

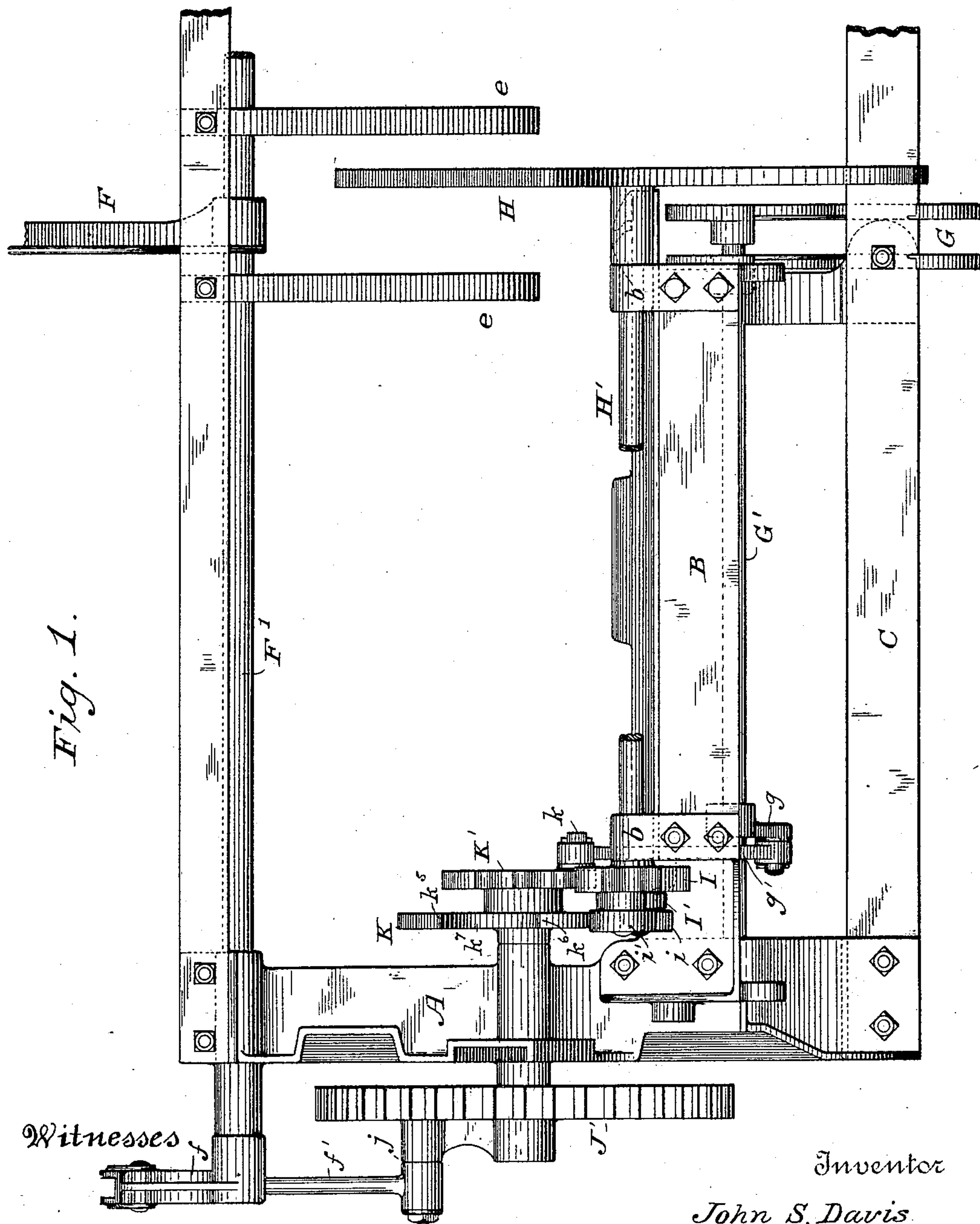
(No Model.)

2 Sheets—Sheet 1.

J. S. DAVIS.
GRAIN BINDER.

No. 405,203.

Patented June 11, 1889.



Witnesses

Inventor

John S. Davis

By his Attorney

Wm A. Shinkle

A. E. Sumner
Ida D. Sumner

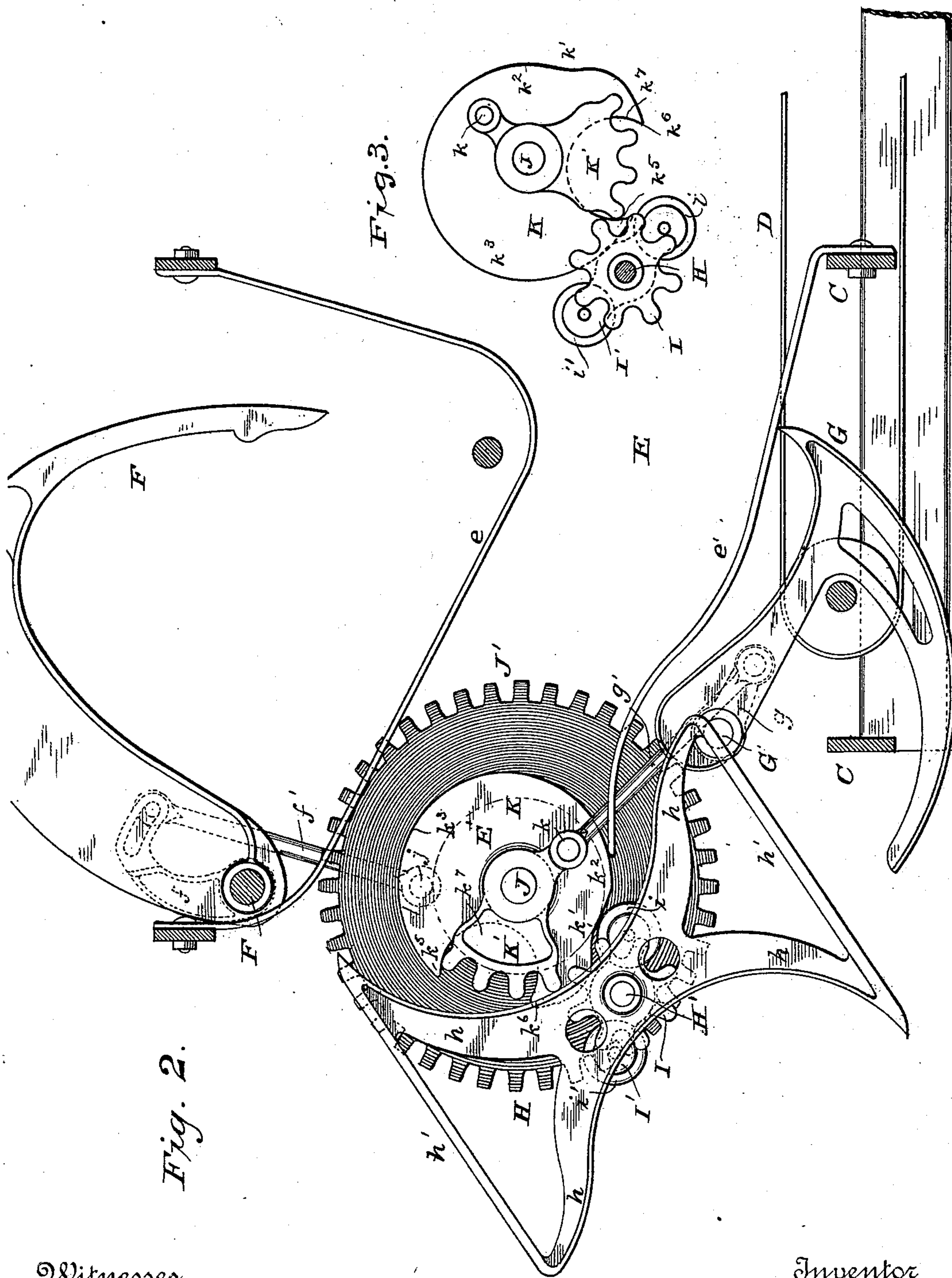
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UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF CLEVELAND, OHIO, ASSIGNOR TO THE DAVIS PLATFORM
BINDER COMPANY, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 405,203, dated June 11, 1889.

Application filed October 19, 1887. Serial No. 252,796. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Grain-Binders, of which the following is a description.

My invention relates to the gavel-compressing and bundle-discharging mechanism of a grain-binder, and it is particularly adapted to the form of binder for which many patents have been granted to me since 1881, and on which my application for Patent No. 166,849, filed May 28, 1885, is now pending in the Patent Office.

It consists of the combined retaining and discharging arm which forms the outer wall of the gavel-receptacle and the improved means for actuating it, as will hereinafter be set forth.

In the accompanying drawings, which show my improvement in the best form now known to me, Figure 1 is an outside elevation of so much of a binding mechanism as is necessary to illustrate the application and operation of my invention, and Fig. 2 is a rear elevation of the same, the supporting-frame, &c., being omitted and the working parts only shown. Fig. 3 is a view of some of the parts in the positions assumed at one stage of their operation.

The gear-plate A, upon which the binder-actuating mechanism is supported, and the casing B of the knotting mechanism attached thereto and also to the sill-bars C of the binder-frame, are preferably shaped as shown in the before-mentioned applications, but not necessarily so, as any suitable supports for the moving portions of the machinery will do as well.

The grain is brought from the platform, upon which it falls when cut, by the carrier-belts D and deposited in the throat or contracted passage-way E, leading to the binding-receptacle E', into which it is urged by any suitable packing device—such, for instance, as that shown in my patent, No. 283,866, granted August 28, 1883, or in my pending application, No. 166,849, above mentioned, which also shows the breast or top bars e and the bottom bars e', constituting the throat to

the receptacle. The needle-arm F and cut-off arm G are also shown and their action fully described in said application.

The retainer-arm H resembles in most respects the semi-revolving retainer-arm of the said application. It is, however, located below the plane of the bottom of the receptacle, and its arms or prongs h are slightly different in shape and are strengthened by connecting-bars h'; but these points form no part of the invention herein claimed, as they will constitute part of the subject-matter of another application for a patent soon to be filed by me. The action of the arm is also like that of the arm in the before-mentioned application, No. 166,849, and consequently is not novel; but my present invention lies in the simplified means by which the position of the arm is at all times controlled and from which it derives its various movements.

The shaft H', upon the rear extremity of which the retainer-arm is secured, is mounted in suitable bearings b below the binding-receptacle, and shown in this instance as attached to the knottor-casing B. Upon the front end of the shaft is secured a pinion I, having an arm or cross-bar I' cast upon its front side, the projecting ends of which are formed with the stud axles or pins, upon which are mounted anti-friction rollers i i'. It will be observed that the arm and its rollers lie in such close proximity to the cam that they act as a delay-shoe or stop-motion to prevent the retainer-arm from being jarred out of place or revolving except at the proper time, and also to insure accuracy of engagement between the rack and pinion at such times as the machine is running empty or not binding.

The main driving-shaft J of the binder is mounted in a bearing in the gear-plate A and carries the master-wheel J' of the binder mechanism upon its front end.

At the rear extremity of the shaft are secured a cam-disk K and segmental gear K', the latter having a crank projection and wrist-pin k cast integrally with it.

The disk and segment-gear may be cast in one piece, as shown, or made in separate pieces, which should be firmly united or correspondingly secured to the same shaft.

The disk and segmental gear engage the rollers i i' and the pinion I, respectively, as follows: In the normal position of the parts shown in the drawings the roller i rests
 5 against the periphery of the disk lying in the notch or depression k' , and holding the top of the retainer-arm against the outward pressure of the grain in the receptacle. When the binding mechanism starts, the roller first
 10 encounters the quick rise k^2 in the cam, moving the retainer quickly into the receptacle to meet the rising cut-off compressor-arm G, and giving the bundle a preliminary squeeze before the cord is placed about it and the tying of the knot begins. As the needle-arm
 15 F descends into the receptacle and places the cord around the bundle, the cam rises, gradually increasing the compression on the bundle until the point k^3 is reached, from whence
 20 to the point k^5 the cam is concentric. As indicated in Fig. 3, where the parts are shown in the positions assumed just previous to the actuation of the ejector, the rollers i and i' are
 25 in such close proximity to the cam-track as to positively hold the retainer-shaft against rotation in either direction, and in such position that the teeth of the rack K' will properly engage the pinion I to impart a half-revolution to the shaft and cause the arm to eject
 30 the bundle, as will be readily understood. To permit of this movement, the cam-track is depressed or cut away from k^5 to k^6 , forming a pocket k^7 , into or through which the roller i swings until it assumes the rear position, and
 35 at the completion of the binding operation the roller i' rests in the depression k' , as the roller i was described at the beginning of the operation.

I regard it as very important to secure the
 40 proper presentation of the pinion I to the rack K, so that the first tooth of the rack shall not strike against the end of a pinion-tooth, but enter the space between two teeth, and also that it shall enter the proper space
 45 each time. By thus positively controlling the retainer-shaft I am not dependent on the pressure of the gavel against the retainer-arm to hold the leading roller on the arm I' against the cam-track and insure the proper engagement of the rack and pinion, for I can trip
 50 the binder into action by hand and operate it either with an insufficient gavel or none at all. Without this arrangement the arm may rebound or be otherwise thrown out of place
 55 when the binding-receptacle is empty, and if

the machine should be tripped into action under such circumstances breakage would be the likely result.

The cut-off compressor-arms G are mounted on a shaft G', rocking in bearings below the
 60 binding-receptacle and having at its front end a short crank-arm g , connected by a pitman or link g' to the wrist-pin k on the segmental gear. The positions of the crank-pins g and k and the shaft G' are such that the
 65 first movement of the binder-shaft J imparts a very rapid movement to the cut-off and raises it across the throat before the point of the needle-arm descends into it.

The needle-arm F is mounted upon a rock-
 70 shaft F', hung in suitable bearings above the binding-receptacle and actuated by a crank-arm f , secured upon the front end of the shaft and connected by a pitman f' to a crank or wrist pin j on the master-wheel.
 75

The pinion I and segmental gear K' might be dispensed with and the arm H given its half-revolution by means of the notch or pocket k^7 in the cam, the expansion and weight of the bundle, pressing against the
 80 arm, being sufficient to force the advance roller i into the notch, from which it cannot escape except by trailing out at the rear as the cam moves along. This, however, does
 85 not give as smooth and regular a movement as I desire, and with the parts proportioned as shown I prefer to employ the gearing for this purpose.

By the construction and assembly of the parts shown in the drawings I have greatly
 90 simplified the machine and cheapened its manufacture, and by dispensing with springs have added to the certainty of its operation.

What I claim, and desire to secure by Letters Patent, is—
 95

The combination of the cam-disk having its surface notched or cut away, as shown, and the rack coincident with the notch in the cam, with the retainer-arm shaft, the pinion I, and the arm I' and its anti-friction rollers,
 100 both of which lie in close proximity to the periphery of the disk to insure the proper engagement of the rack and pinion, substantially as hereinbefore set forth.

In testimony whereof I hereto affix my signature in presence of two witnesses.
 105

JOHN S. DAVIS.

Witnesses:

HENRY W. WELKER,
 A. E. SUMNER.