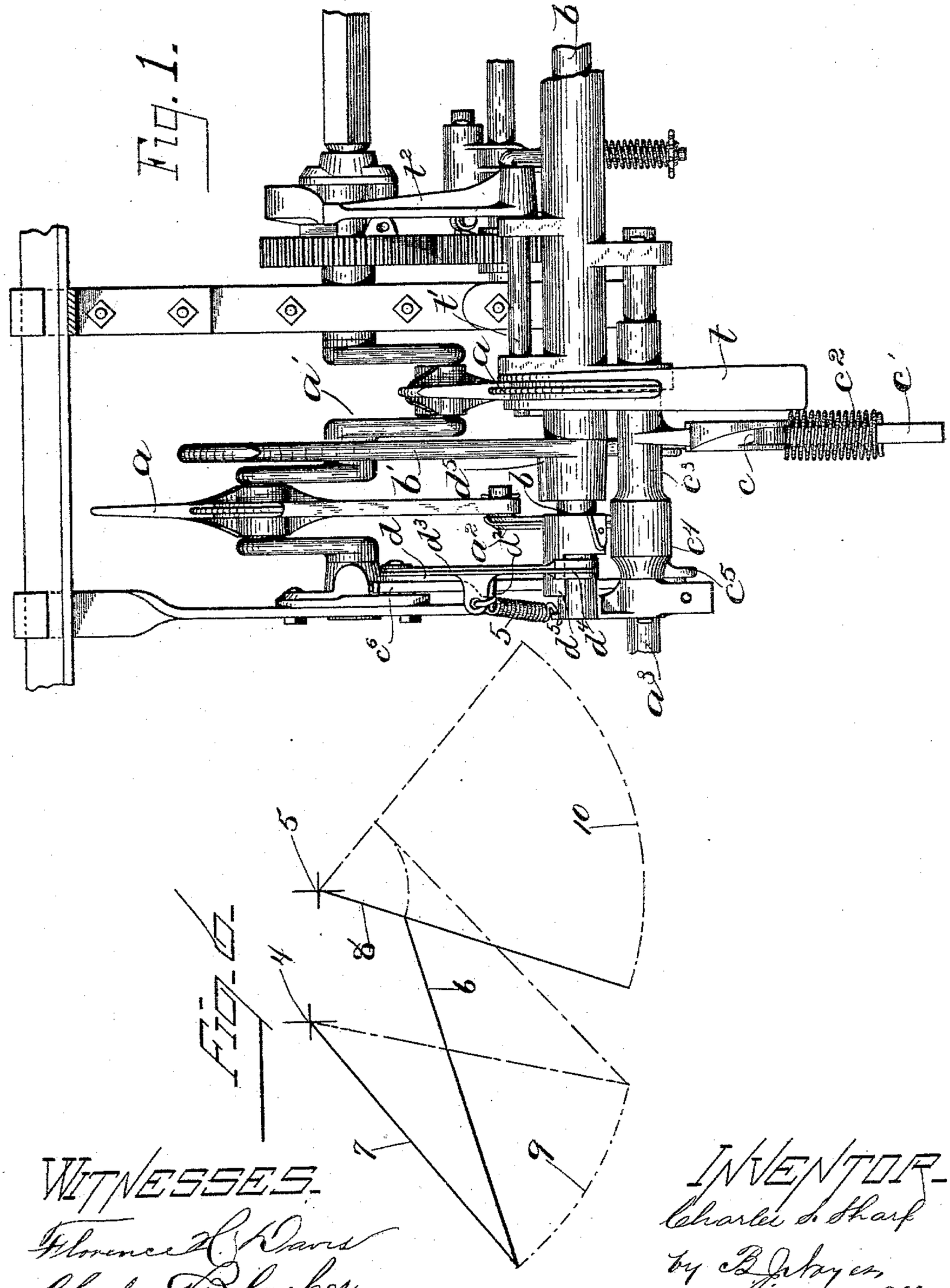
(No Model.) 3 Sheets—Sheet 1.

C. S. SHARP.

GRAIN BINDER.

No. 598,019. Patented Jan. 25, 1898.

FIG. 1.



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(No Model.) 3 Sheets—Sheet 2.

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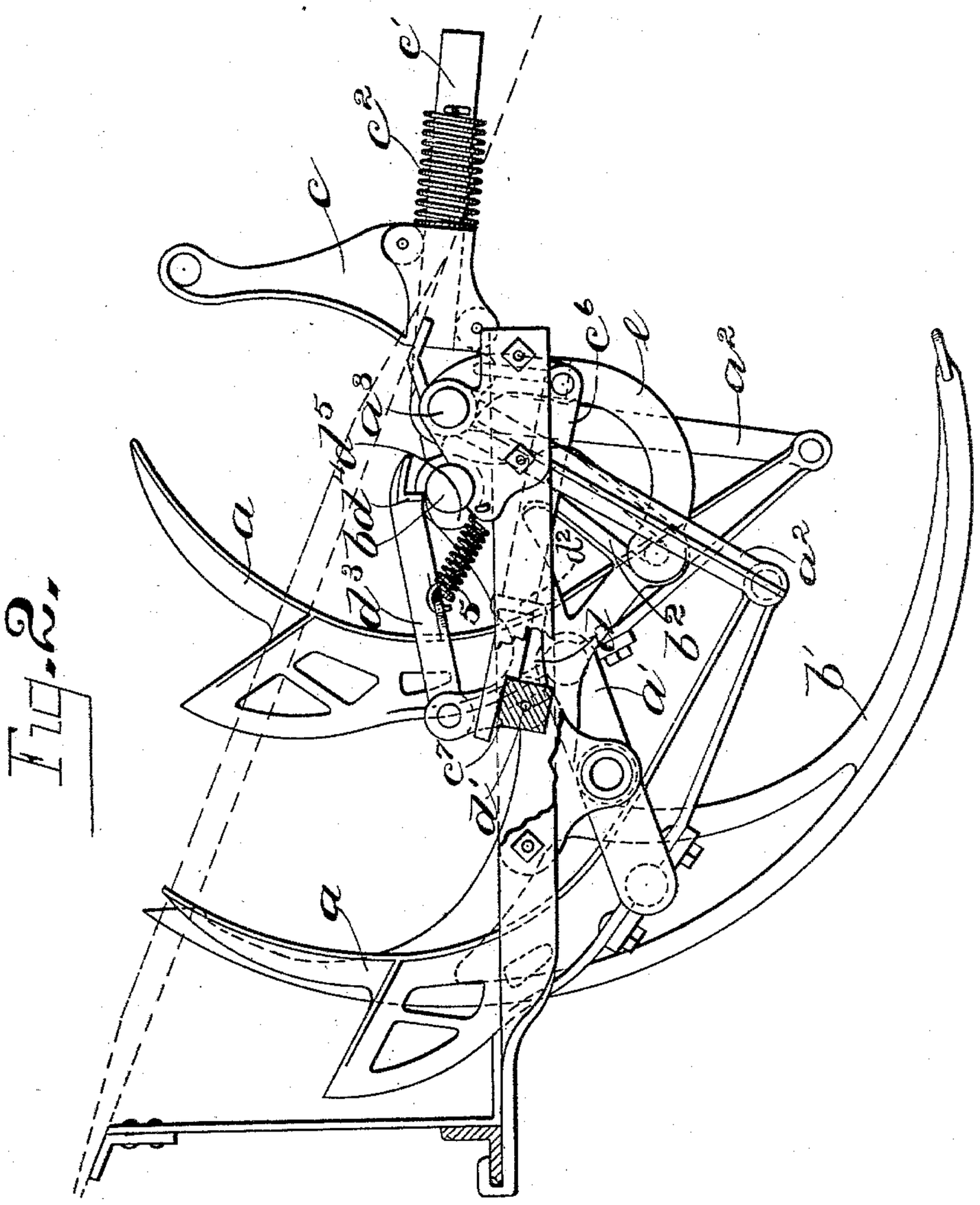
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

C. S. SHARP.

GRAIN BINDER.

No. 598,019. Patented Jan. 25, 1898.

Fig. 3.

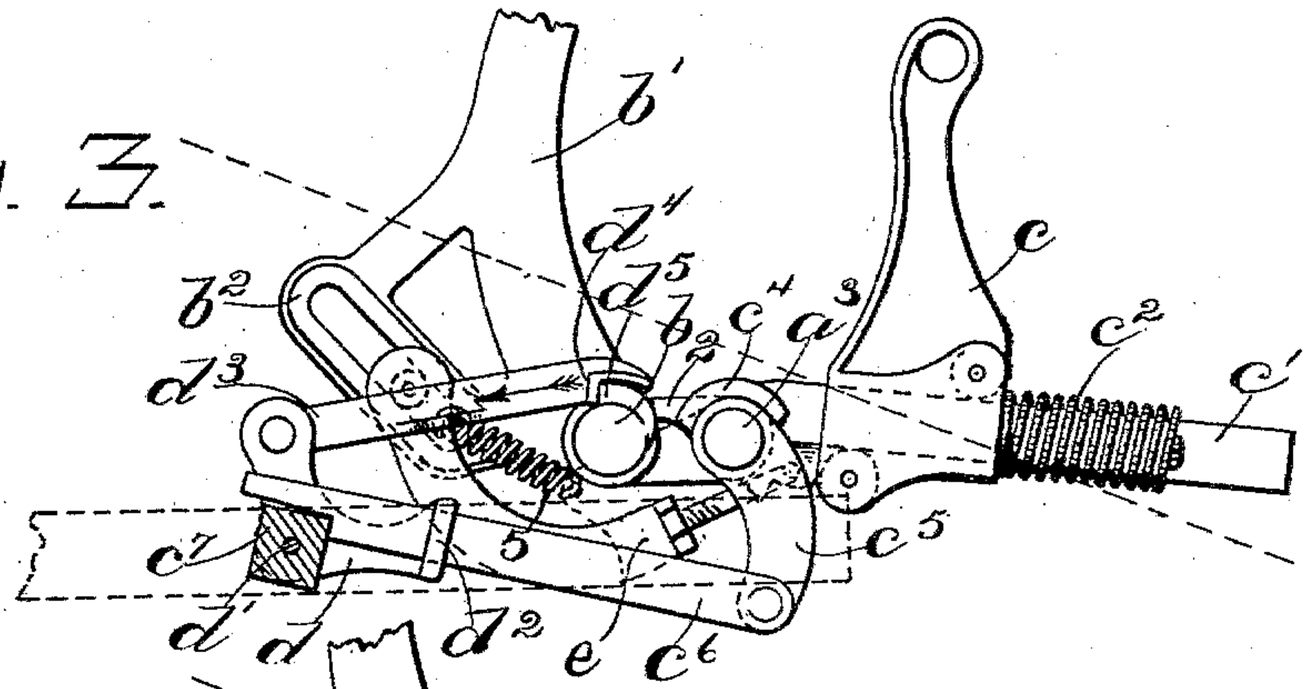


Fig. 4.

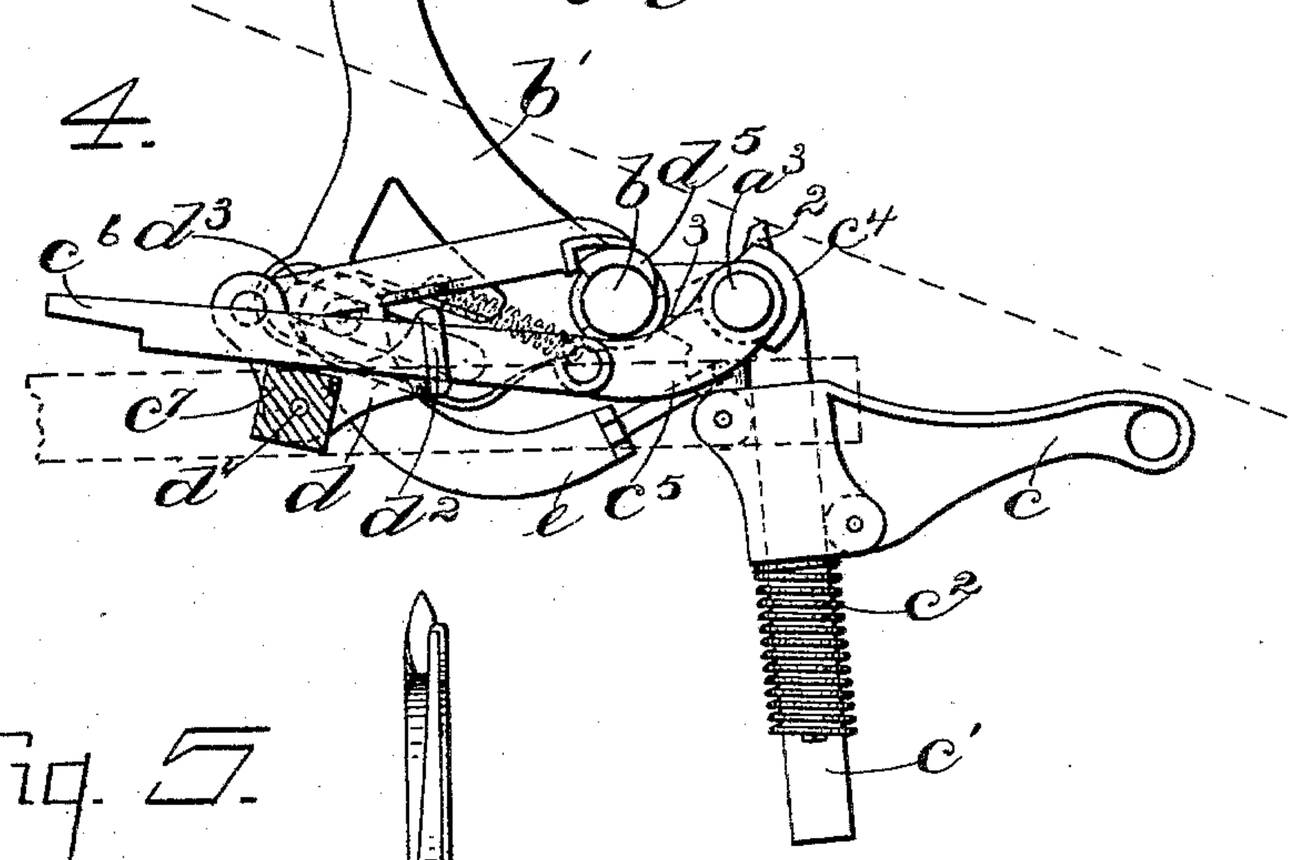
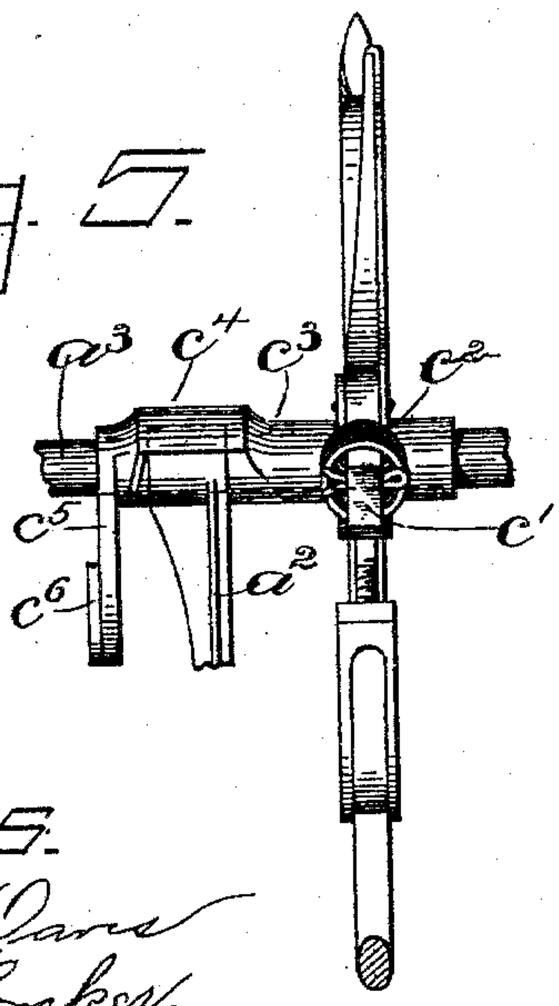


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES S. SHARP, OF AUBURN, NEW YORK, ASSIGNOR TO THE D. M. OSBORNE & COMPANY, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 598,019, dated January 25, 1898.

Application filed January 9, 1895. Serial No. 534,347. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. SHARP, of Auburn, county of Cayuga, and State of New York, have invented an Improvement in Grain-Binders, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of grain-binders, to the end that the discharge-passage of the binder may be opened for the discharge of the bundle for a maximum period of time; and the invention consists in a grain-binder having a compressor normally held in its elevated position to close the discharge-passage of the binder, means for operating said compressor to quickly open said discharge-passage at the beginning of the descent of the needle, and means for operating said compressor to quickly close said discharge-passage just as the needle ceases to descend, thereby leaving the discharge-passage open for the discharge of the bundle for a maximum period of time.

The compressor is herein shown as normally held in its elevated position to close the discharge-passage by means of a locking device, and a releasing device is provided for operating said locking device to release the compressor, and said releasing device is operated, preferably, by the needle-shaft, or it may be by the needle on said shaft, and said operation takes place at the beginning of the descent of the needle, so as to permit the compressor to quickly open the discharge-passage at the beginning of the descent of the needle, and, furthermore, as herein shown, the compressor is connected with the needle by a link, the points of connection being at different distances from the respective axes of the compressor and needle, so that just as the needle ceases to descend the compressor will be restored to normal position at a greater rate of speed than the needle travels, to thereby quickly close the discharge-passage.

Figure 1 is a plan view of a sufficient portion of the binding mechanism of a grain-binder to illustrate my invention; Fig. 2, a side elevation of the mechanism shown in Fig. 1; Fig. 3, a detail showing the needle at the limit of its upward throw or stroke. Fig. 4, a detail showing the needle just beginning its downward stroke, having just tripped the compressor; Fig. 5, a detail showing the compressor-bar bridged to span one of the packer-links and having an arm to which the locking-lever of the compressor is connected; and Fig. 6, a diagrammatical view showing the relative movements of the needle and compressor during the time the compressor is being restored.

The packers a a, double-cranked packer-shaft a', links a^2 a^2, rod a^3, to which said links are loosely connected, the needle-shaft b, needle b' thereon, compressor c, constructed and arranged to slide along bodily on an arm c' against the spring c^2, the sleeve c^3, which constitutes the compressor-bar loosely mounted on the rod a^3, all are substantially as usual in grain-binders, with the exception that the needle b' has a slotted heel extension b^2 next its fulcrum, and that the compressor-bar or sleeve c^3 is arched or bridged at c^4 to span the connection of one of the links a^2 of the packer a to thereby insure compactness of parts.

The usual independent tripping mechanism is provided for the binder-actuating mechanism, consisting, as herein shown, of the trip-arm t, secured to the shaft t', bearing an arm t^2, which engages the usual clutch for the binder-actuating mechanism.

A short arm c^5 is fixed to and projects from the sleeve or compressor-bar, which has loosely connected with its lower end a latch c^6, notched or shouldered at its end to engage a quadrangular or other shaped block c^7.

The latch c^6, engaging the block c^7 and connected with the arm c^5, rigidly secured to or cast integral with the compressor-bar, constitutes a locking device for holding the compressor-bar, and consequently the compressor, in its normal or elevated position to receive the grain.

A bell-crank lever d is pivoted to the framework, as at d', for instance, one arm of which is formed with an eye d^2, which receives the locking-lever c^6, and the other arm of which has loosely connected to it a finger d^3, pro-

vided with a notched or shouldered end d^4, which overlies the needle-shaft b and is held pressed down upon said shaft by a spring 5.

A cam or projection d^5 is formed on the hub of the needle b' or on its shaft, which, when the needle arrives at a certain position, engages the notched or shouldered end d^4 of the finger d^3, and by moving said finger longitudinally in the direction of the arrow, Fig. 3, turns the bell-crank lever on its pivot, raising the locking-lever c^6 out of engagement with the block c^7. Therefore the bell-crank lever d, which is connected with the locking device, the finger d^3, connected to it, and the cam d^5 on the needle-shaft or moving in conjunction with the needle constitute a releasing device for the locking or retaining device of the compressor.

A curved link e is connected at one end with the compressor-bar c^3, and has at its other end a pin or roll which enters and works in a slot formed in the heel extension b^2 of the needle.

As the needle b' falls the pin or roll of the link e follows along the slot until it arrives at the end thereof, at which point it arrives just before the needle resumes its normally-depressed position, and then by pressure upon or against the link e the compressor-bar c^3 is turned and the compressor c again elevated. Thus the compressor is tripped at the beginning of the descent of the needle and restored at the end thereof.

I desire to allow the compressor to remain "tripped" as long as possible to insure the discharge of the bundle, for if restored too soon it engages the bundle which is being discharged, and, on the other hand, it is necessary that the compressor shall be restored just as soon as the bundle is discharged, in order that it may catch the first grain of the next bundle. To carry out these very desirable results it will be seen that the needle and compressor are pivoted on separate rods or shafts side by side, thereby turning on separate and independent axes, and that they are connected by link e, the ends of which are attached to the needle and compressor, respectively, at different distances from their axes—as, for instance, the link is connected with the needle at a considerable distance from the axis thereof, while its connection with the compressor is but a short distance from the axis thereof, and owing to this difference in radii the arc through which the needle end of the link travels is a less number of degrees than the arc through which the compressor end of the link travels, and therefore it will seen that the compressor is moved at a greater rate of speed than the needle, and hence is restored quickly just as the needle arrives at its lowermost position.

In Fig. 6, 5 4 represent, respectively, the axes of the needle and compressor; 6, the connecting-link; 7, the radial line extending from the axis of the needle to one end of the link, and 8 the radial line extending from the axis of the compressor to the other end of the link. The dotted line 9 indicates the travel of the needle while restoring the compressor, and the dotted line 10 the travel of the compressor.

It will readily be observed that the needle travels a less number of degrees than the compressor, and hence permits the compressor to remain tripped longer than usual and at the same time restored in time for use.

The compressor-bar has projecting radially from it at points more or less remote from each other two stops 2 3, (see Fig. 4,) one of which, as 2, by striking against the needle-bar or other fixed stop limits the ascent of the compressor, and the other, as 3, by striking against said needle-bar or other fixed stop limits the descent of the compressor.

The operation of the parts is as follows: In Fig. 2 the compressor is shown in its normal elevated position to receive the grain, the needle being depressed and the packers operating to form the bundle. The bundle having been formed, the needle rises to the position shown in Fig. 3, when the cam or projection d^5 of the releasing device engages the finger d^3. As the needle descends (see Fig. 4) the finger d^3 is thrust longitudinally, turning the bell-crank lever d and raising the arm c^6, and as said arm disengages the block c^7 it moves longitudinally through the eye d^2 and the compressor falls. Just before the needle arrives at its lowest position its slotted heel extension acts upon the link e and quickly restores the compressor, drawing the arm c^6 back into engagement with the block c^7 and the parts are again in the position shown in Fig. 2.

I claim—

1. In a grain-binder, a compressor, a locking device for holding it in its normal elevated position to receive the grain, a releasing device for said locking device operated by the needle-shaft at the beginning of the descent of the needle and a link connecting the compressor and needle at different distances from their axes, whereby the compressor is restored quickly at the end of the descent of the needle, and relatively thereto, substantially as described.

2. In a grain-binder, the combination of independent tripping mechanism for the binder-actuating mechanism, the compressor c, pivoted compressor-arm c' upon which said compressor c slides bodily against the spring c^2, a locking device for holding the compressor-arm with the compressor in its elevated position to receive the grain, a releasing device for said locking device operated by the needle-shaft, and a link connected at one end to the compressor-arm c', and at the other end to a slotted heel extension on the needle, the end connections of the link with said arm c' and needle being at different distances from their axes, substantially as described.

3. In a grain-binder, a compressor and a

needle turning on separate and independent axes, a link connected at one end with the compressor at a short distance from its axis and connected at the other end with the needle at a much greater distance from its axis, whereby the compressor is restored by the needle but moved at a greater rate of speed, a locking device for holding said compressor in elevated position, means for releasing it, and means for restoring said locking device operated by and at the end of the descent of the needle, substantially as described.

4. In a grain-binder, a compressor, a locking device for holding it in its normal elevated position to receive the grain, a releasing device for said locking device operated by the needle-shaft at the beginning of the descent of the needle, and a restoring device for said compressor operated by the needle-shaft only at the end of the descent of the needle, and constructed and arranged to move said compressor at a greater rate of speed than the needle which operates it, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES S. SHARP.

Witnesses:
J. J. GLASS,
H. R. HANKINS.