No. 746,379. PATENTED DEC. 8, 1903.

F. S. RICH.

# FEEDING AND BAND CUTTING MECHANISM.

APPLICATION FILED APR. 27, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

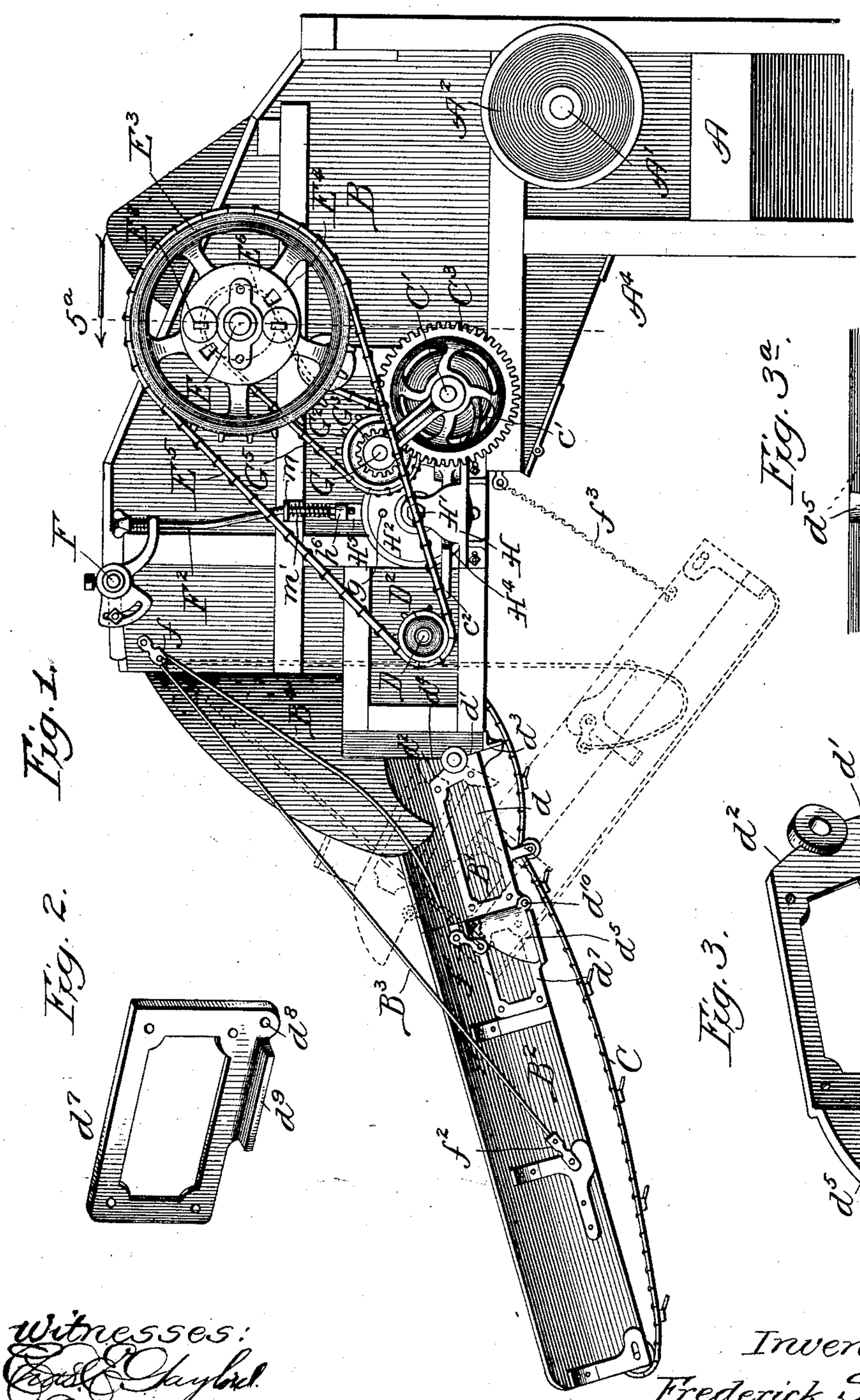

Fig. 1.

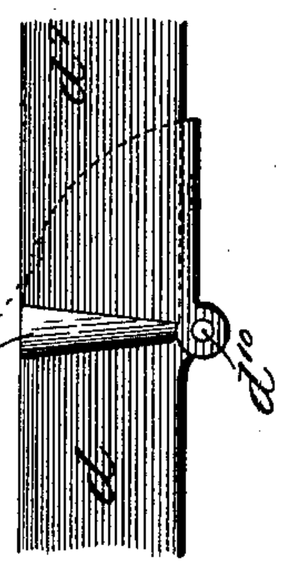

Fig. 3a.



Fig. 2.

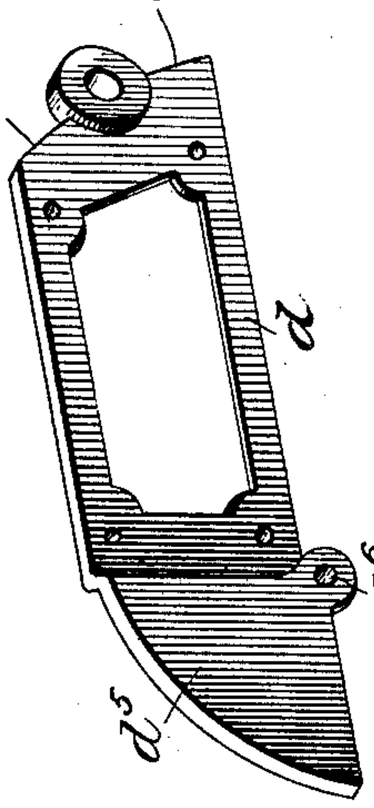

Fig. 3.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 4.

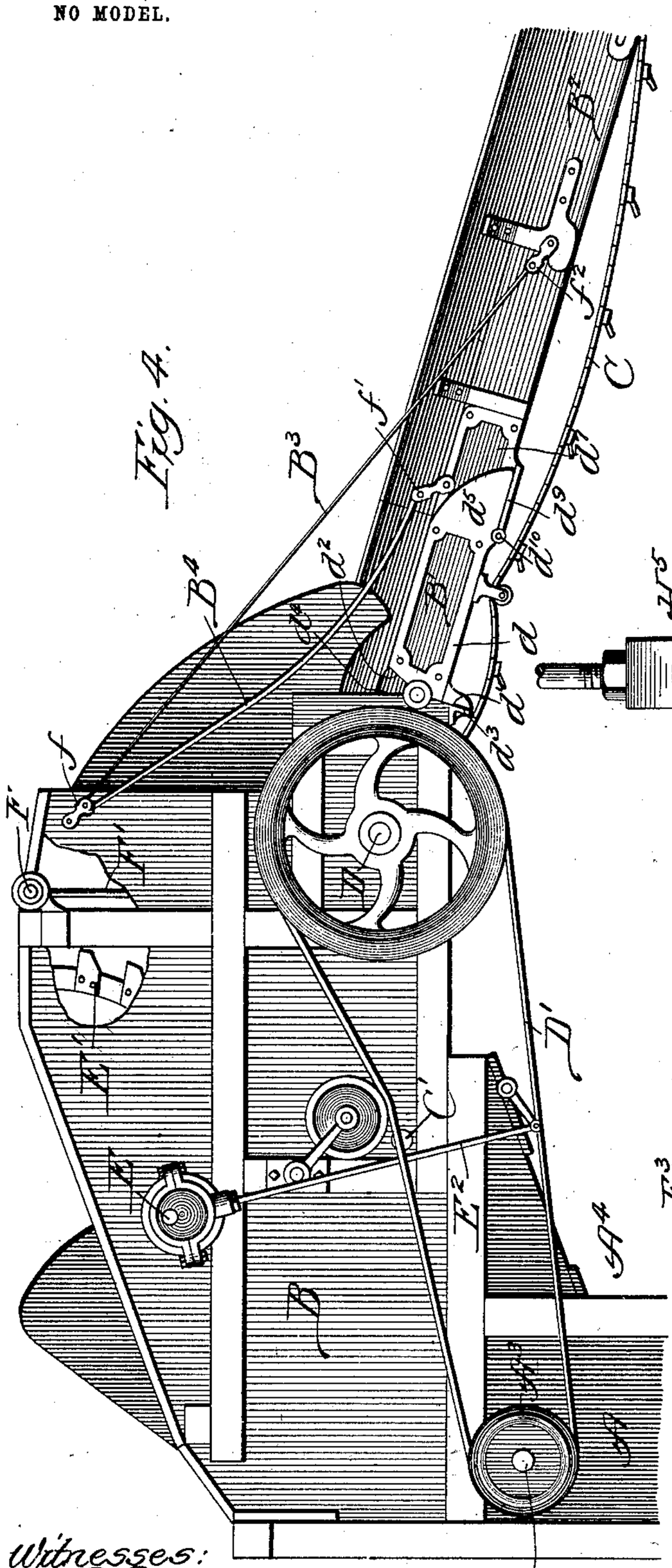


Fig. 5.

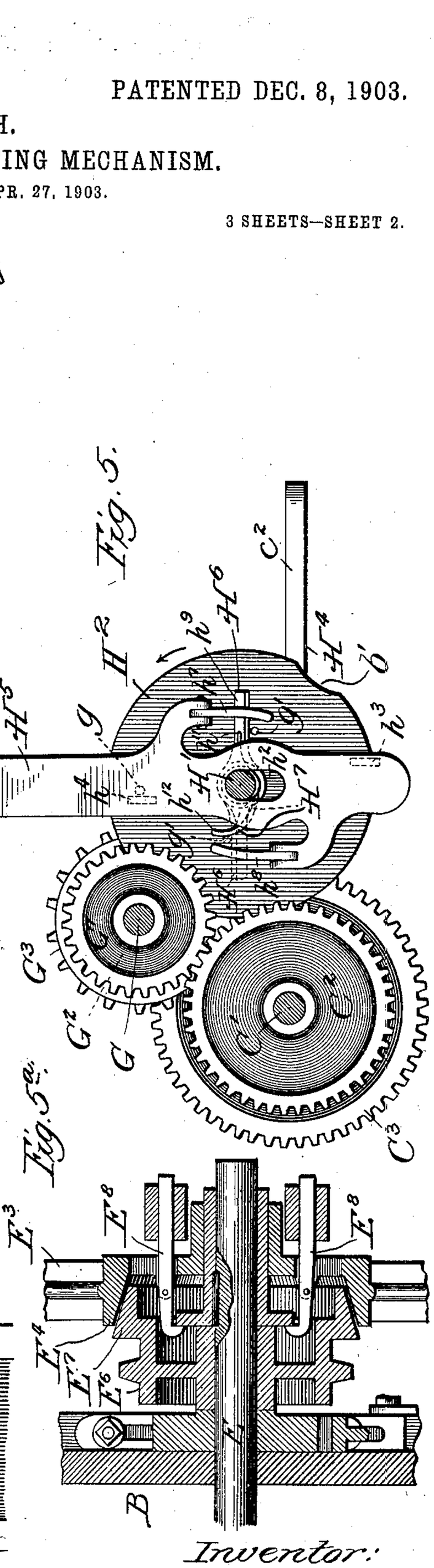


Fig. 5a.




Witnesses:
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APPLICATION FILED APR. 27, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.

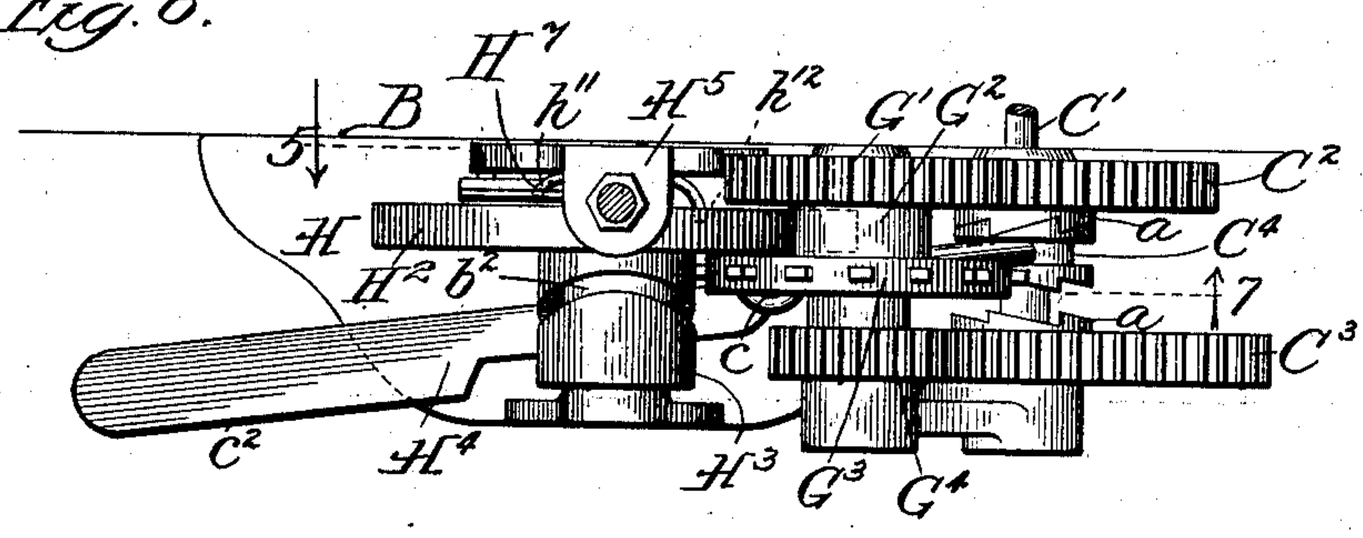


Fig. 7.

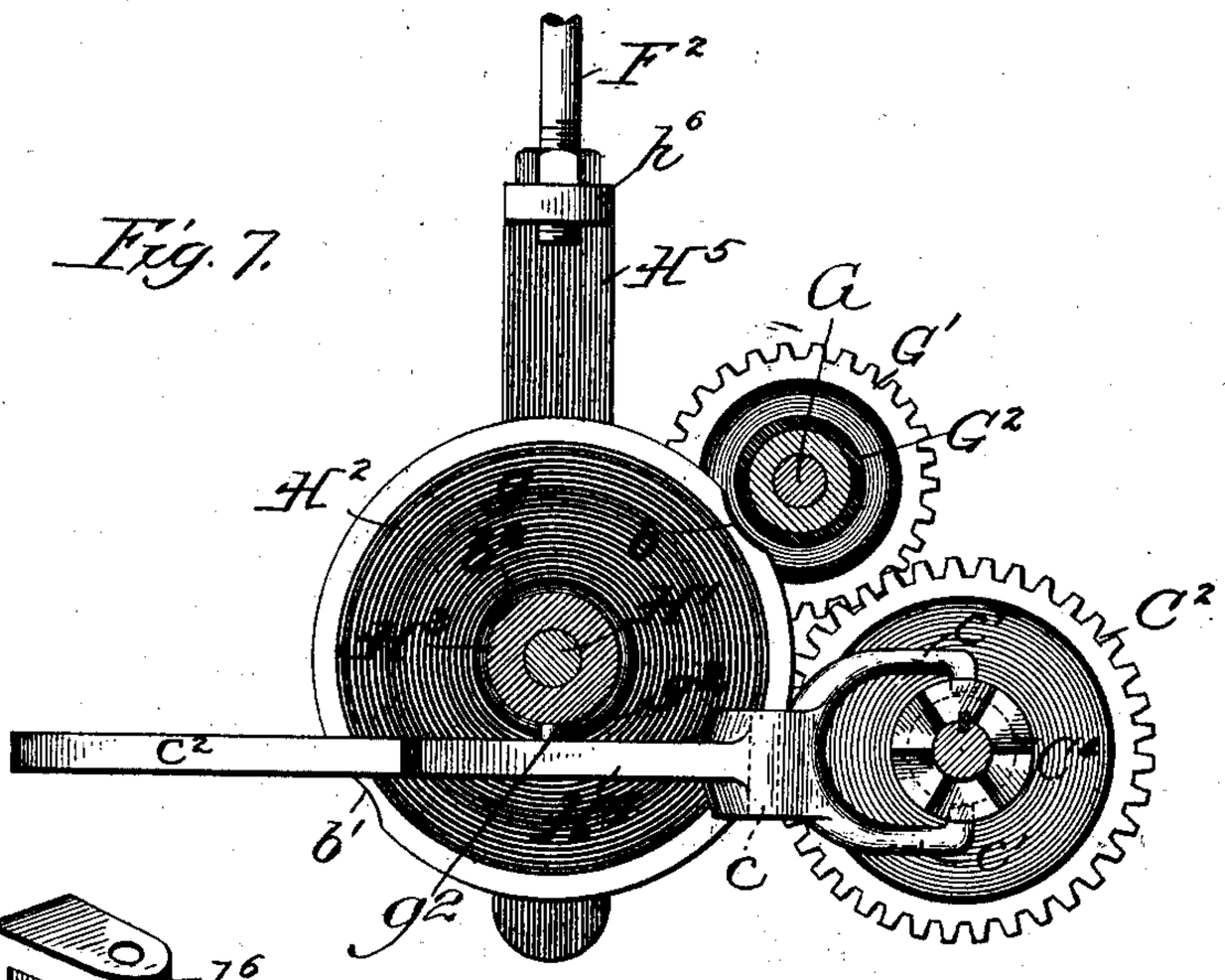


Fig. 8.

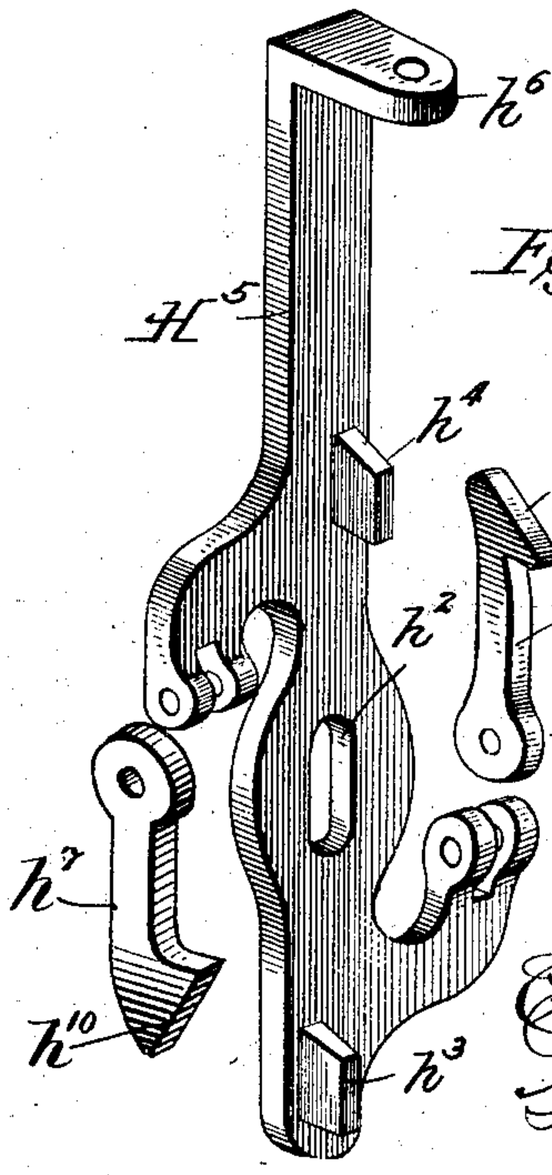


Fig. 9.

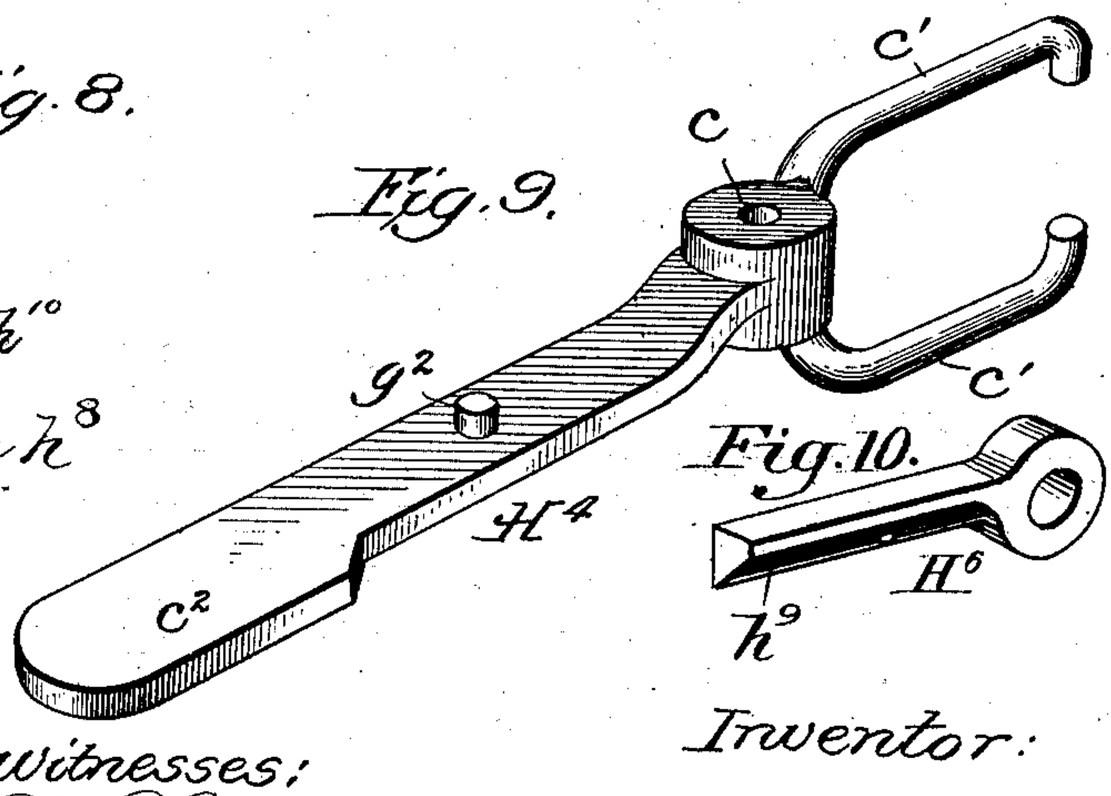


Fig. 10.




Witnesses:
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No. 746,379. Patented December 8, 1903.

# UNITED STATES PATENT OFFICE.

FREDERICK S. RICH, OF CANTON, OHIO.

## FEEDING AND BAND-CUTTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 746,379, dated December 8, 1903.

Application filed April 27, 1903. Serial No. 154,460. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK S. RICH, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Feeding and Band-Cutting Mechanism, of which the following is a specification.

My invention relates particularly to feeding and band-cutting mechanism of the general construction described in Letters Patent No. 720,846, granted to me February 17, 1903.

My primary object is to provide improved mechanism of this character for use in connection with threshing-machines for barn threshing, where economy of space is required.

A further object is to provide improvements in the sheaf-conveyer frame and the means for supporting the same.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevational view of my improved feeding and band-cutting mechanism, the dotted lines indicating the sheaf-conveyer in its folded condition; Fig. 2, a perspective view of one leaf of a hinge employed in connection with the sheaf-conveyer frame; Fig. 3, a perspective view of the other leaf of the same hinge; Fig. 3$^a$, an inner face view of the hinge, on a reduced scale; Fig. 4, a broken view of the opposite side of the mechanism to that shown in Fig. 1; Fig. 5, a sectional view taken as indicated at line 5 of Fig. 6 and showing the inner side of speed-changing gear employed; Fig. 5$^a$, a broken sectional view taken as indicated at line 5$^a$ of Fig. 1; Fig. 6, a plan view of said gear; Fig. 7, a section taken as indicated at line 7 of Fig. 6; Fig. 8, an outer perspective view of an automatically-actuated member serving to set in operation the mechanism for changing the speed of the conveyer; Fig. 9, a perspective view of a clutch-shifting lever, and Fig. 10 an enlarged perspective view of an arm employed in the mechanism shown in Fig. 5.

A description of the preferred construction is as follows: A represents the front portion of a threshing-machine; A′, the shaft of the threshing-cylinder journaled therein and equipped at one end with a driving-pulley A$^2$ and at the opposite end with a transmission-pulley A$^3$; A$^4$, the usual reciprocating grain-pan; B, a fixed frame firmly secured to the front portion of the threshing-machine and constituting a portion of a conveyer-frame; B′, a conveyer-frame section pivotally connected with the frame-section B; B$^2$, a conveyer-frame section pivotally connected with the section B′; B$^3$ B$^4$, cables supporting the sections B′ B$^2$ in the extended and folded positions, respectively; C, an endless sheaf-conveyer having an upwardly and rearwardly inclined front portion and a rearwardly and downwardly inclined rear portion, as fully shown in the patent above referred to; C′, the driving-shaft of the conveyer; C$^2$ C$^3$, Fig. 6, inner and outer gears journaled on said shaft and equipped on their adjacent sides with clutch members *a*; C$^4$, a clutch member located between the clutch members *a* and having keyed connection with the shaft C′; D, a counter-shaft journaled on the frame-section B at the lower front portion of the same and connected at one end with the pulley A$^3$ by a belt D′; D$^2$, a sprocket-wheel fixed on the other end of the shaft D; E, a crank-shaft equipped with combination cutting and feeding devices E′, of a construction fully disclosed in said patent; E$^2$, an eccentric-actuated pitman connected with one end of the shaft E and serving to actuate the grain-pan A$^4$ in a well-known manner; E$^3$, a sprocket-wheel non-rotatably and slidably connected with the opposite end of the shaft E and provided near its hub portion with a friction member E$^4$; E$^5$, a sprocket-chain serving to actuate the sprocket-wheel E$^3$ and through the medium thereof the crank-shaft E; E$^6$, a sprocket-wheel journaled on the shaft E between the frame B and the wheel E$^3$ and equipped with a clutch member E$^7$; E$^8$, weighted levers carried by the wheel E$^3$ and serving to draw the clutch members E$^4$ E$^7$ together in a manner now well understood to cause the wheel E$^6$ to rotate after the wheel E$^3$ reaches a predetermined speed; F, a transversely-extending rock-shaft journaled in the upper front portion of the frame B and equipped with trip-arms F′, as fully shown in the above-mentioned patent; F$^2$, a connecting-rod suitably actuated from the shaft F; G, a short shaft or stud supported on the frame B near one end of the shaft C′; G′ G$^2$ G$^3$ G$^4$, a rela-

tively large gear, a friction-wheel, a sprocket-wheel, and a relatively small gear integrally formed and journaled on the stud G, the gears meshing, respectively, with the gears $C^2$ $C^3$; $G^5$, a chain connecting the sprocket-wheel $G^3$ with the sprocket-wheel $E^6$; H, a bracket connected with the frame-section B and supporting a stud H′, parallel with the stud G; $H^2$, a normally inactive friction-disk journaled on the stud H′ and provided peripherally at points *b b′*, one hundred and eighty degrees apart, with depressions for receiving the periphery of the friction-disk $G^2$ in the inactive positions of the disk $H^2$; $H^3$, a hub formed integrally with the disk $H^2$ and equipped peripherally with a cam-slot $b^2$; $H^4$, a lever pivotally supported at a point *c* and provided at one end with a yoke *c′*, engaging a peripheral channel with which the clutch member $C^4$ is provided and provided at the opposite end with an extension $c^2$, affording a handle; $H^5$, a vertically-movable member serving to start or initially move the friction-disk $H^2$ to throw said disk into working engagement with the disk $G^2$, and $H^6$ an arm pivoted on the shaft H′ and connected by a spring $H^7$ with the disk $H^2$.

The section B′ of the conveyer is connected with the stationary frame-section B by means of hinged leaves *d*, having beveled surfaces *d′* $d^2$ at their rear ends for engaging, respectively, in the extended and folded positions of the carrier-inclined surfaces $d^3$ and vertical surfaces $d^4$, with which the front lower portion of the frame-section B is provided. The front ends of the leaves *d* are offset outwardly, as indicated at $d^5$, and adjacent to the lower inner portions of the offsets are provided pivot-receiving perforations $d^6$. The inner end of the conveyer-section $B^2$ is equipped with leaves $d^7$, provided at their inner lower corners with pivot-receiving perforations $d^8$ and on the outer surfaces of their lower margins with ledges or flanges $d^9$, upon which the lower edges of the extensions $d^5$ bear in the extended position of the conveyer-frame. The leaves *d* $d^7$ are joined at their registering perforations by pivots $d^{10}$. It will thus be seen that the leaves of the hinges overlap each other, which strengthens the connections and tends to prevent lateral motion of the outer frame-section of the conveyer. The cables $B^3$ $B^4$ are firmly secured to the outer upper portion of the frame-section B by means of clips *f*. The cables $B^4$ are secured to the upper inner corners of the frame-section $B^2$ at the hinged leaves $d^7$ by means of firmly-fixed clips *f′*, and the front extremities of the cables $B^3$ are secured to the frame-section $B^2$ at a considerable distance in front of the clips *f′* by means of clips $f^2$. By means of this arrangement the carrier may be folded by pressing upwardly near the pivots $d^{10}$, the weight of the main portion of the conveyer-frame being gradually shifted from the cables $B^3$ to the cables $B^4$ in the folding operation, as is evident. The free end of the frame-section $B^2$ is supported in the folded position by chains $f^3$, connected with the stationary frame-section B. It thus will appear that during transportation of the machine a limited portion of the weight of the folding sections of the conveyer is supported by the cables $B^4$, and the remainder of the weight is supported by the chains $f^3$. This relieves the hinges and pivots, as well as the cables $B^4$, from undue strain.

The driving-shaft C′ of the conveyer C corresponds with the driving-shaft $C^2$ of the above-mentioned patent. The chain $G^5$ is started after the cylinder of the machine reaches a predetermined number of revolutions sufficient to cause the inertia balls of the wheel $E^3$ to force the friction member $E^7$ into engagement with the friction member $E^4$ and start the sprocket-wheel $E^6$. The construction and operation of the means for setting the sprocket-wheel $E^6$ in motion are now well understood and are similar to the construction and operation of the governor mechanism connected with the shaft D of the patent referred to. For the reasons stated it is unnecessary to give a minute description of the construction shown in Fig. 5ª, it being sufficient to state that when the wheel $E^3$ reaches a predetermined number of revolutions the friction members $E^4$ $E^7$ are drawn together by the weight of the levers $E^8$, thereby starting the sprocket-wheel $E^6$.

It is unnececsary to describe the connection between the rod $F^2$ and the rock-shaft F, this construction being well known and fully described in the above-mentioned patent. It may be stated, however, that the rock-shaft has fixed on its projecting extremity an arm which is connected with the upper end of said rod in a manner now well understood.

As the gears G′ $G^4$ are in constant rotation when the chain $G^5$ is in movement and the gears $C^2$ $C^3$ are also in constant rotation at such time it is only necessary to shift the clutch member $C^4$ from one of the members $C^2$ $C^3$ to the other to effect a change in the motion contributed to the shaft C′ by the clutch member $C^4$. The shaft C′ is normally operated at a high speed; but when a surplus of grain engages the trip-arm F′ the result is to shift the clutch member $C^4$ to the low-speed set of gears.

The bracket H is suitably secured to the frame-section B and supports the vertical pivot at *c* as well as the horizontal stud H′. The friction-disk $H^2$ is provided at its inner surface with pins *g g′*, and the lever $H^4$ is provided on its upper surface with a stud $g^2$, which engages the cam-groove $b^2$ of the hub $H^3$. The member $H^5$ is provided some distance from its lower end with a vertical slot $h^2$, through which the short shaft or stud H′ passes, is provided on its outer surface some distance below the slot $h^2$ with a lug or stop $h^3$ and some distance above said slot with a lug or stop $h^4$, has its upper end provided with an outturned lug $h^6$, with which the lower

end of the rod $F^2$ is adjustably connected, and is equipped at its lateral edges, respectively above and below the slot $h^2$, with hooks or latches $h^7$ $h^8$, which are pivotally connected with suitable lugs provided at said lateral edges. The arm $H^6$ is journaled at one end on a stud H′ and has its inner surface beveled, as indicated at $h^9$. The extremities of the hooks $h^7$ $h^8$ have beveled surfaces $h^{10}$, Fig. 8, to permit them to ride over the surface $h^9$. The lug $h^4$ is so located as to be in the path of the pin $g$ of the disk $H^2$ when the member $H^5$ is in the depressed position, and the lug $h^3$ is in the path of the pin $g$ when the member $H^5$ is in the elevated position. The spring $H^7$ comprises a coil encircling the short shaft H′ and extremities, one of which is fixed at $h^{11}$ to the arm $H^6$ and the other of which is fixed at $h^{12}$ to the disk $H^2$. It now will be understood that when the member $H^5$ is lifted, as by a surplus of grain acting upon the trip-rods F′, tension is put upon the spring $H^7$ and the lug $h^4$ is carried out of the path of the pin $g$, whereupon the spring acts to move the disk $H^2$ into operative engagement with the disk $G^2$, which has continuous rotation after the threshing-cylinder reaches a predetermined number of revolutions. Thereupon the disk $H^2$ will be turned through a half-revolution until the disk $G^2$ encounters the depression at the opposite side and the pin $g$ engages the lower stop $h^3$. On the other hand, when the member $H^5$ is depressed, as by the passing of the overplus of grain from beneath the trip-arms, the arm $H^6$ (now in the position of the dotted lines of Fig. 5) is again actuated, this time through the medium of the hook $h^8$, thereby moving the disk $H^2$ again into operative contact with the disk $G^2$ and causing another half-revolution of the disk $H^2$. At the first half-revolution of the disk $H^2$ the lever $H^4$ is shifted in one direction, and at the second half-revolution said lever is shifted in the opposite direction, thereby accomplishing the change in speed above referred to. The pin $g'$ affords a stop for the arm $H^6$.

The manner of use and operation may be briefly summarized thus: In the extended position of the conveyer-frame the folding-sections are supported by the cables $B^3$ and in the folded position are partially supported by the cables $B^4$. Assuming the machine to be in operative condition, the shaft D is operated from the threshing-cylinder and imparts motion to the wheel $E^3$. When the wheel $E^3$ reaches a predetermined speed, the sprocket-wheel $E^6$ is set in motion, and thereafter the gears G′ $G^4$ are maintained in continuous rotation, the gears $C^2$ $C^3$ rotating idly upon the driving-shaft C′ of the conveyer unless one of the last-named gears is connected with said driving-shaft through the medium of the clutch member $C^4$. The endless conveyer is normally operated at the high speed; but when a surplus of grain is carried beneath the trip-arms F′ the clutch member $C^4$ is shifted to throw the low-speed gears into operative connection, thereby providing for a smaller supply of grain to the threshing-cylinder. The devices E′ operate both as cutting and feeding devices and for barn service, where the improved mechanism is to be used chiefly and where the amount of work accomplished is not of as great consideration as in outdoor work, the use of a rotary band-cutter, in connection with the combination cutters and feeders E′, is unnecessary. By dispensing with the rotary cutter the whole mechanism may be shortened materially and cheapened somewhat also, as is evident.

If desired, any suitable governor may be employed in lieu of the governor mechanism shown for controlling the starting of the gears G′ $G^4$, or the governor mechanism may be dispensed with entirely without departure from the other features of my invention. Other changes in details of construction within the spirit of my invention may be made. Hence no undue limitation should be understood from the foregoing detailed description.

A bracket $m$ serves as a guide for the rod $F^2$, and a spring $m'$ is confined between said bracket and the upper end of the member $H^5$, serving to yieldingly hold the latter depressed.

What I regard as new, and desire to secure by Letters Patent, is—

1. In means of the character described, a conveyer-frame having a fixed section, a short section pivotally connected therewith and capable of swinging upwardly, a short section pivotally connected with said second-named section and capable of swinging downwardly with relation thereto, and two sets of cables attached to stationary supports and at different points on the outer section, one set being taut and the other loose in the normal condition, whereby the weight of the swinging sections is supported by one set of cables in the extended position and the cables of the other set become taut in the operation of folding the conveyer-frame, for the purpose set forth.

2. In means of the character described, a conveyer-frame having a fixed section, a short section pivotally connected therewith and capable of swinging upwardly, a front section pivotally connected with said second-named section and capable of swinging downwardly with relation thereto, and means connecting the front section and the fixed section to support the frame in the extended position, the pivotal connections between the two folding-sections comprising hinges with one set of leaves overlapping the other set of leaves and stops on the second set of leaves engaging the lower edges of the first set of leaves.

3. In means of the character described, the combination of a rotary cylinder, a set of gears actuated therefrom, a friction-disk moving with said set of gears, trip-arms located adjacent to the path of the grain, a suitably-journaled friction-disk engaging said first-named disk, means connected with said trip-

arms for throwing said second-named disk into operative engagement with the first-named disk, an endless conveyer provided with a driving-shaft, gears journaled on said driving-shaft and provided with clutch members, and a shiftable clutch member connected with said driving-shaft and actuated from said second-named friction-disk.

4. In mechanism of the character described, the combination with the driving-shaft of a conveyer and a threshing-cylinder, of a set of gears journaled on said driving-shaft and provided on adjacent sides with clutch members, a clutch member located between said gears and keyed to said shaft, a second set of gears meshing with the first set, a friction member, and a sprocket-wheel located between the members of said second-named set of gears, a chain operated from the threshing-cylinder and connected with said sprocket-wheel, a suitably-journaled friction-disk located in the plane of said first-named disk and provided peripherally with a depression maintaining the second-named disk normally inoperative, automatically-acting trip mechanism serving to turn said second-named disk initially to throw it into operative engagement with the first-named disk, and a shifting-lever for said shiftable clutch member actuated from said second-named disk, for the purpose set forth.

5. In mechanism of the character described, a suitably-driven friction-disk, change-gears, a second friction-disk provided peripherally with two or more depressions, a trip-actuated member provided with an escapement for said second-named disk, and spring connection between said member and said second-named disk, whereby in the movement of said member power is stored to initially move said second-named disk into operative engagement with said first-named disk, for the purpose set forth.

6. In mechanism of the character described, a suitably-driven disk, change-gears, and a clutch-shifting device comprising a suitable lever, a second friction-disk provided peripherally at points substantially one hundred and eighty degrees apart with depressions, said second-named disk serving to actuate said lever, and a trip-actuated member having an escapement for said second-named disk, and spring connection with said disk, for the purpose set forth.

7. In mechanism of the character described, a suitably-driven disk or wheel, a pair of gears moving therewith, a driving-shaft, a pair of gears journaled thereon provided with clutch members, a shiftable clutch member, a suitably-fulcrumed shifting-lever, a second disk or wheel provided peripherally at points substantially one hundred and eighty degrees apart with depressions, and a trip-actuated member having escapement connection with said second-named disk and serving to throw said second-named disk into operative engagement with said first-named disk, for the purpose set forth.

8. In mechanism of the character described, the combination with a disk or wheel $H^2$, a suitably-actuated member $H^5$ having escapement connection with said disk, a suitably-pivoted arm having spring connection with said disk, and hooks carried by the member $H^5$ and serving to engage said arm and through the medium thereof to store up energy for initially moving said disk.

9. In means of the character described, the combination of a normally rotating pair of gears and a normally rotating member forming a part of clutch shifting mechanism, a loosely-journaled pair of gears meshing with the first-named gears and provided with clutch members, a shiftable clutch member, a shifting-lever, a rotatable lever-shifting member normally out of operative engagement with said first-named member of the shifting mechanism, and a trip-actuated member having spring connection with the lever-shifting member, for the purpose set forth.

10. In mechanism of the character described, the combination of a rotary threshing-cylinder, a counter-shaft actuated therefrom, a crank-shaft equipped with combination feeding and cutting devices and geared to said counter-shaft, an endless conveyer, change-gears for said conveyer geared to said crank-shaft, and trip mechanism acting automatically to change the speed of the conveyer, for the purpose set forth.

11. In mechanism of the character described, the combination of a rotary cylinder, a counter-shaft actuated therefrom, a crank-shaft equipped with combination feeding and cutting devices and provided with a sprocket-wheel geared to said counter-shaft and fixed to rotate with said crank-shaft, a transmission member journaled on the crank-shaft, means for automatically connecting said member to rotate with said crank-shaft, an endless conveyer, change-gears therefor geared to said transmission member, and trip-actuated clutch mechanism for said change-gears, for the purpose set forth.

FREDERICK S. RICH.

In presence of—
C. A. GRATE,
THAD. J. HOGAN.