

No. 810,568.

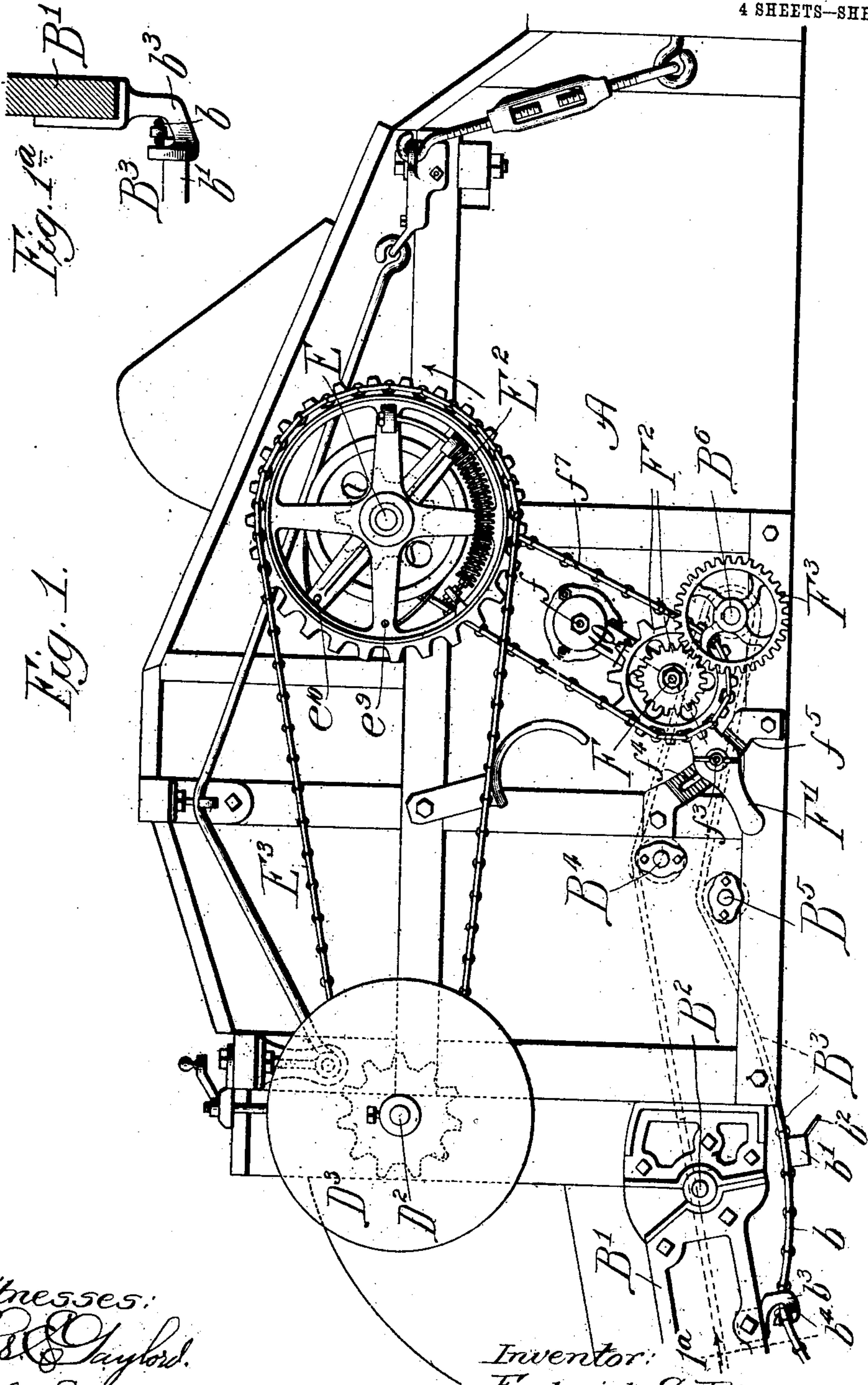
PATENTED JAN. 23, 1906.

F. S. RICH.

FEEDING AND BAND CUTTING MECHANISM.

APPLICATION FILED JUNE 20, 1904.

4 SHEETS—SHEET 1.



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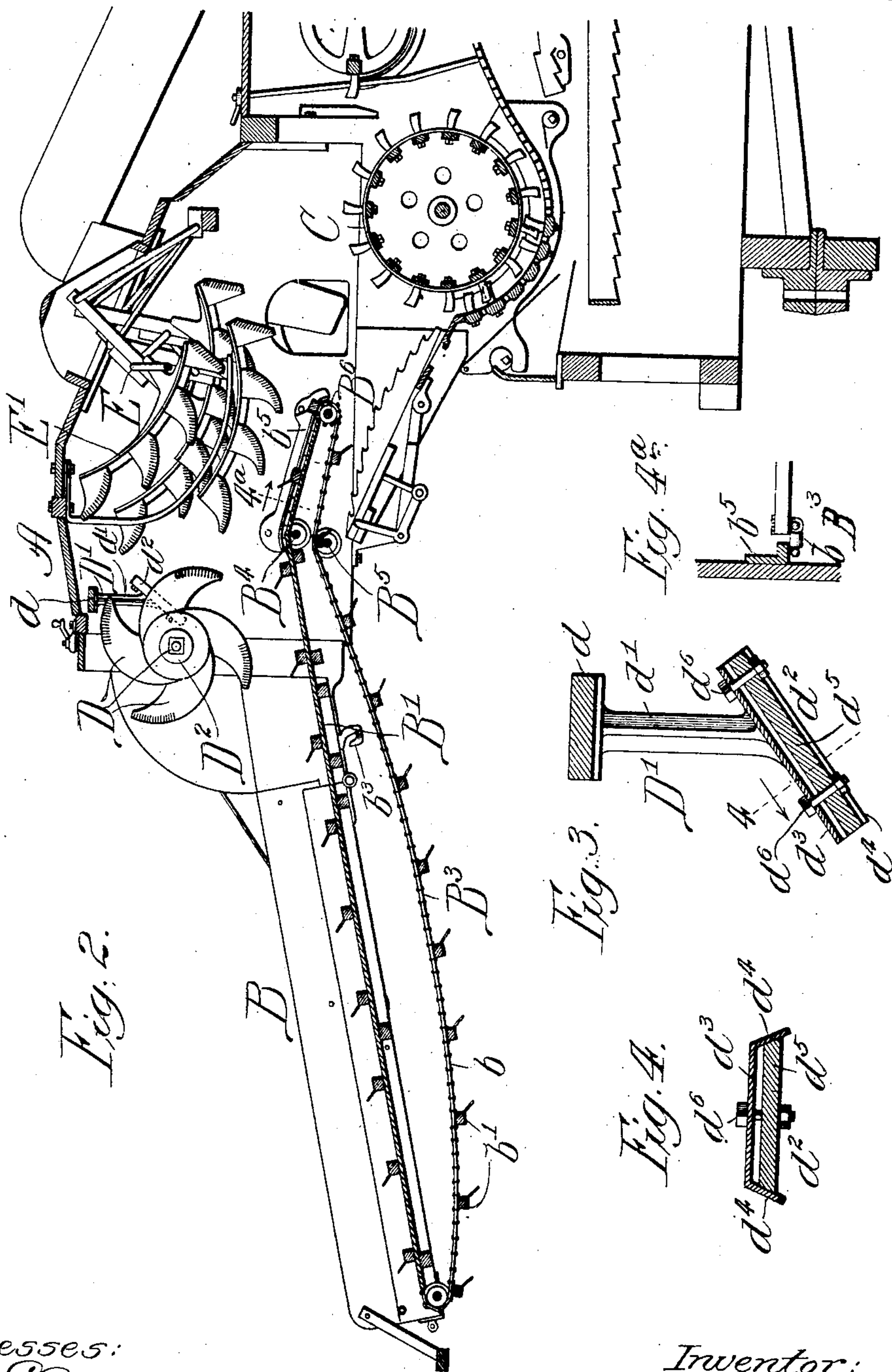
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 5.

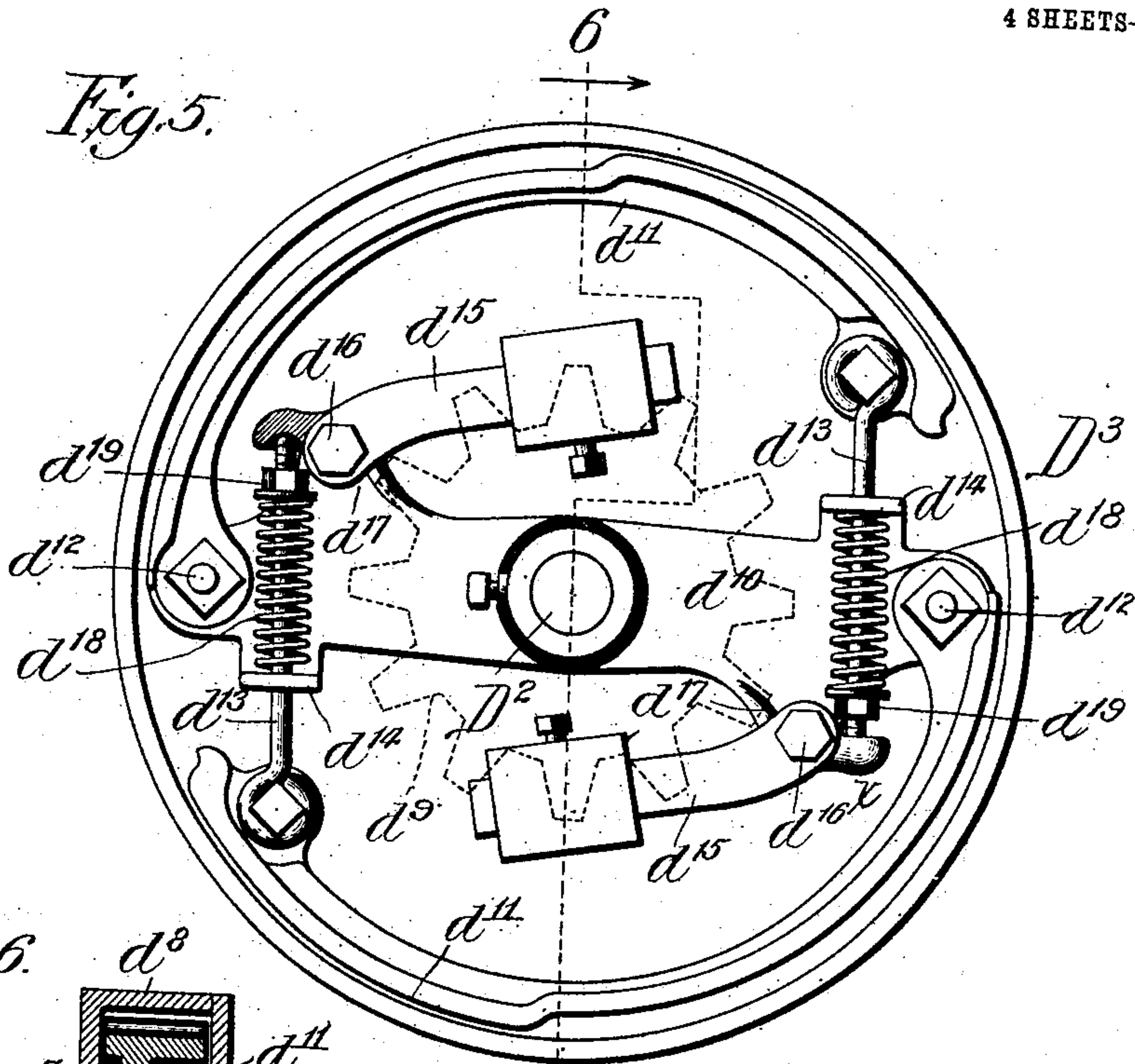


Fig. 6.

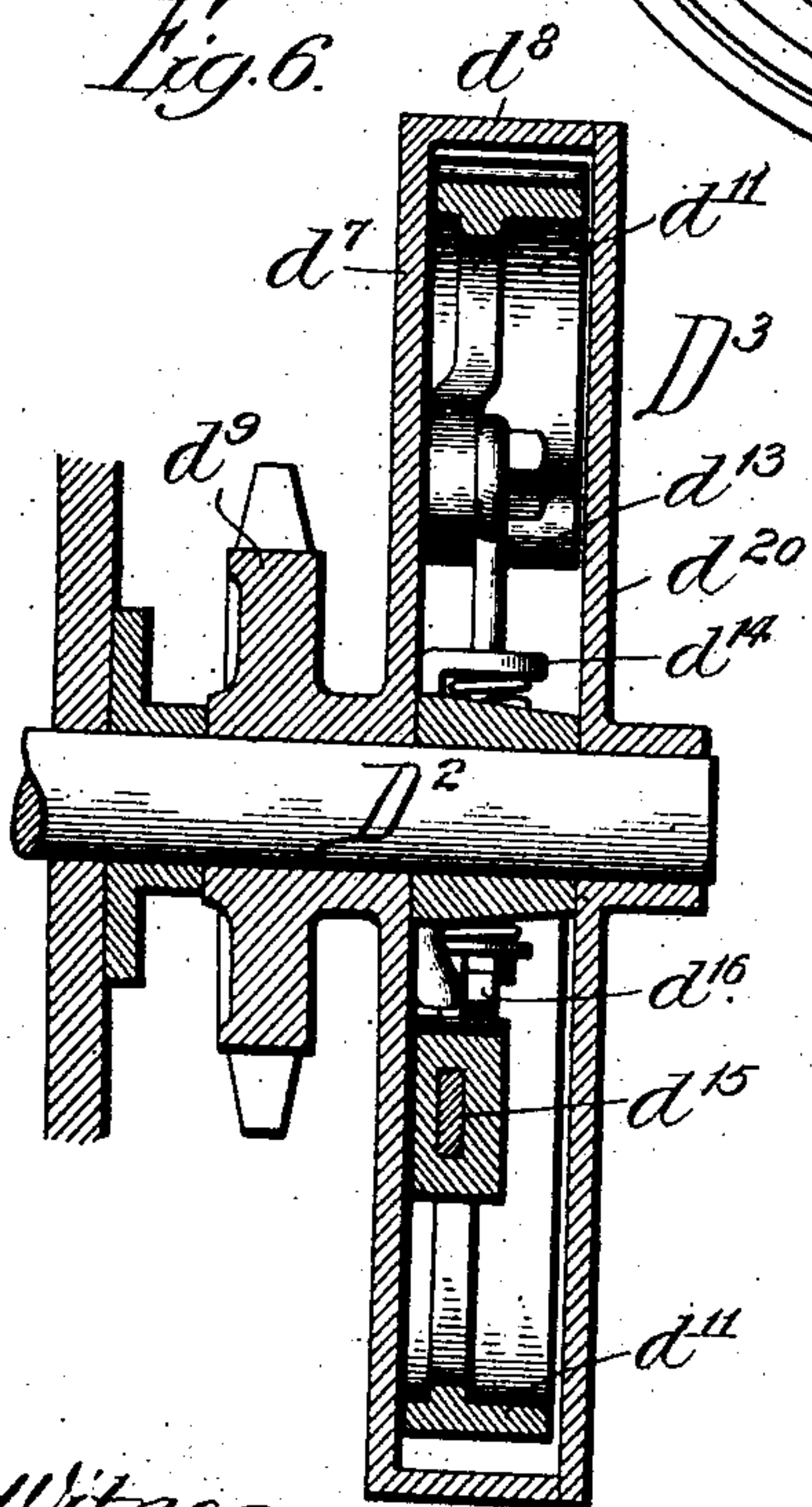
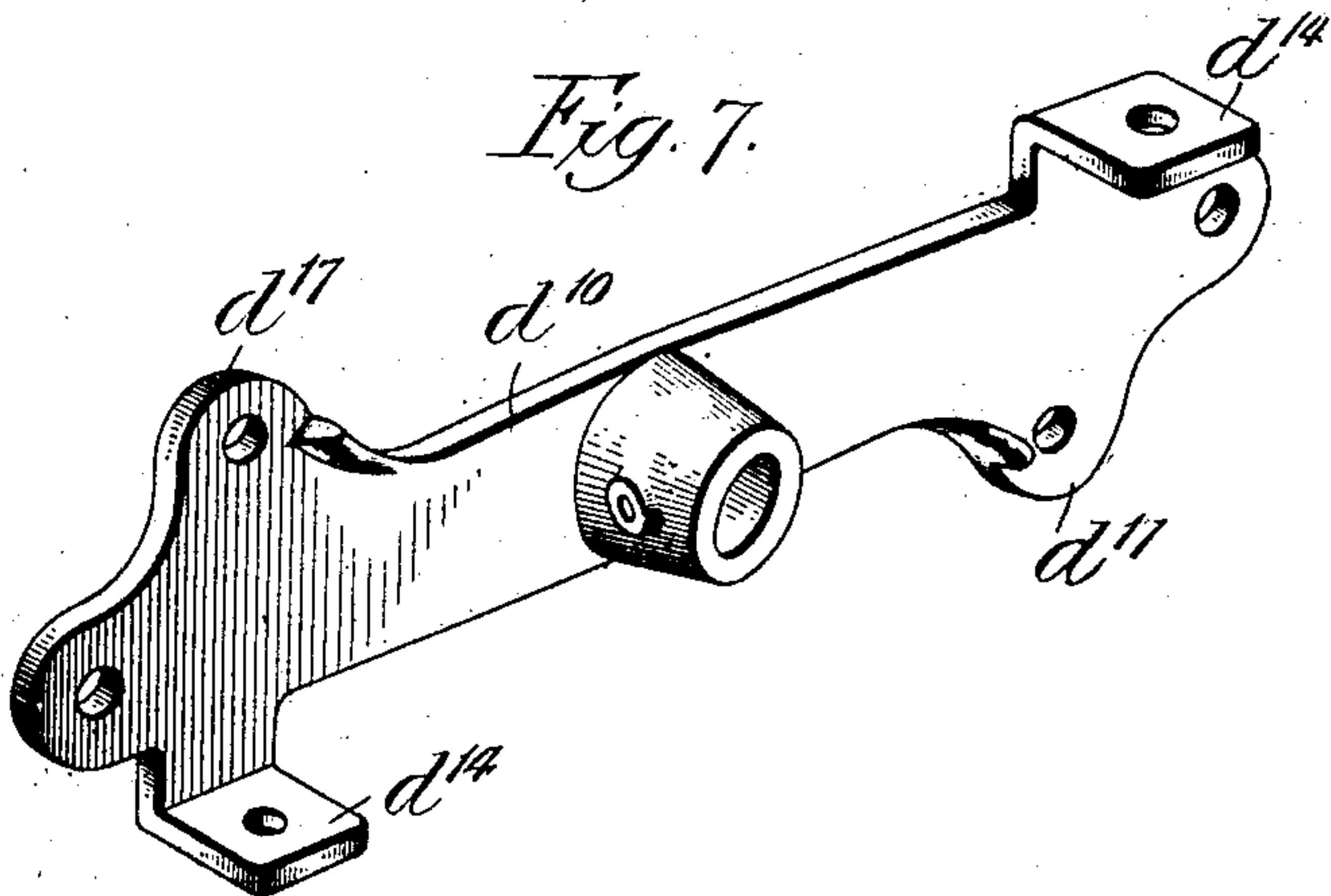


Fig. 7.



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4 SHEETS—SHEET 4.

Fig. 8.

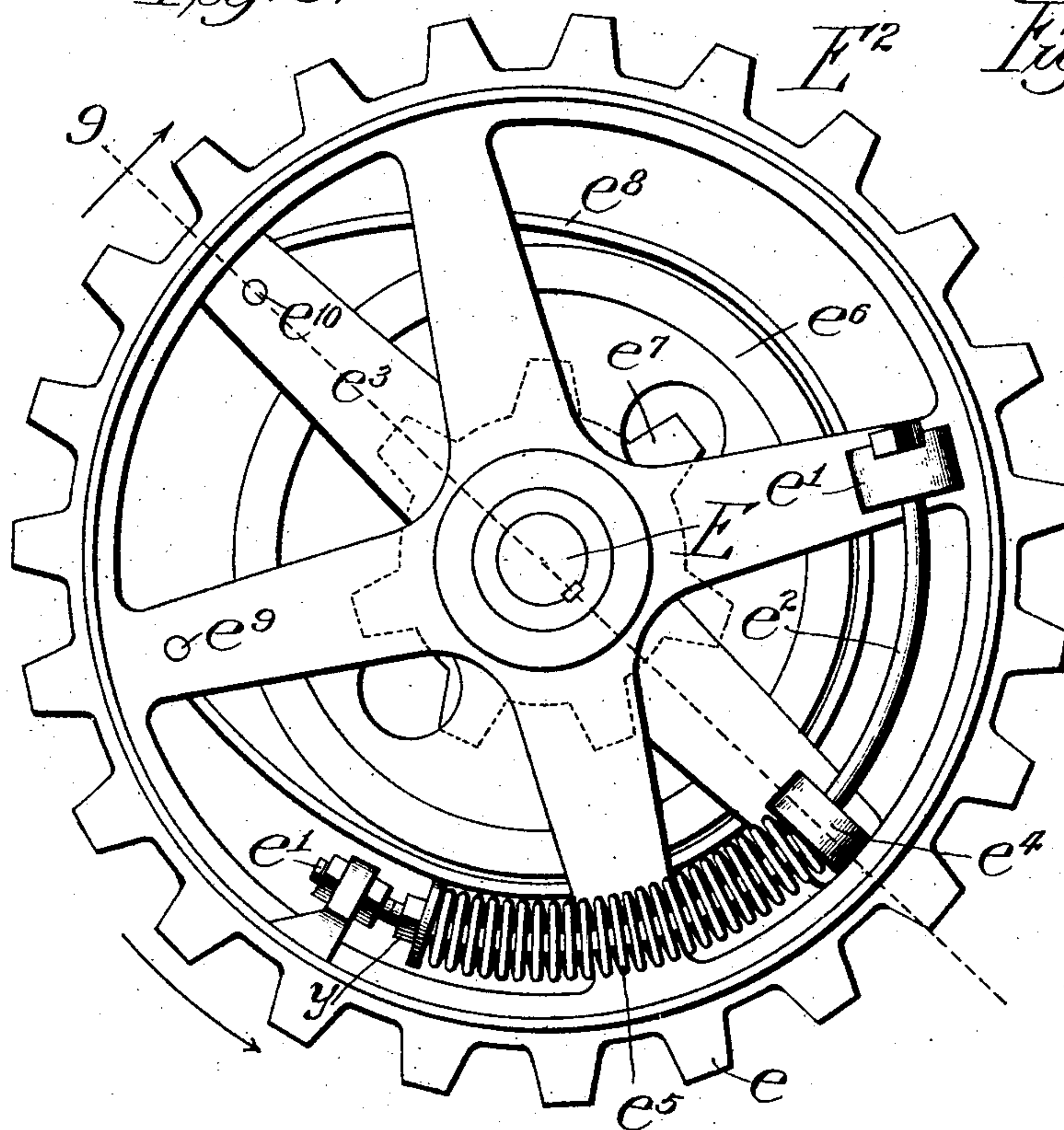


Fig. 9.

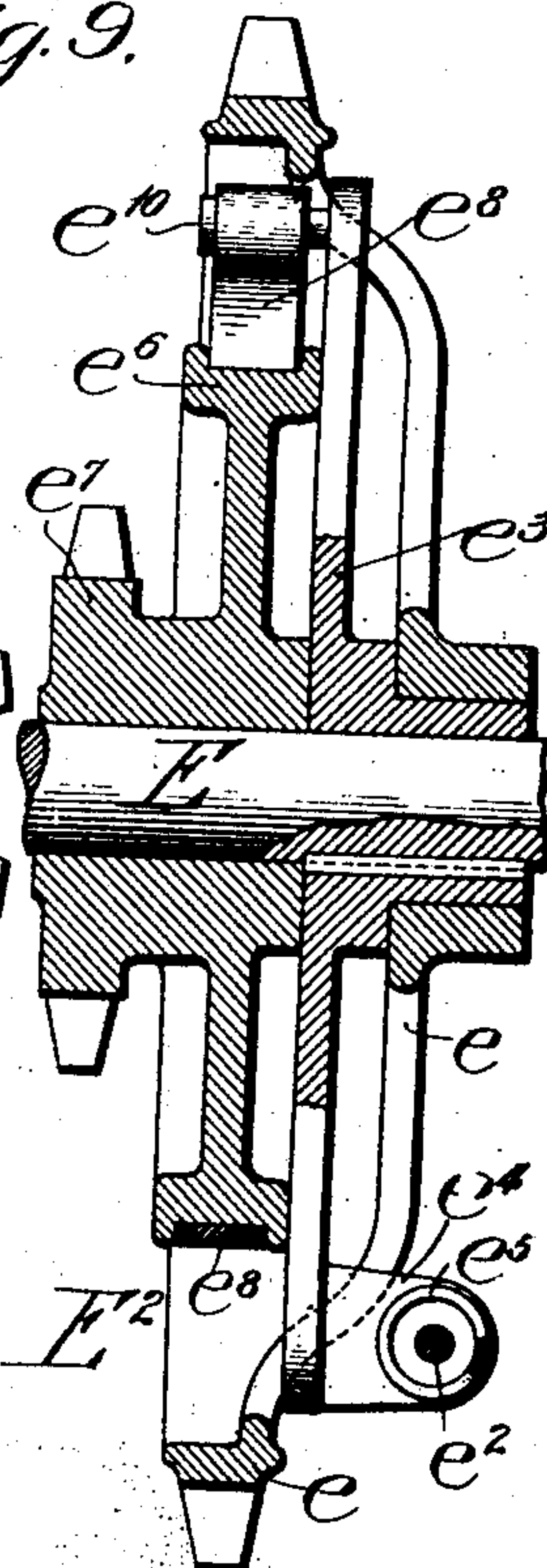


Fig. 10.

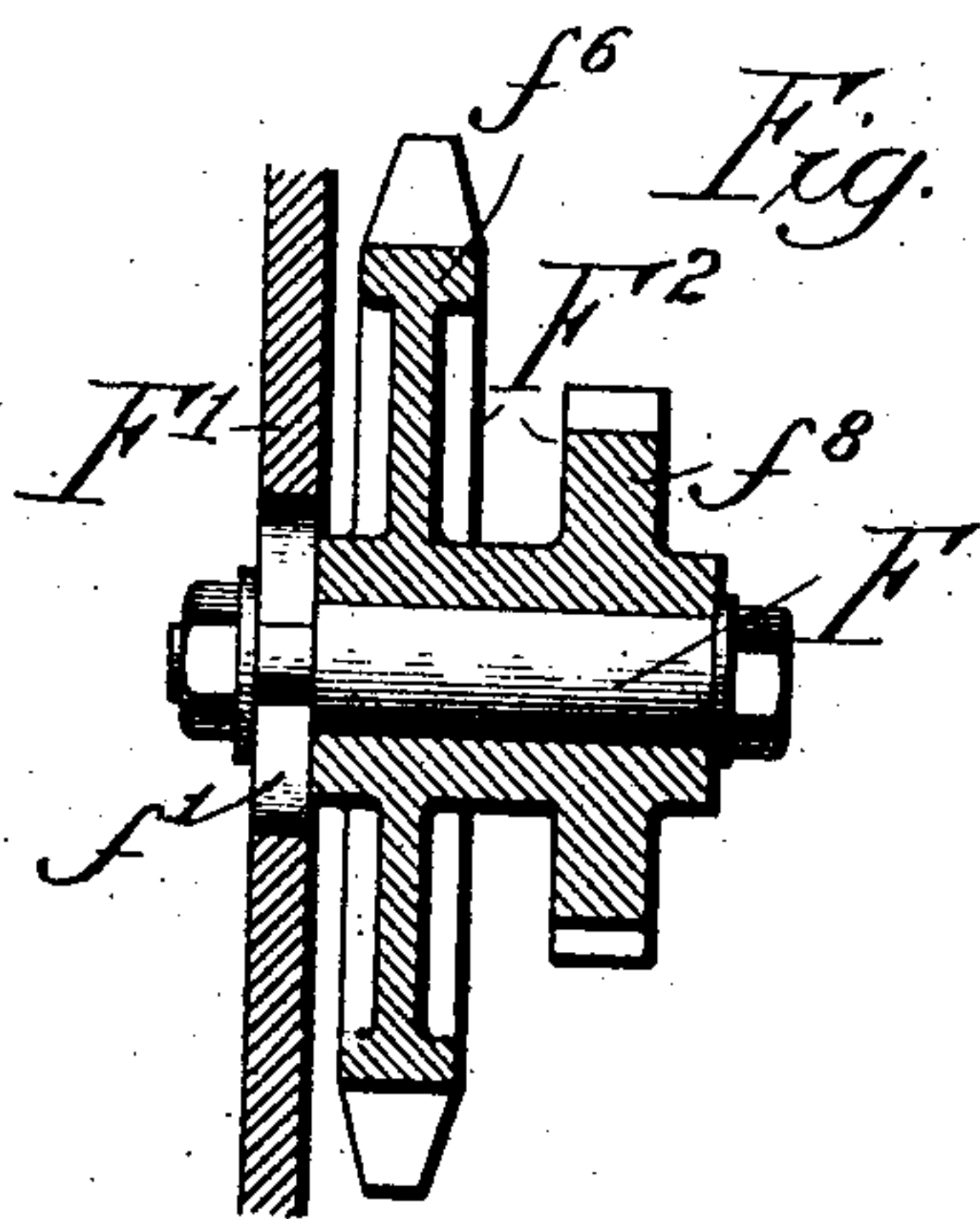
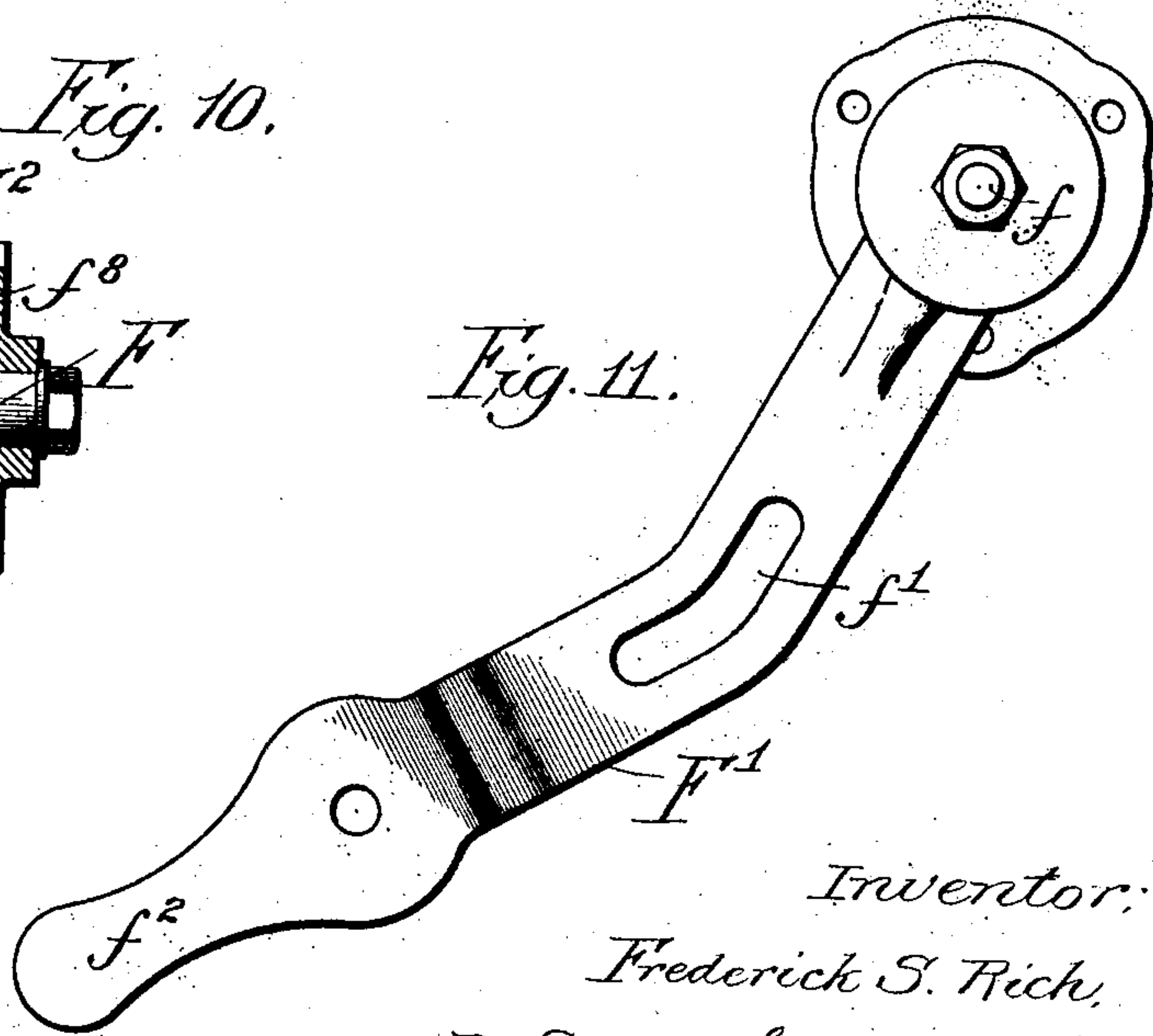


Fig. 11.



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# UNITED STATES PATENT OFFICE.

FREDERICK S. RICH, OF CANTON, OHIO, ASSIGNOR TO RICH SELF FEEDER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

## FEEDING AND BAND-CUTTING MECHANISM.

No. 810,568.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed June 20, 1904. Serial No. 213,366.

*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 provided with means for automatically retarding the feed to prevent clogging or "slugging" the cylinder.

My primary object is to provide simplified and improved means for preventing clogging of the cylinder, an improved speed-governor for throwing the feeding devices into operation after the cylinder has reached a predetermined number of revolutions, an improved guard for the rotary band-cutter, and improved means for sustaining the lower run of the endless sheaf-conveyer when the frame of the sheaf-conveyer is in the folded position.

In the improved construction I dispense with the trip device which has commonly been employed for stopping the operation of the endless sheaf-conveyer when the conveyer becomes overcharged. In lieu thereof I provide means dependent upon the resistance encountered by the crank-actuated feed and cutting devices which I employ that serve to retard the movement of the endless sheaf-conveyer automatically when the sheaf-conveyer is overcharged.

My invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a broken side elevational view of feed and band-cutting mechanism equipped with my improvements; Fig. 1<sup>a</sup>, an enlarged broken sectional view taken as indicated at line 1<sup>a</sup> of Fig. 1 and showing means for holding the lower portion of the endless sheaf-conveyer when the sheaf-conveyer frame is in a folded condition; Fig. 2, a longitudinal sectional view of the improved mechanism; Fig. 3, a sectional view illustrating a detail of the guard employed in connection with the rotary band-cutter; Fig. 4, a section taken as indicated at line 4 of Fig. 3; Fig. 4<sup>a</sup>, a sectional view taken as indicated at line 4<sup>a</sup> of Fig. 2 and showing a detail of a guide employed in connection with the endless sheaf-conveyer; Fig. 5, a

view showing the details of the speed-governor employed, the casing-plate appearing in Fig. 1 being removed; Fig. 6, a sectional view taken as indicated at line 6 of Fig. 5; Fig. 7, a perspective view of a weight-carrying arm employed in the construction of the speed-governor; Fig. 8, a view of an automatically-controlled friction-clutch forming a part of the power-transmission means between the rotary cutter and the crank-shaft which actuates the oscillating cutting and feeding knives; Fig. 9, a section taken as indicated at line 9 of Fig. 8; Fig. 10, a section taken as indicated at line 10 of Fig. 1 and showing a detail of the transmission means between the crank-shaft and the driving-shaft of the endless conveyer, and Fig. 11 a view of an adjustable lever which supports the stub-shaft shown in Fig. 10.

A description of the preferred construction is as follows:

A represents the fixed portion of the frame of the mechanism, the same being connected with the front end of the threshing-machine in the usual manner; B, the folding frame of the endless sheaf-conveyer, this folding frame having a section B' connected by a pivot B<sup>2</sup> with the fixed frame in the usual manner; B<sup>3</sup>, an endless sheaf-conveyer passing over suitable pulley-equipped shafts, including shafts B<sup>4</sup>, B<sup>5</sup>, and B<sup>6</sup>, the latter constituting a driving-shaft for the sheaf-conveyer; C, a threshing-cylinder; D, a rotary band-cutter driven in the usual manner from the cylinder by means of pulley-and-belt connection (not shown) at the farther side of the machine; D', a stationary guard for the band-cutter; D<sup>2</sup>, a shaft for the band-cutter; D<sup>3</sup>, a speed-governor connected with the shaft B<sup>3</sup>; E, a crank-shaft; E', combination feed and cutting devices operating above the grain in a well-known manner; E<sup>2</sup>, friction-clutch mechanism connected with the crank-shaft E and actuated from the speed-governor D<sup>3</sup> by a sprocket-chain E<sup>3</sup>; F, a stub-shaft adjustably connected with an adjustable lever F' and having journaled thereon a combination sprocket-wheel and spur-gear F<sup>2</sup>, and F<sup>3</sup> a spur-gear secured on the driving-shaft B<sup>6</sup> of the sheaf-conveyer and meshing with the spur-gear of the member F<sup>2</sup>.

The construction of the frame is well understood in the art and need not be described in detail herein.



The endless sheaf-conveyer comprises endless chains  $b$ , connected by slats  $b'$ , equipped with fingers  $b^2$ . The section B' of the folding frame of the conveyer is equipped at each side with hooks  $b^3$  of the form shown in Figs. 1 and 1<sup>a</sup>, both of said hooks being shown in the drawings. The drawings illustrate the manner in which the hooks support the lower portion of the endless conveyer, while at the same time allowing the conveyer to operate without breakage in case the attendant fails to take the chains off the hooks after extending the conveyer-frame. The shanks of the hooks lie outside the chains, and the points of the hooks extend inwardly and toward the front end of the conveyer, the inclined surfaces  $b^4$  (shown in Fig. 1) enabling the conveyer to operate without breakage until the rattling attracts the attention of the operator. The endless conveyer has a rearwardly and downwardly inclined rear portion, as is now well understood in the art. To maintain the upper portion of the rear end of the endless conveyer in proper position, as when, for instance, the knives E' are drawing upon straw which is in engagement with the spines on the slats of the conveyer, I provide on the inner sides of the stationary frame-section A angle-form guides  $b^5$ , one of which is shown in Figs. 2 and 4<sup>a</sup>.

The rotary band-cutter is of well-known construction and need not be described in detail. It is sufficient to remark that the shaft of the cutter is equipped with suitably spaced knives. The guard D' comprises a cross-bar  $d$ , from which depend shanks  $d'$ , supporting shoes  $d^2$ , Figs. 2, 3, and 4. Each shoe  $d^2$  comprises a forwardly and downwardly inclined sheet-metal member  $d^3$ , having lateral oblique flanges  $d^4$  and an expanding member  $d^5$ , confined between the flanges  $d^4$  and adjustably connected with the upper plate  $d^3$  by means of bolts  $d^6$ . The free edges of the flanges  $d^4$  are in more or less intimate contact with the knives of the rotary cutter, and it will be understood that the flanges may be spread apart to bring them closer to the knives by adjusting the bolts  $d^6$ .

The speed-governor D<sup>3</sup> comprises a wheel or pulley  $d^7$ , having an outwardly-turned flange  $d^8$ ; a sprocket-wheel  $d^9$ , formed integral with the pulley and receiving the sprocket-chain E<sup>3</sup>; a weight-carrying arm or bar  $d^{10}$ , having a hub secured by a set-screw upon the shaft D<sup>2</sup>; curved friction-shoes  $d^{11}$ , having intumed ends connected by pivots  $d^{12}$  with the extremities of the bar  $d^{10}$ ; links  $d^{13}$ , connected with the free ends of the brake-shoes and extending through guide-lugs  $d^{14}$  on bar  $d^{10}$ ; weight-arms  $d^{15}$ , supplied with adjustable weights and connected by pivots  $d^{16}$  with lugs  $d^{17}$  on the bars  $d^{10}$ , said weight-arms being provided with short arms or lugs  $x$ , bearing upon the free ends of the links  $d^{13}$ ; springs  $d^{18}$ , confined between the lugs  $d^{14}$  and

nuts  $d^{19}$ , with which the links are provided near their ends, and a disk  $d^{20}$ , having a hub secured by a set-screw to the end of the shaft D<sup>2</sup>, said disk forming a plate coacting with the pulley  $d^7$  to inclose the weights and springs.

The crank-shaft E is equipped with a plurality of combination feeding and cutting devices E', which are suitably spaced and which move in cycles in a now well-understood manner.

The friction-clutch device E<sup>2</sup> will be understood by reference to Figs. 8 and 9. It comprises a sprocket-wheel  $e$ , rotatable with respect to the crank-shaft E and equipped on its outer surface with lugs  $e'$ , supporting a curved rod  $e^2$ , a bar or member  $e^3$ , having a hub keyed upon the shaft E and affording a journal for the sprocket-wheel  $e$ , said member  $e^3$  being equipped on the outer surface of one of its extremities with a lug  $e^4$ , through which the rod  $e^2$  passes freely; a curved spring  $e^5$ , encircling the rod  $e^2$  and confined between an adjusting-nut  $y$  on the rod  $e^2$  and the lug  $e^4$  of the member  $e^3$ ; a grooved wheel  $e^6$  journaled on the shaft E and having formed integrally therewith a sprocket-wheel  $e^7$ , and a friction band or strap  $e^8$  passing about the wheel  $e^6$  and having its ends secured to pins  $e^9$   $e^{10}$ , with which the sprocket-wheel  $e$  and the member  $e^3$  are equipped, respectively.

The lever F' is joined by a pivot  $f$  to one side of the frame A and is curved near its central portion, where it is provided with a slot  $f'$ , which adjustably receives the stub-shaft F. The lever has a handle  $f^2$ , and near thereto is provided with a perforation which receives a bolt equipped with a winged end  $f^3$ . Said bolt is adjustable in a slot  $f^4$ , formed in a segment  $f^5$ , connected with the frame A. The member F<sup>2</sup> comprises a sprocket-wheel  $f^6$ , joined by a sprocket-chain  $f^7$  to the sprocket-wheel  $e^7$  on the shaft E, and a spur-gear  $f^8$ , meshing with the spur-gear F<sup>3</sup> on the drive-shaft of the endless conveyer.

From the foregoing detailed description the operation of the mechanism will be readily understood. The threshing-cylinder C of the separator is driven in the usual manner, and power is transmitted from the threshing-cylinder to the rotary band-cutter in the usual manner. When the band-cutter reaches a predetermined number of revolutions, the centrifugal force developed operates to throw the weights of the speed-governor out, thereby forcing the friction-shoes  $d^{11}$  into contact with the inner surface of the flange of the pulley  $d^7$ , causing the pulley to rotate with the member  $d^{10}$  and the shaft D<sup>2</sup>. Power is now transmitted through the sprocket-chain E<sup>3</sup> to the sprocket-wheel  $e$ , and the bar or member  $e^3$  is driven through the medium of the sprocket-wheel  $e$  and the spring  $e^5$ , thereby rotating the crank-shaft E.



Normally the tension (adjustable) of the spring  $c^5$  is such that the friction-strap  $c^8$  engages the friction-pulley  $c^6$  with sufficient friction to rotate the same and transmit  
 5 power to the endless conveyer. When an abnormal amount of grain passes beneath the combination feeding and cutting devices  $E'$ , actuated by said crank-shaft, the movement of the crank-shaft is retarded somewhat, while the sprocket-wheel  $e$  continues  
 10 to advance, thereby causing the friction-strap  $c^8$  to lighten or release its hold upon the friction-wheel  $c^6$ , thereby retarding or stopping the movement of the endless conveyer.  
 15 Meanwhile the devices  $E'$  continue to operate and gradually convey the overplus of grain to the cylinder, whereupon, the normal condition having been reestablished, the endless conveyer will again be operated at normal  
 20 speed.

It will be understood that changes in details of construction within the spirit of the invention may be made. Hence no undue limitation should be understood from the  
 25 foregoing detailed description.

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

1. The combination with a rotary band-cutter, an endless sheaf-conveyer, and a feed  
 30 device located above the path of the grain and provided with a driving-shaft, of power-transmission means connecting the band-cutter, feed device and sheaf-conveyer, comprising a friction-clutch connected with said  
 35 shaft and operated by increase of torsional force upon said shaft, due to an overload of grain, for retarding the conveyer, to permit the restoration of normal conditions, for the purpose set forth.

2. The combination with a rotary band-cutter, an endless sheaf-conveyer, and a feed  
 40 device located above the path of the grain, of power-transmission means connecting the band-cutter, feed device and sheaf-conveyer, comprising a wheel rotatable with relation to the shaft of said feed device and geared to said band-cutter, a member connected with  
 45 said shaft through the medium of which the shaft is rotated, spring connection between said wheel and member, a friction-wheel, a friction-strap thereon connected with said first-named wheel and with said shaft-actuating member, and means for communicating motion from said friction-wheel to said  
 50 conveyer, for the purpose set forth.

3. The combination with a feed device having a crank-shaft, of a suitably-actuated wheel revoluble with relation to said crank-shaft, a friction-wheel adjacent thereto, a  
 60 member fixed to said crank-shaft, a spring yieldingly maintaining said first-named wheel and said member in a given relation, an endless sheaf-conveyer, and means for transmitting power from said friction-wheel to said  
 65 conveyer, for the purpose set forth.

4. The combination of an endless sheaf-conveyer, a crank-shaft equipped with oscillating feeding devices located above the rear portion of said conveyer; a wheel revoluble  
 70 on said crank-shaft, an actuating member fixed to said crank-shaft, spring connection between said wheel and said member, a friction-wheel adjacent to said member, a friction-strap passing about said friction-wheel and connected to said first-named wheel and  
 75 to said member, means for actuating said first-named wheel, and means for transmitting power from said friction-wheel to said conveyer, for the purpose set forth.

5. The combination of an endless conveyer, a crank-shaft equipped with oscillating feed devices located above the rear end of said conveyer, a rotary band-cutter in advance of said crank-shaft and equipped with  
 80 a speed-governor, a wheel journaled on said crank-shaft and geared to said speed-governor, yielding connection between said wheel and said crank-shaft, and a friction-clutch serving normally to transmit power from the crank-shaft to the endless conveyer and which  
 85 is automatically released to retard the conveyer when said feed devices encounter an overload abnormally increasing the torsional resistance at the crank-shaft, for the purpose set forth.

6. In mechanism of the character set forth, the combination with a feed device having a driving-shaft, and a sheaf-conveyer, of means for transmitting power from the feed device  
 100 to the sheaf-conveyer, comprising a suitably-actuated wheel revoluble with relation to the driving-shaft of the feed device, an actuating member for said driving-shaft yielding connection between said wheel and said member, a friction-wheel journaled on said driving-shaft, a friction-strap having its ends  
 105 connected with said wheel and said member, respectively, a sprocket-wheel connected with said friction-wheel, and a sprocket-chain through which power is transmitted from said sprocket-wheel to actuate the sheaf-conveyer, for the purpose set forth.

7. In mechanism of the character set forth, the combination with an endless sheaf-conveyer, and a crank-shaft equipped with a plurality of feed devices operating above the rear portion of said conveyer, of a sprocket-wheel revoluble with relation to said crank-shaft, a member fixed to said crank-shaft and located at the inner side of the hub thereof,  
 120 a friction-wheel located at the inner side of said member, spring connection between said sprocket-wheel and said member, a friction-strap upon said friction-wheel and having its ends connected respectively with said sprocket-wheel and said member, and a wheel fixed to revolve with said friction-wheel and serving to transmit power to the conveyer, for the purpose set forth.

8. The combination of an endless sheaf- 130



conveyer having a driving-shaft equipped with a spur-gear, a stub-shaft equipped with a spur-gear meshing therewith and with a sprocket-wheel for actuating said second-  
5 named spur-gear, a crank-shaft equipped with a plurality of feed devices and having journaled thereon a sprocket-wheel geared to said first-named sprocket-wheel and a friction-wheel serving to actuate said second-  
10 named sprocket-wheel, an actuating member for said crank-shaft fixed to the crank-shaft, a sprocket-wheel on the crank-shaft adjacent to said member, spring connection between said third-named sprocket-wheel and  
15 said member, and a sprocket-chain through the medium of which said third-named

sprocket-wheel is actuated, for the purpose set forth.

9. In feeding and band-cutting mechanism, the combination with a rotary band-cutter equipped with a plurality of suitably-spaced knives, of a guard comprising a suitable cross-bar and shoes depending therefrom between the knives, each shoe comprising a member provided with oblique flanges and an  
25 expanding member confined between said flanges and adjustable with relation thereto, for the purpose set forth.

FREDERICK S. RICH.

In presence of—

A. A. VAN DORSTEN,

PRIMUS PHILIPPI.