(No Model.) 3 Sheets—Sheet 1.

B. F. STEWART.

TRIP MECHANISM FOR GRAIN BINDERS.

No. 573,048. Patented Dec. 15, 1896.

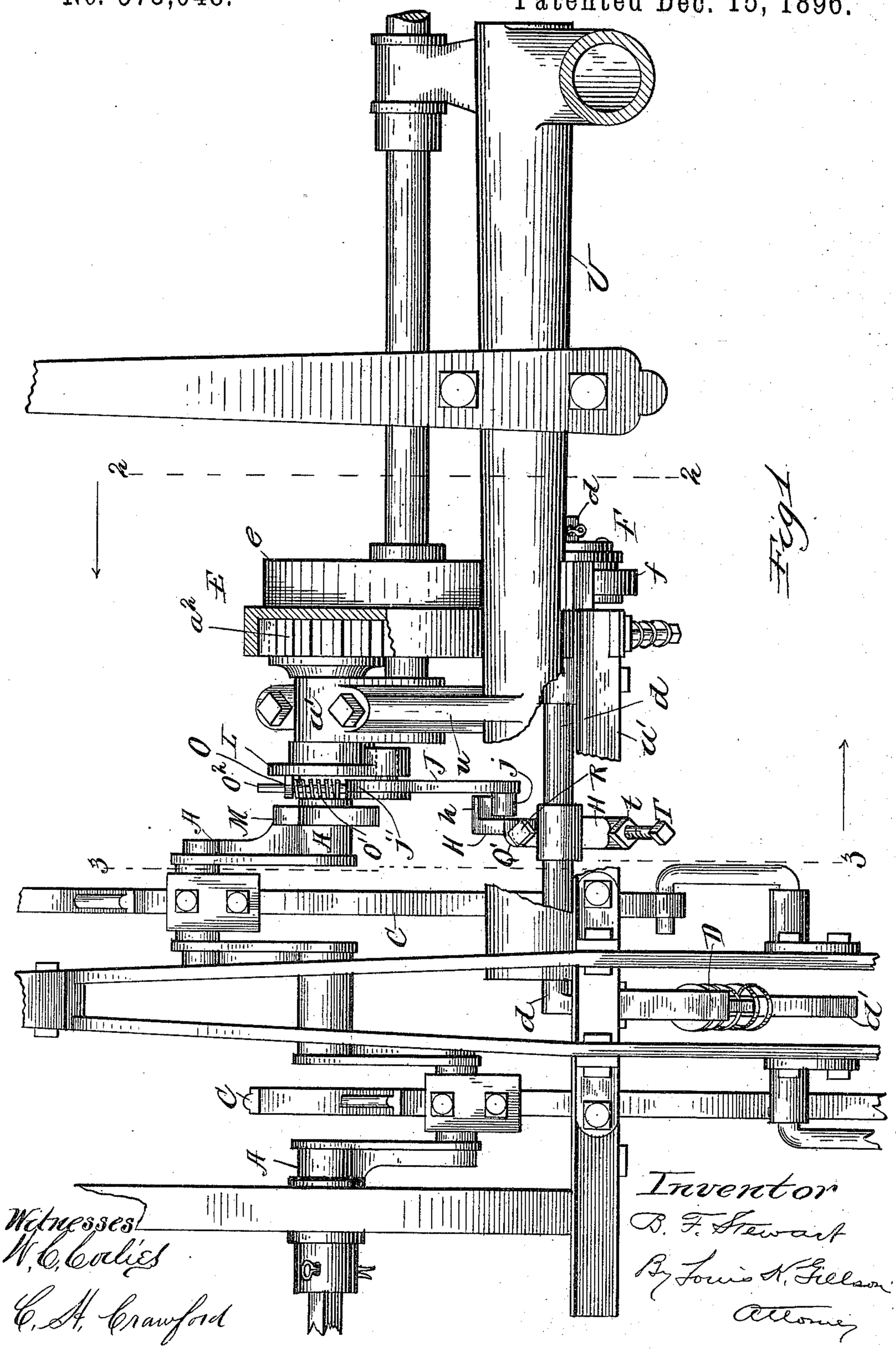

Fig. 1.

(No Model.) 3 Sheets—Sheet 2.

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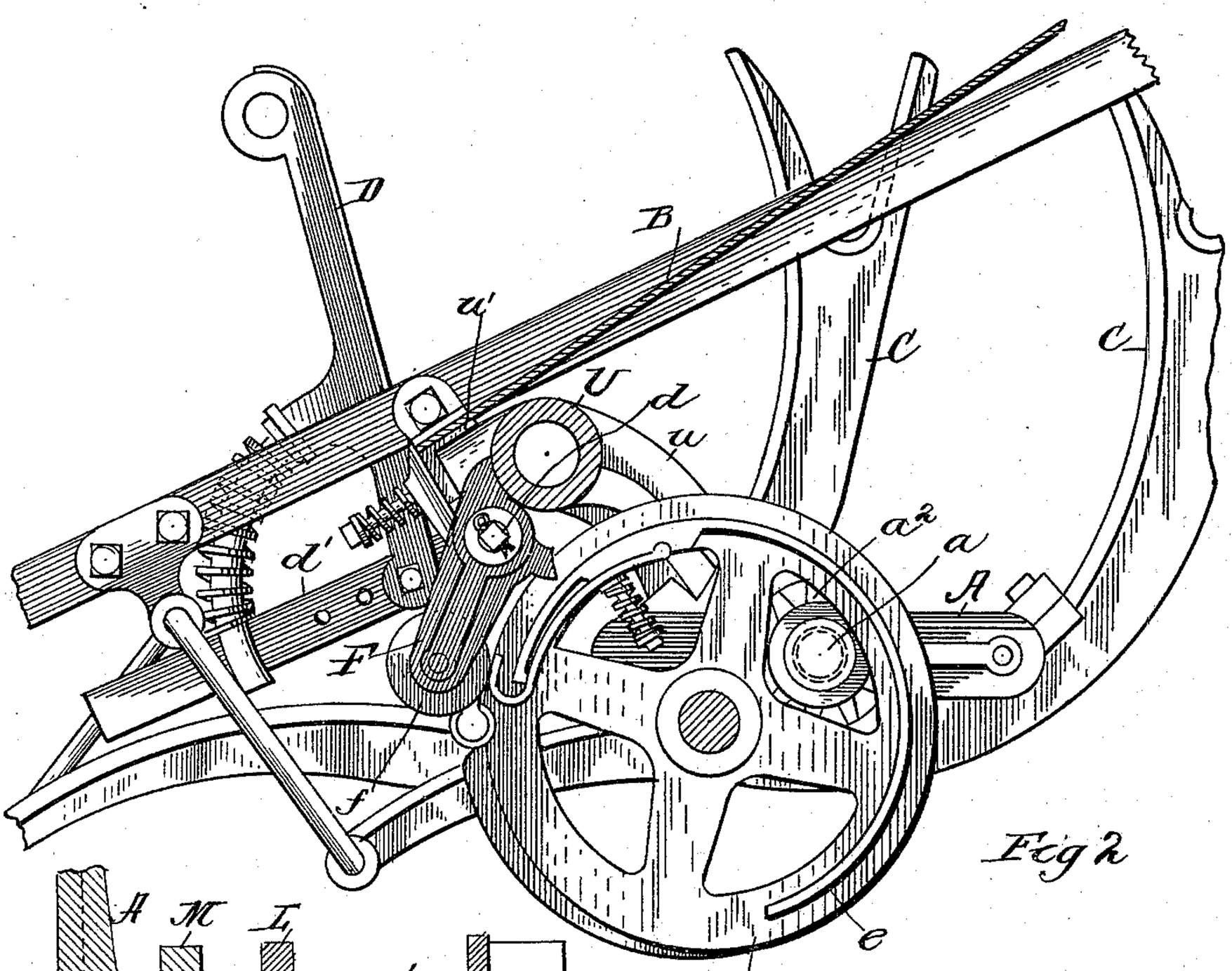

Fig 2

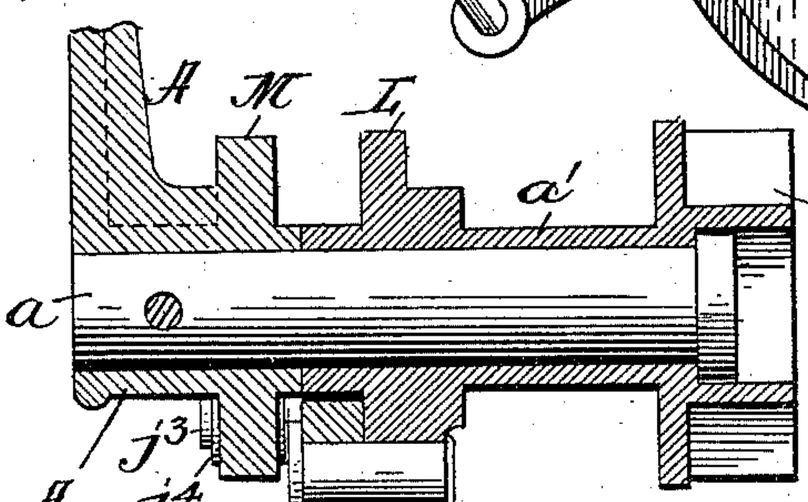

Fig 4

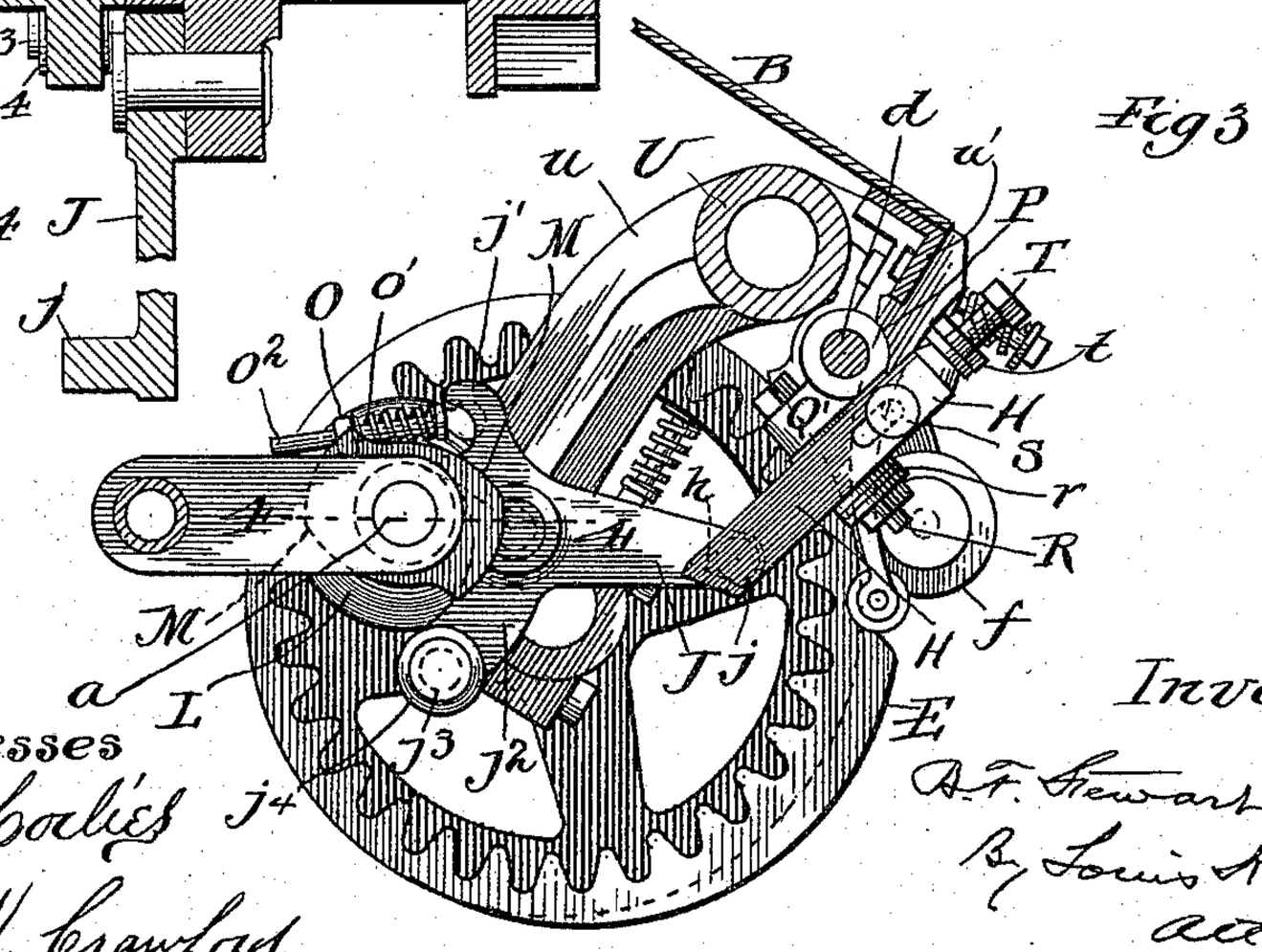

Fig 3

Witnesses
H. C. Curtis
C. A. Crawford

Inventor
B. F. Stewart
By Louis A. Gibson
Attorney.

(No Model.) 3 Sheets—Sheet 3.

B. F. STEWART.

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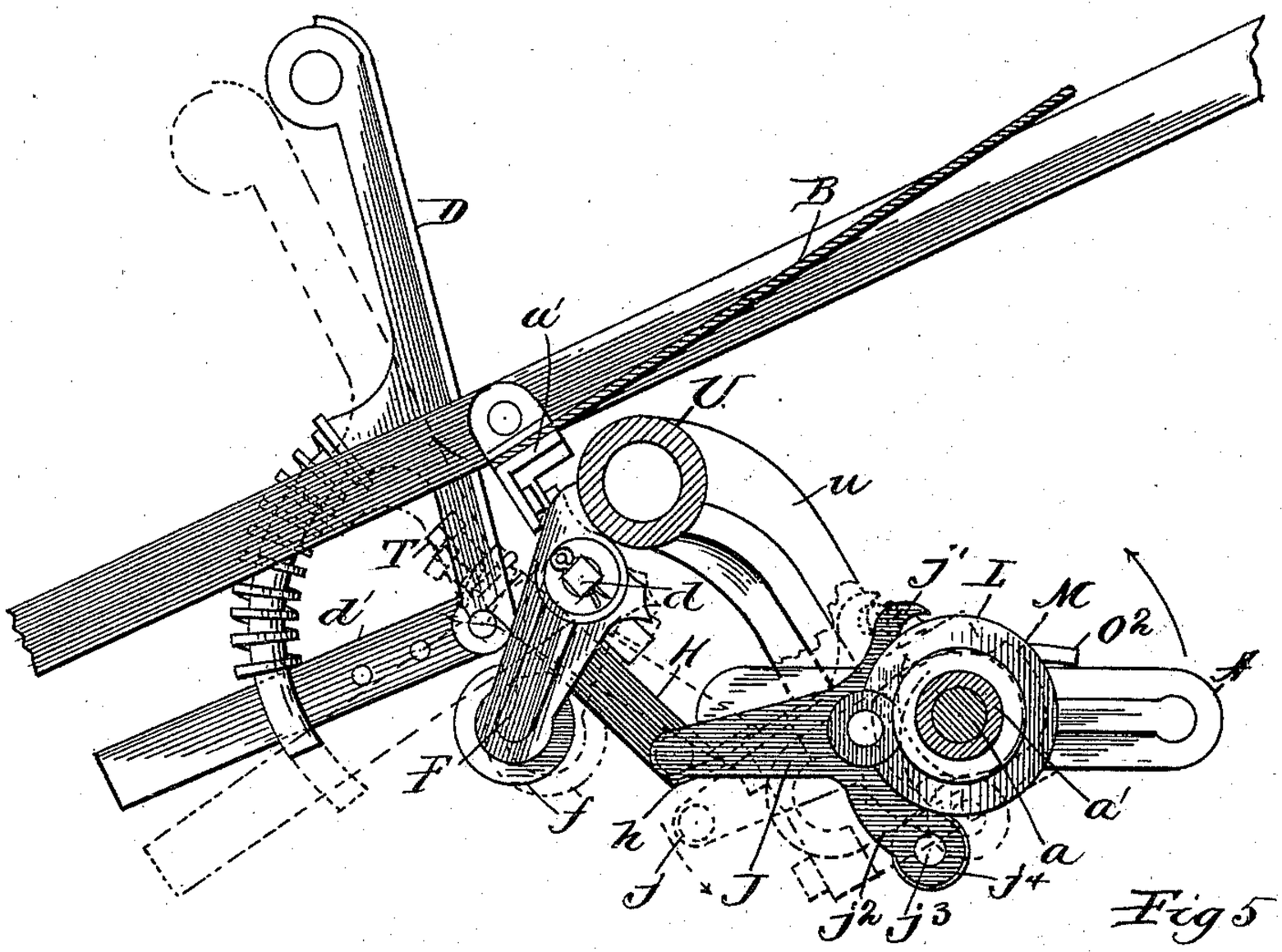

Fig 5

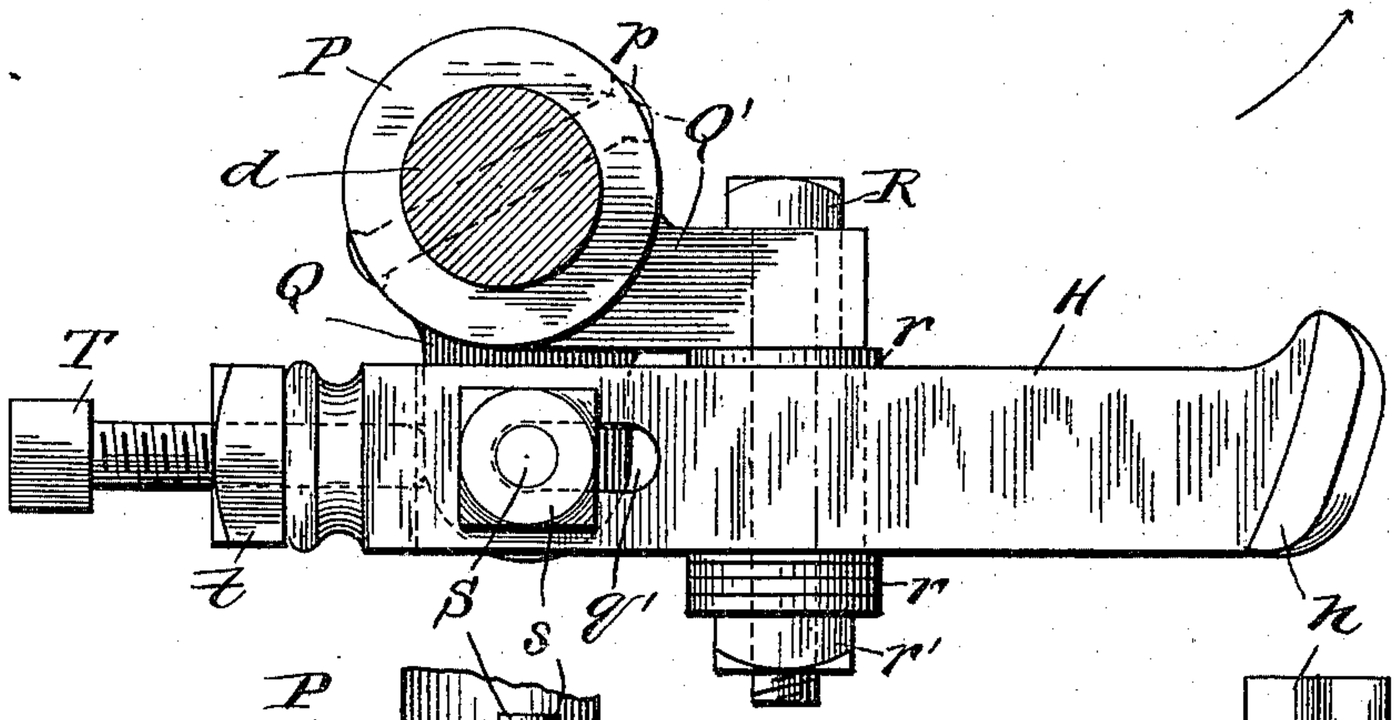

Fig 6

Fig 7

Witnesses
W. C. Curtis
C. A. Crawford

Inventor
B. F. Stewart
By Morris & Gibson
Attorneys

UNITED STATES PATENT OFFICE.

BENJAMIN F. STEWART, OF CHICAGO, ILLINOIS.

TRIP MECHANISM FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 573,048, dated December 15, 1896.

Application filed April 22, 1896. Serial No. 588,686. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. STEWART, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Trip Mechanism for Grain-Binders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The invention relates to that class of harvesting-machines in which an automatic binding mechanism is employed, the action of which is controlled by a trip-arm which yieldingly receives the pressure of the forming gavel and by the movement of which under such pressure the disengaging-arm of a spring-actuated clutch is released to throw the binding mechanism into engagement with a drive-shaft.

The invention consists in certain hereinafter-described improvements in the trip-arm for engaging the clutch.

I have illustrated in the drawings only such parts of the machine as I deem necessary to show the connection and action of the parts improved upon.

Figure 1 is a plan view of that portion of the binder mechanism which is below the deck, some portions being broken away. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig. 3 is a sectional view on the line 3 3 of Fig. 1. Fig. 4 is a plan section on the line 4 4 of Fig. 3. Fig. 5 is a detail elevation, partly in section, as seen from the line 2 2 of Fig. 1 with some of the parts removed. Fig. 6 is a side elevation of the trip-stop, and Fig. 7 is a plan view of the same.

In the drawings I show the packer-shaft at A, the deck at B, the packers at C, the trip-arm for receiving the pressure of the forming gavel at D, and the rock-shaft for carrying the trip-arm at d, the trip-arm being pivotally attached to a crank-arm d', fixed upon the shaft d. The cam-wheel for controlling the movement of the trip-arm D is indicated at E, the cam-flange e of this wheel being adapted to carry the crank-arm F, mounted upon the shaft d and provided with an antifrictional roller f for bearing upon the flange e. The wheel E has an internal gear, which meshes with a pinion a^2, carried by a sleeve a', mounted upon the end a of the packer-shaft A.

At U is shown the U-frame, which carries the binder mechanism, and at u a bracket of such frame, which carries the journal-block, within which the shaft end a and sleeve a' are mounted. The bar u' is a part of the frame of the machine and supports the deck B.

All of the parts above referred to are of known construction, and I have not, therefore, deemed it necessary to enter into a detailed description of them in this application.

The sleeve a' carries at the end removed from the pinion a^2 a plate L. A clutch-block M is mounted upon the shaft A in proximity to the plate L, and a spring-controlled pawl j^2 is pivotally attached to the plate L and carries a lateral stud j^3, upon which is mounted an antifrictional roller for engaging the clutch-block M. The pawl j^2 is thrown into engagement with the clutch-block M by the action of a spiral spring o', mounted upon a thrust-bar o^2, sliding in an aperture in a lug O, projecting from the face of the plate L and bearing against an arm j'', projecting backwardly from the pawl j^2, the spring o' reacting between a shoulder upon the bar o^2 and the lug O.

The clutch-block M is in disk form and is provided with two oppositely-disposed concaved shoulders for receiving the roller upon the stud j^3, the rearward sides of such shoulders being inclined or rounded, so that the reverse movement of the clutch-block is not impeded by the pawl, which freely rides over the rounded portion of the shoulders. An arm J projects laterally from the base of the pawl j^2 and carries on its outer end a lateral stud j.

The shafts A d are parallel, and upon the latter is mounted a trip-stop H, comprising an arm with a lateral stud h at its outer end, the normal position of which, while the gavel is being formed, is directly in the path of the stud j, so that, as the latter revolves about the shaft A, it is intercepted by the stud h and retarded in its movement, thereby compressing the spring o' and throwing the pawl

j^2 out of engagement with the clutch-block M. As the gavel grows in size it forces back the trip-arm D, and thereby elevates the trip-stop H and disengages its stud *h* from the stud *j*, allowing the pawl j^2 to be again thrown into engagement with the clutch-block M by the action of the spring *o'*. The stud *j* is caught by the inner face of the stud *h*, which is oblique to the longitudinal direction of the trip-stop H, so as to lie substantially radially across the orbit of the stud *j*. In order to effect the certain and easy disengagement of these parts under the action of the trip-arm D, it is necessary that their adjustment be very delicate, so that a slight movement of the arm H frees the pawl. When the relative adjustment of the studs *h j* is dependent, as it has been in the past, upon the construction of so many parts of the machine, it will be seen that the slightest inaccuracies in the location of the journals of the shafts A *d*, as well as any slight inaccuracies in the casting of the arm H and the pawl and its accessories, will prevent the delicacy of engagement of the parts *h j*, which is essential to the proper action of the mechanism. Another source of difficulty arises from the wear of the contact-faces of the studs *h j*, whose initial contact is very forcible.

These machines are necessarily subjected to very hard usage. The season of their usefulness is limited to but a few days, and it is necessary that they be put into the harvest-field and driven to their utmost capacity throughout the entire season. Any accident to the machine results in great loss to the user by reason of the loss of time in making repairs, unless the mechanism is so constructed that repairs can be instantly made.

To overcome the difficulties of the initial adjustment of the parts in question, as hereinbefore set forth, due to the inaccuracies of construction, and to admit of the quick readjustment of the parts should the wearing of the contact-faces of the studs *h j* render them inoperative, I make the trip-arm H both longitudinally and laterally adjustable. This I accomplish by securing it to the shaft *d* by means of a hub P, fixed to the shaft by any suitable means, as by a rivet *p*. The hub P is provided with two lugs Q Q', standing in perpendicular relation each to the other. The trip-arm H is formed with a longitudinal slot *q*, adapted to receive the lug Q and also a bolt R, which passes through a suitable aperture in the lug Q'. The lug Q is apertured to receive a bolt S, which passes through a second longitudinal slot *q'* in the arm H, the bolt S carrying a nut *s*, by which the trip-arm may be locked in the desired position. An adjusting-screw T is set in the rearward end of the trip-arm H, extending through to the slot *q*, so that it may bear against the lug Q. A jam-nut *t*, mounted upon the bolt T, serves to effectually lock this bolt against rotation. A nut *r'*, carried upon the end of the bolt R, binds the trip-arm H against the lug Q', and thereby prevents its lateral displacement. The lateral adjustment of the arm H is accomplished by the use of washers *r*, a supply of which may be carried upon the outer end of the bolt R under the nut *r'*, and a suitable number of which may be interposed between the lug Q' and the trip-arm H. By this means it will be seen that should the clutch-tripping mechanism become inoperative by reason of the wear of the contact-faces of the studs *h j* this wear can be compensated for in a few minutes' time by the readjustment of the trip-arm H.

I mount a roller j^4 upon the stud j^3 to contact with the clutch-block M. This construction is of advantage when in repairing or adjusting the machine it becomes necessary to reverse the motion of the packer-shaft A, but its principal advantage is found in the fact that it distributes the wear incident to the somewhat violent concussion between the pawl and the clutch-block when the two parts come into engagement, the roller being rotated slightly incidentally to the impact, so that its entire surface receives the wear.

The pawl is ordinarily made of comparatively soft metal. The roller j^4, mounted upon its stud j^3, is of steel.

I claim as my invention—

1. In a grain-binder, the combination with the binder mechanism, of a drive-shaft, a spring-clutch for engaging the drive-shaft with the binder mechanism, a yielding trip-arm for receiving the pressure of the forming gavel, a rock-shaft for carrying the trip-arm, and a longitudinally and laterally adjustable trip-stop fixed to the rock-shaft and being so disposed as to disengage the clutch while the gavel is accumulating, and to be thrown out of connection therewith as the trip-arm yields to the pressure of the gavel.

2. In a grain-binder the combination with the binder mechanism, a drive-shaft, a spring-clutch for connecting the binder mechanism with the drive-shaft, and a trip for automatically disengaging the clutch and comprising a rock-shaft, an arm carried by the rock-shaft for receiving the pressure of the forming gavel and a spring to resist such pressure, of an arm for controlling the clutch and having a lateral stud at its end, and a longitudinally and laterally adjustable trip-arm fixed to the rock-shaft and having a lateral stud at its end, said trip-arm being so held by the shaft while the gavel is forming that its lateral stud intercepts the lateral stud of the clutch-controlling arm to disengage the clutch.

3. In a grain-binder the combination with a drive-shaft, binder mechanism, a clutch-block mounted upon the drive-shaft, and a spring-pawl connected with the binder mechanism for engaging the clutch-block and having a trip-arm extending radially from the center of its rotation, of a trip-arm for receiving the pressure of the forming gavel, a rock-shaft for carrying such arm, a hub fixed

upon such shaft and having lugs, a trip-stop comprising an arm having a longitudinal slot to receive one of such lugs and being in lateral adjustable engagement with another of such lugs, and an adjusting-screw set in the end of the trip-stop and bearing against the lug within its longitudinal slot.

4. In a grain-binder the combination with the binder mechanism, of a drive-shaft, a clutch for engaging the binder mechanism with the drive-shaft and being normally in engagement, a longitudinally and laterally adjustable trip-stop so disposed as to normally disengage the clutch, mechanism for yieldingly receiving the pressure of the forming gavel, such gavel-receiving mechanism and the trip-stop being so connected that the yielding of the former disconnects the latter from the clutch.

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

BENJAMIN F. STEWART.

Witnesses:
LOUIS K. GILLSON,
SPENCER WARD.