(No Model.)

A. STARK.

GRAIN BINDER.

No. 549,942. Patented Nov. 19, 1895.

Fig. 1.

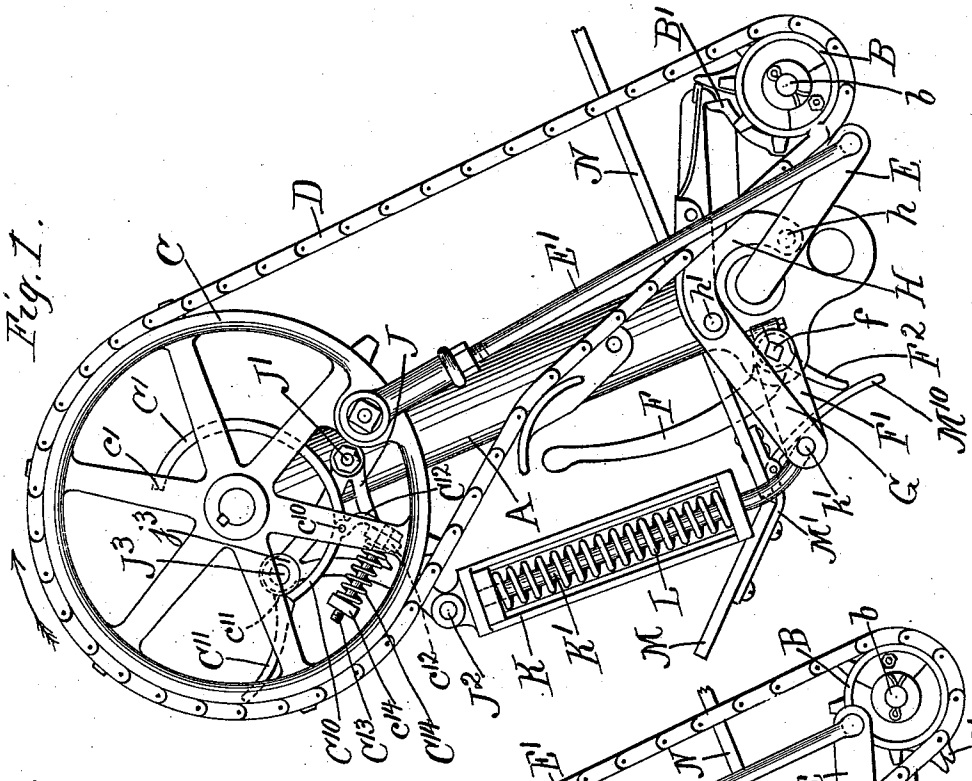
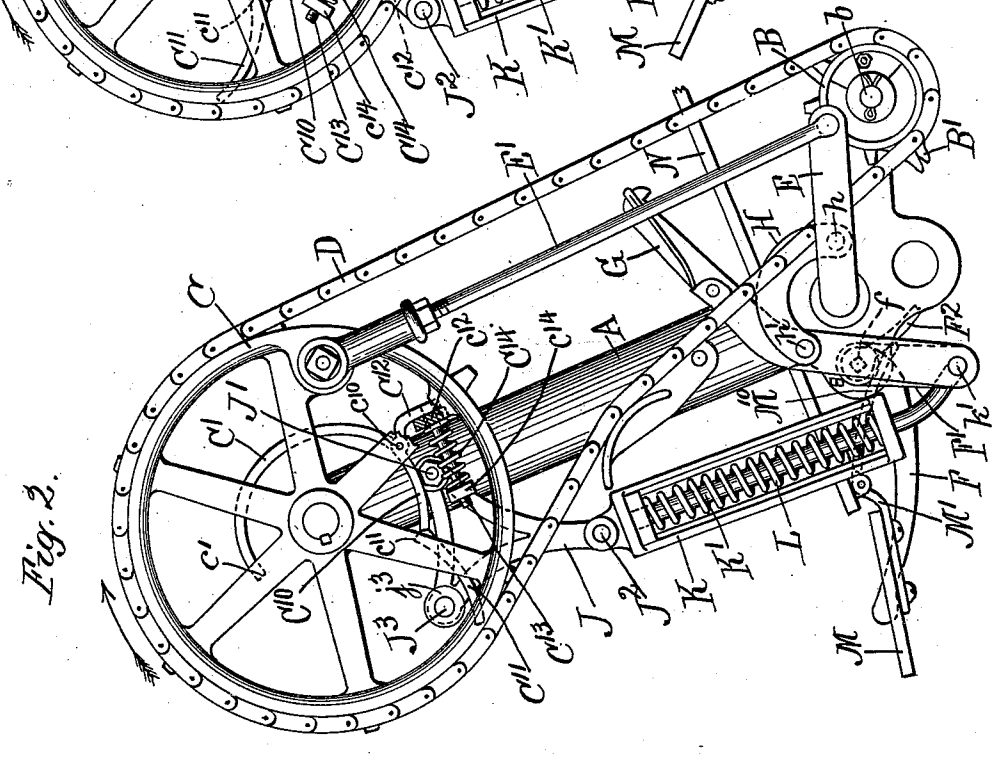


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

ANDREW STARK, OF CHICAGO, ILLINOIS.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 549,942, dated November 19, 1895.

Application filed September 29, 1894. Serial No. 524,475. (No model.)

To all whom it may concern:

Be it known that I, ANDREW STARK, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to details of the mechanism connected with the trip and compressor; and it consists of the details of construction specified in the claims.

In the drawings, Figure 1 is a detail front side elevation of a grain-binder comprising my invention, the position of the parts being that at which they are locked at rest, as in the intervals of binding. Fig. 2 is a similar view of the same parts shown in the position occupied at the time the bundle is discharged.

A is the standard of the binder **U** frame of the usual construction.

b is the shaft through which power is communicated to the binder mechanism, and which, because the clutch-wheel is on this shaft, may be referred to as the "clutch-shaft."

B is the driving sprocket-wheel on the clutch-shaft.

B′ is a latch of the clutch mechanism which is not shown in detail, because it does not specifically pertain to the present invention, and any clutch having a latch adapted to be engaged and arrested during the rotation of the clutch-wheel, and thereby to cause the disengagement of the clutch, may be employed in connection with the improvements which constitute my present invention.

C is the binder main driving-wheel; D, the chain by which power is communicated to said wheel from the sprocket-wheel B.

E is the needle rock-shaft crank-arm; E′, the link or pitman by which it is operated from the wheel C.

f is the rock-shaft of the trip and compressor.

F is the trip and compressor arm.

F′ is a crank-arm on the forward end of the rock-shaft *f*.

G is the trip-latch or arm which engages the latch B′ of the trip at proper time to release the clutch.

H is a link pivotally connected in the needle rock-shaft crank-arm E and to the trip-latch G at *h* and *h*′, respectively. This link is curved or recessed to reach around the needle rock-shaft and its bearing in the standard A, and the pivot connection *h*′ of said link to the trip-latch is a fulcrum of the latter, said fulcrum being shifted by the needle rock-shaft crank-arm as the latter oscillates.

As thus far described, the construction is substantially the same as that shown in my Patent No. 520,458, dated May 29, 1894, and the mode of operation may be briefly described as follows:

When the accumulation of the grain against the trip and compressor arm F forces the latter outward, its crank-arm F′ carries down the outer end of the trip-latch G and lifts the inner end, disengaging the same from the clutch, which thereupon operates to engage the sprocket-wheel B with the driving-shaft *b*, whereby the binder-train is set in operation. The movement of the needle rock-shaft crank-arm E during the operation of binder mechanism lifts the trip-latch G, so that the return of the trip and compressor arm F, which occurs during compression of the bundle, and the consequent swinging up again of the crank-arm F′ does not drop the inner end of the latch into position where it can engage the latch B′ of the trip; but when the bundle has been discharged and the compressor under the action of the other mechanism is permitted to come back to its initial position and the binder-arm also returns to its initial position the trip-latch G is by the concurrence of these two movements dropped to a position where it engages the clutch and disengages the binder-train from the driving-shaft. The present invention has to do with features which co-operate with this mechanism, but which are not dependent upon its specific features.

The parts of the structure which have to do with the present invention will now be described specifically.

J is a triangular lever fulcrumed at one of its angles at J′, on the standard A, facing the wheel C, and connected at another angle J^2 to one member K of the compound extensible link K K′, the other member K′ connected at *k*′ to the crank-arm F′.

L is the compressor-spring, operating in a familiar manner between the two members K and K′ of the compound and extensible link. At the third angle J^3 of the triangular lever there is mounted a roll or abutment j^3, which is adapted to travel upon the cam-track C′, which projects from the inner face of the wheel C. C^{10} is a gate or hinged portion in this cam-track C′, being hinged at c^{10} and swinging to a stop against the detached portion C^{11} of the cam-track.

C^{12} is a tail on the gate portion C^{10}, extending outwardly approximately rigidly with respect to the wheel when the gate is closed and stopping against a lug c^{12}, which projects from the inner face of the wheel C. A bolt C^{13}, connected to the tail C^{12}, extending at right angles thereto through the lug c^{12}, has on it beyond said lug the spring C^{14}, which is stopped by the nut c^{14}, screwed onto the end of the bolt.

The wheel C revolves in the direction indicated by the arrows on both figures. In the position of rest it will be observed that the roll j^3 rests against the free end of the gate-piece C^{10} of the cam-track C′. The pressure of the grain against the trip-arm F, tending to rock the triangular lever J about its fulcrum J′, causes the roll j^3 to press the gate open, this being effected against the resistance of the spring C^{14}, and this spring offering less resistance than the main compressor-spring L will yield for the purpose of permitting the movement described before the compressor-spring yields to permit the elongation of the extensible link K K′. The movement of the trip and compressor arm F and its crank-arm F′, which is permitted by the yielding of the spring C^{14}, which may be called the "trip-spring," is sufficient to unlatch the clutch and permit the binder-train to be driven. The first portion of the rotary movement of the wheel C carries the gate away from the roll j^3 and permits it to close again, and the cam-roll j^3 travels on the principal portion of the cam-track C′. The eccentricity of the principal portion of the cam-track is such as to draw inward—that is, toward the center of the wheel—the corner J^3 of the triangular lever as the roll travels upon said cam-track, and such movement tending to lift the crank-arm F′ and force the compressor-arm F in against the bundle operates in the customary manner to compress the bundle yieldingly because of the spring L, which intervenes in the compound compressor-link K K′. When the cam-roll j^3 reaches the end c' of the cam-track, the reaction of the compressor-spring L and the pressure of the bundle against the compressor-arm throw the roll out past the cam-track, and being no longer restrained by the latter the triangular lever ceases to hold up the compressor, and the bundle, by this time completed and ready to be ejected, in moving out throws the compressor down, as seen in Fig. 2.

M is an outside gate at the discharge edge of the binder-deck N, hinged to the latter and having its hinge M′ provided with a tail M^{10}, which projects in a plane transverse to the binder-shafts, in which there is also an arm F^2, projecting from the compressor rock-shaft f. While the compressor is in any position at which it restrains the bundle, the arm F^2, bearing against the tail M^{10} of the hinge M′, holds up the gate M; but when the compressor falls when the roll j^3 passes on the cam-track C′ at c' the arm F^2, withdrawing grainward, leaves the gate M without support and it falls to the position shown in Fig. 2, being stopped by the collision of the tail M^{10} against the bearing of the rock-shaft f. The position of the parts is now that shown in Fig. 2. It will be noticed that the eccentric portion C^{11} of the cam-track, which stands apart from the other fixed portion, is now in a position so that as the wheel continues to revolve it engages the stud j^3 and picks up the corner J^3 of the triangular lever, and while the wheel C is completing its rotation this portion C^{11}, engaging thus the triangular lever, restores the lever and the link K K′ and the compressor rock-shaft, compressor-arm, lever-arm F′, and gate M to their initial position, which is reached just as the roll j^3 runs off the corner c^{11} of the portion C^{11} of the cam-track, at which instant, also, the trip-latch G, having had its nose depressed by the return downward of the needle rock-shaft crank-arm E and standing in the path of rotation of the nose of the latch B′, engages the latter, disengages the clutch, and brings the binder mechanism to rest. The stud j^3, lodging thus behind the projection c^{11}, locks the binder mechanism against any return movement.

I claim—

1. In a grain binder, in combination with a wheel having the cam C′ provided with a pivoted portion adapted to yield by swinging about its pivot; a lever fulcrumed on the binder gear standard and having connections through which it is actuated by pressure on the compressor or trip, said lever having an abutment engaged by the cam, the pivoted portion of the cam having its swinging or yielding end in position to reach the abutment in advance of the pivot as the wheel revolves; whereby after yielding and without regard to the extent of such yielding and without regard to its own return movement, it is adapted, as the wheel revolves, to guide the abutment back toward the position from which it yielded: substantially as set forth.

2. In a grain binder, in combination with the wheel having the cam C′, provided with a yielding portion C^{10} and a fixed portion C^{11}, the latter terminating in a shoulder immediately adjacent to the yielding portion, a lever fulcrumed on the binder gear standard, and connections therefrom which cause it to be actuated by pressure against the compressor; said lever having an abutment adapted to follow the cam track and to be engaged by the cam and to be passed by said fixed shoulder

just before the binding mechanism comes to rest, and to bear against said shoulder at one side and against the yielding portion of the cam at the other side during the interval of rest, whereby retrograde movement of the binding mechanism is resisted by the shoulder and tends to cause the abutment to be drawn farther down behind the shoulder: substantially as set forth.

3. In combination with the cam C′ having a hinged and yielding part C^{10} and a fixed eccentric part C^{11}, the latter terminating in the shoulder c^{11} immediately adjacent to the yielding end of the hinged part, the lever J fulcrumed on the binder gear standard and having an abutment adapted to bear against said yielding portion of the cam at the position of rest of the binding mechanism, the compressor rock-shaft and suitable connections therefrom to the lever J comprising the compressor spring, the trip latch adapted to be operated by the compressor rock-shaft and to be dropped into engagement with the clutch when the abutment of said lever runs off the shoulder c^{11}, substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 22d day of September, 1894.

ANDREW STARK.

Witnesses:
JEAN ELLIOTT,
E. T. WRAY.