(No Model.) 2 Sheets—Sheet 1.

C. A. A. RAND & J. F. STEWARD.

GRAIN BINDER.

No. 548,723. Patented Oct. 29, 1895.

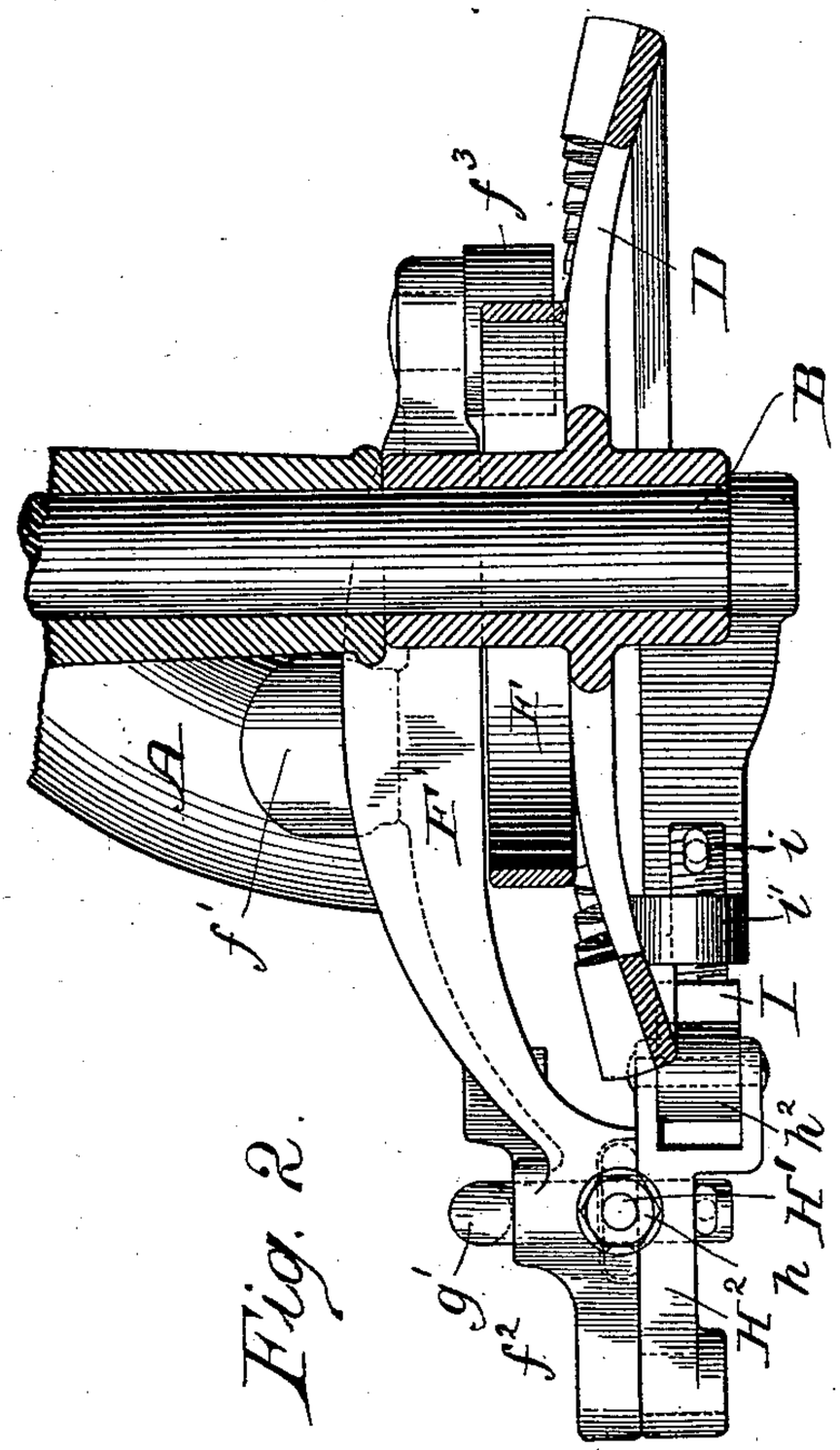

Fig. 2.

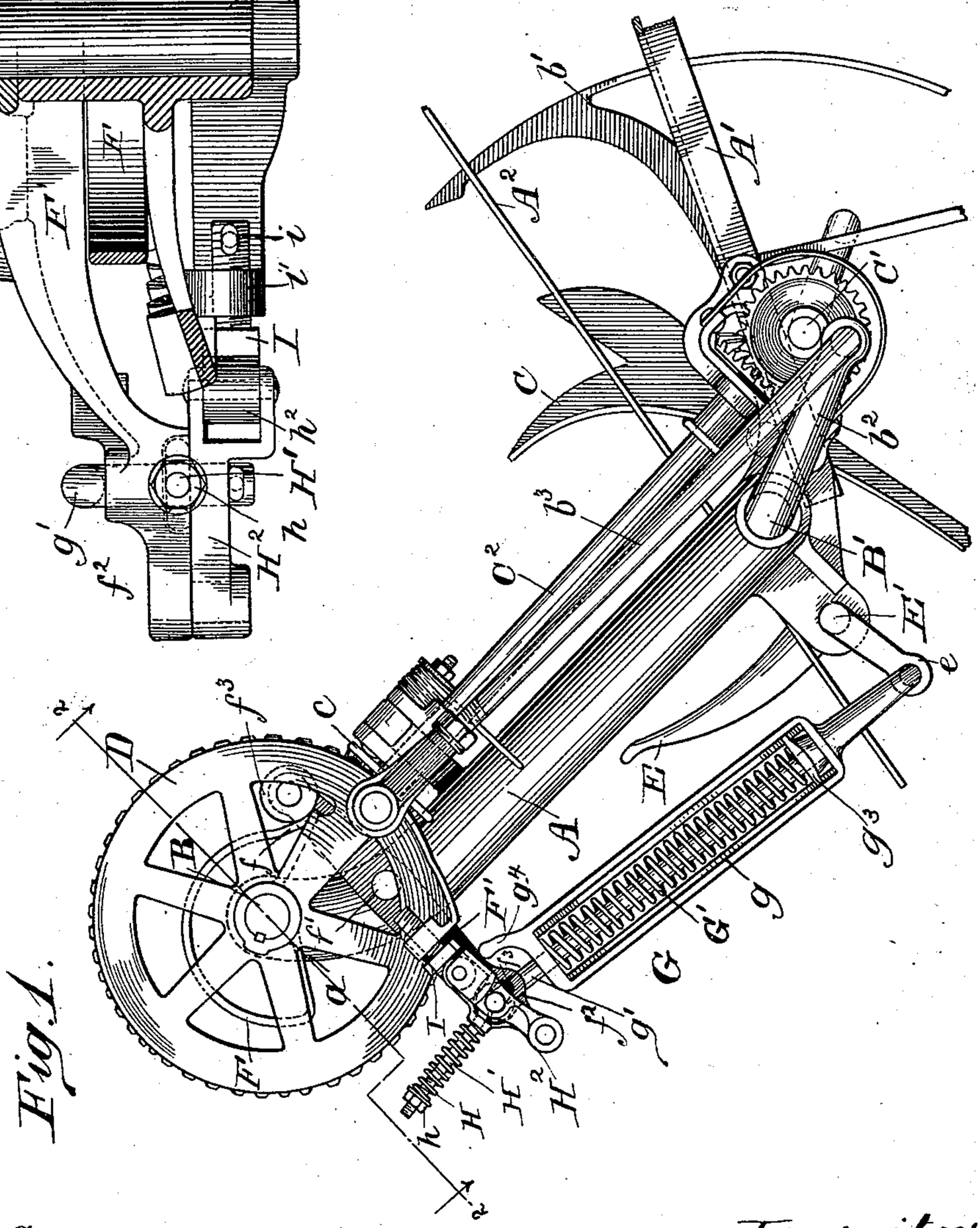

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

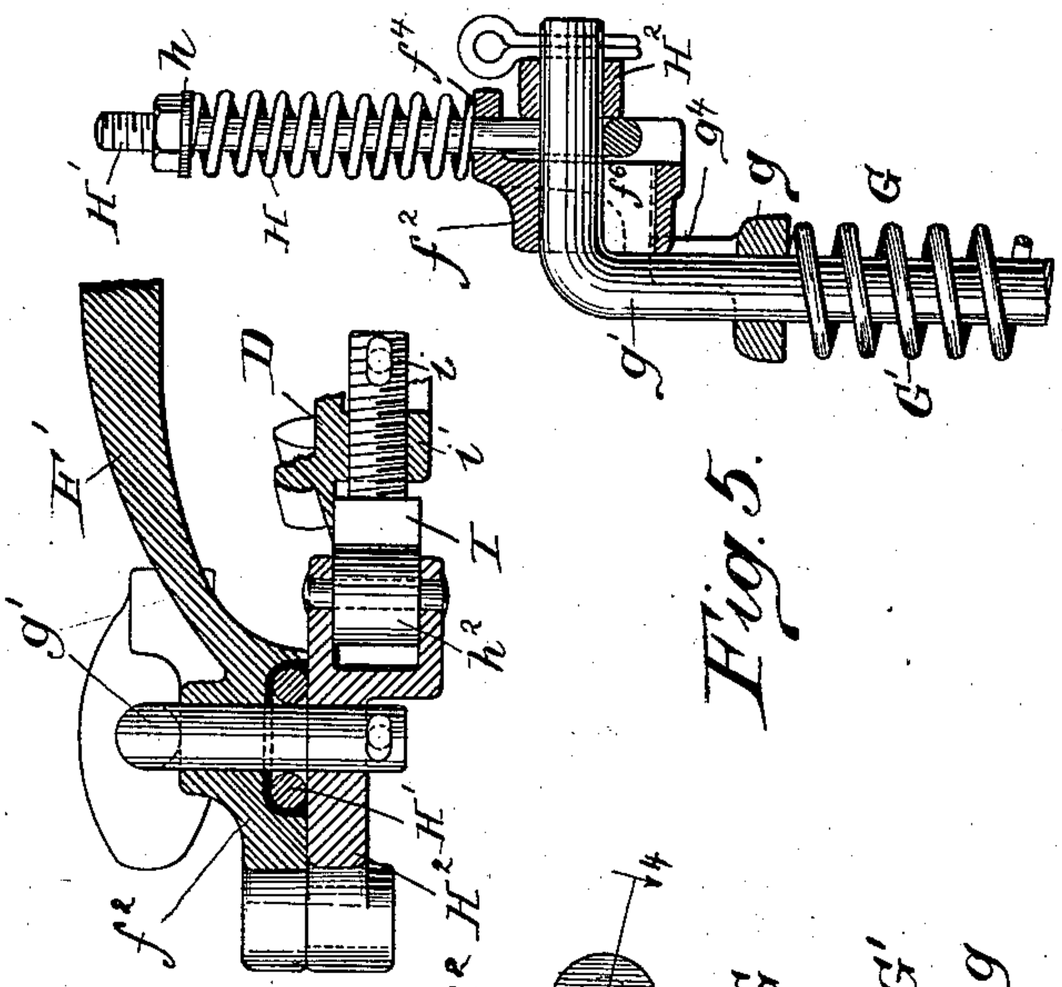


Fig. 5.

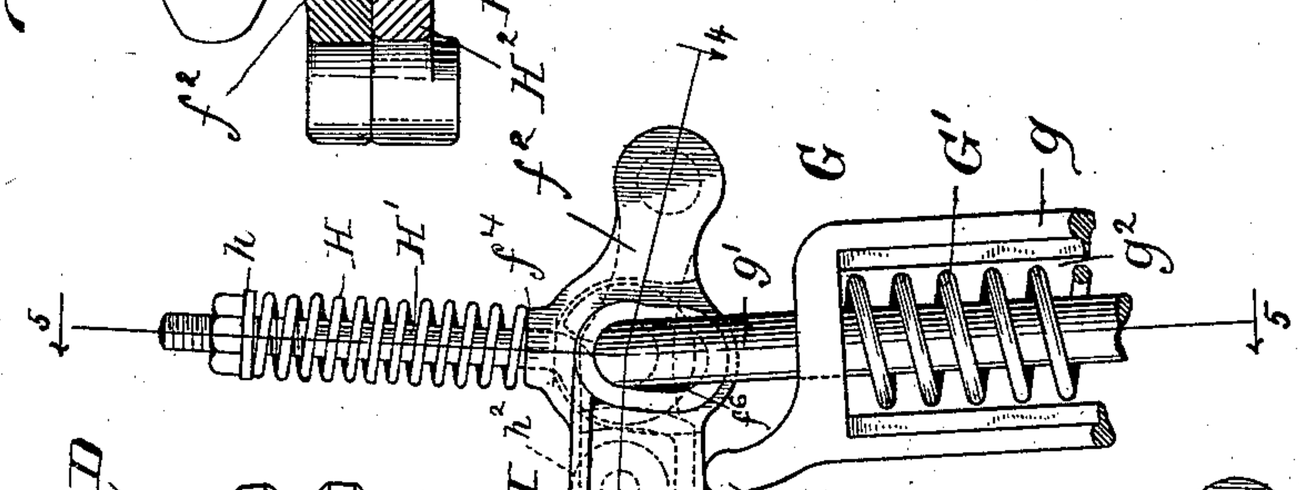
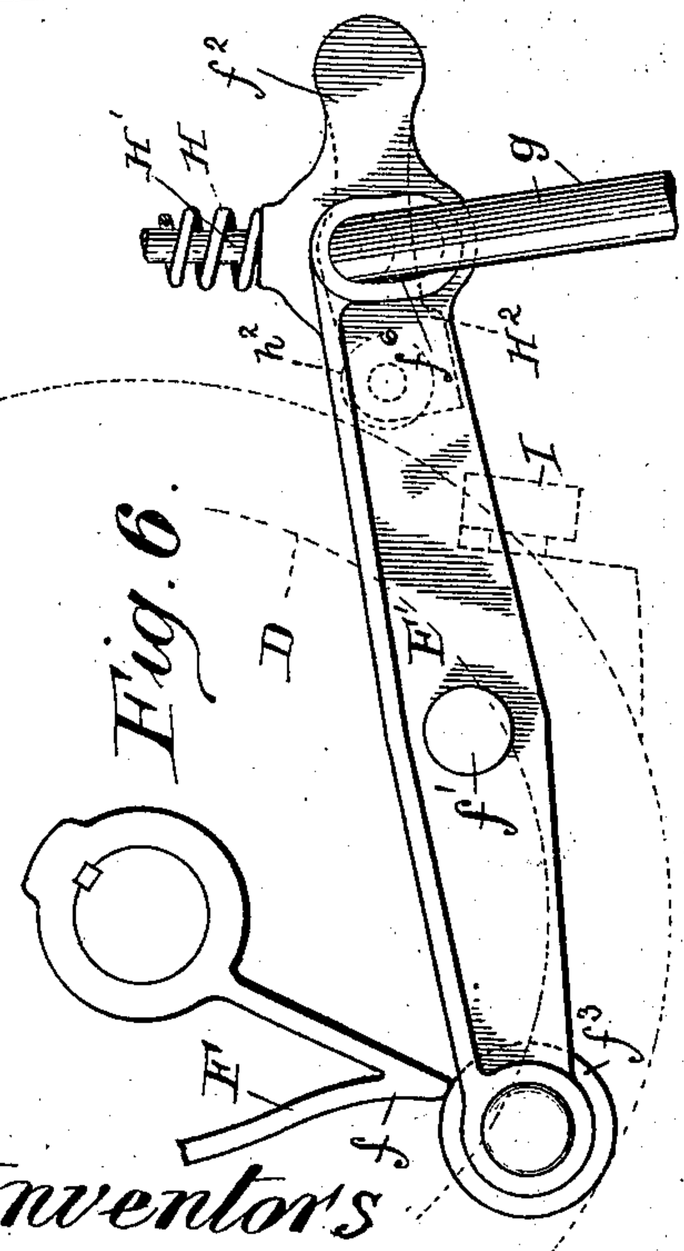


Fig. 6.



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George H. Ellis

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UNITED STATES PATENT OFFICE.

CHARLES A. ANDERSON RAND AND JOHN F. STEWARD, OF CHICAGO, ILLINOIS.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 548,723, dated October 29, 1895.

Application filed June 1, 1895. Serial No. 551,426. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. ANDERSON RAND and JOHN F. STEWARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full description.

This invention relates to that class of binders now in general use in which the grain discharged from the harvester onto a binding-table is carried wisp by wisp by packers against a tripping-arm or its equivalent. As on all prevailing types of automatic binders, the intermittently-moving binding devices are tripped into engagement with the constantly-rotating driving mechanism by the stress of the forming-gavel upon the resistant connected with the clutch-tripping mechanism.

This invention may be considered as an improvement upon the devices shown, described, and claimed in the application of John F. Appleby, filed February 21, 1893, Serial No. 463,284.

The object of this invention is to render more effective in operation the tripping and compressing mechanism in which the tension put upon the compressor-spring in the previous revolution gives the initial movement to the binding devices when the said devices are released by the stress of the forming-gavel upon the resistant.

In the drawings, Figure 1 is a front elevation of a front-geared binder attachment. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a rear elevation of the cam-gear and part of the tripping devices. Fig. 4 is a section upon the line 4 4 of Fig. 3, and Fig. 5 is a section upon the line 5 5 of Fig. 3. Fig. 6 is a view similar to Fig. 3, showing the parts in a position just prior to the end of a revolution.

The binding devices are supported upon the usual U-shaped frame A, which has braces A′ extending inwardly therefrom.

A^2 is the binder-deck.

In the upper member *a* of the frame is journaled the shaft B, from which shaft the band-placing, band-uniting, and bundle-discharging devices are intermittently driven.

B′ is the needle-shaft, carrying the needle *b*′ at its inner end and having a crank b^2 formed on the outer end, which is adapted to have attached thereto a pitman-rod b^3. The upper end of this pitman-rod is carried in the usual manner on a wrist-pin as one part with the gear D, which gear will be hereinafter described.

In Fig. 1 is shown a packer C, (of the kind of which two are generally used,) which is carried upon a crank on the packer-shaft C′ and which has its lower end held by a swinging link (not shown) pivoted to the binder-frame. Geared to the packer-shaft by a pair of bevel-gears or continuously rotated by any means is a rapidly-running driving-shaft C^2, having at its upper end a pinion *c*. The gear D is a mutilated one, and is secured to the main shaft B and thus adapted to drive the intermittently-moved binding devices and to engage with the continuously-revolving pinion *c* when set free and impelled into engagement with the said pinion by the power stored for that purpose in the compressor-spring. The upper end of the shaft C^2 is journaled in a bearing elastically held upon the binder-frame, as shown, described, and claimed in the patent granted to John F. Appleby and John F. Steward, dated April 19, 1892, and numbered 472,972. The resistant E in the present exemplification of the invention performs the office of compressor as well as resistant, and will be hereinafter designated as a "tripping-compressor." It is mounted upon a rock-shaft E′, which has at its outer end a crank *e* preferably formed thereon. Upon the gear D and preferably integral therewith is the compressor-cam F.

F′ is a lever fulcrumed conveniently in the binder-frame at *f*′ and having one end f^2 linked by the device G to the crank *e* on the rock-shaft E′ and the other end adapted to track upon the cam F. In order that the cam may control the lever with the least friction and the lever also move the cam with the least resistance, the roller f^3 is provided. The cam F, by the connections above described, serves to hold the arm E in an erect position during the operation of packing and compressing the grain, and at the time immediately following the uniting of the ends of the band allows it to fall out of the way of the

bundle as it is being discharged. The linking device G is made elastic in regard to its length for the usual purpose of preventing undue strain upon the compressing device.

The linking device G consists of the link g, the spring-rod g', and the compressor-spring G'. The link g is hooked at its lower end to the crank e upon the rock-shaft D', and is adapted to support the compressor-spring in its slot g^2. The spring-rod g' is hooked at its upper end to the arm f^2 of the lever F' and extends downwardly through a hole in the upper end of the link g and through the compressor-spring. It has its lower end threaded to receive a nut g^3, which nut serves as a means to adjust the tension put upon the spring G'. The spring G' is supported in the slot g^2 and held in place by the rod g', its stress being exerted between the nut g^3 and the opposite end of the said slot g^2. A projection g^4 upon the link g serves as a stop that maintains the required tension upon the compressor-spring when the parts are at rest by coming in contact with the lever F' at the point g^5.

The connection between the rod g' and the lever F' is an elastic one, the elasticity of which is taken up or overcome by the stress of the accumulating-gavel to release the gear D, in order that the said gear may be given its initial movement by the spring G'. This elastic connection consists of a spring H, (hereinafter to be designated as the "trip-spring,") preferably coiled around a rod H', which rod has an eye formed upon its end to adapt it to engage the hook upon the end of the rod g'. The trip-spring exerts its stress between the shoulder f^4 upon the lever F' and the shoulder h upon the rod H', the said shoulder h being shown as a nut and washer for the purpose of adjusting the tension of the trip-spring. The lever F', where it is connected with the rod g', is slotted, as shown, and the trip-spring exerts its stress to force the lever F' and the linking device together, or, in other words, to force the hooked end of the compressor-spring rod g' to the upper end of the slot f^6. A detent H^2, pivoted upon the lever F' and adapted to receive the hooked end of the rod g', holds the gear D against the force of the compressor-spring by coming in contact with a stop I upon the said gear. The roller h^2 upon the detent H^2 may be considered merely as an antifriction termination thereof.

The stop I is made adjustable preferably by the means shown—namely, by having a threaded shank i formed thereon—and is carried in the boss i' upon the gear D. It may be prevented from turning in the boss preferably by means of a spring-cotter slipped into a hole in the shank. The pressure of the accumulated gavel upon the tripping-compressor draws the linking device down the slot f^6 in the lever against the pressure of the trip-spring, withdrawing the detent from engagement with the stop I upon the gear-wheel, thereby allowing the pressure of the compressor-spring, by means of the lever F' and the declivity f, to give the said gear its initial movement into engagement with the constantly-rotating pinion. As a matter of precise facts, the tripping-compressor is moved by the gavel against the pressure of both the trip and the compressor springs, but only because the former, being the weaker, yields, the spring-link, as far as the action of tripping is concerned, acting as a non-elastic connection.

During the movement of the parts directly concerned in the operation of binding the bundle and until the ends of the band have been united the cam holds the tripping-compressor against the bundle through its connection F' and G, at which time it will allow the said tripping-compressor to fall to allow the bundle to be discharged. Toward the end of the revolution of the gear D the part f^5 of the cam F will raise the tripping-compressor and its connecting parts, so that as the roller on the lever F' passes onto the apex of the declivity the mutilation in the gear will be opposite the pinion d^3, and the stop I will strike against the detent, bringing the parts to a state of rest until a new gavel is formed, when the operation will be repeated.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination with a mutilated gear, a constantly rotating pinion, a tripping compressor, a compressor cam having a declivity, a compressor lever one arm of which tracks upon said cam and the other arm of which is slotted, a compressor spring link pivoted at one end in the slot in said lever, the said link suitably connecting with said tripping compressor, a detent pivoted upon said lever and engaging the pivot of said link and said lever and a detent spring carried upon a rod which is pivoted upon the pivotal joint of said link and said lever, its stress being exerted upon said lever to hold said detent against said gear in opposition to the stress of the forming gavel upon the said tripping compressor, substantially as described.

2. The combination with a mutilated gear, a constantly rotating pinion, a tripping compressor, a compressor cam having a declivity, a lever one arm of which tracks upon said cam, a compressor spring link connecting said lever with said tripping compressor, a detent pivoted upon the said lever and attached to the spring link and a detent spring carried upon said lever acting to hold said detent against an adjustable stop upon said gear in opposition to the stress of the forming gavel upon the said tripping compressor, substantially as described.

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