No. 785,496. PATENTED MAR. 21, 1905.

J. JIRSA.

SELF FEEDER FOR THRESHING MACHINES.

APPLICATION FILED MAR. 24, 1904.

3 SHEETS—SHEET 1.

Fig. 1.

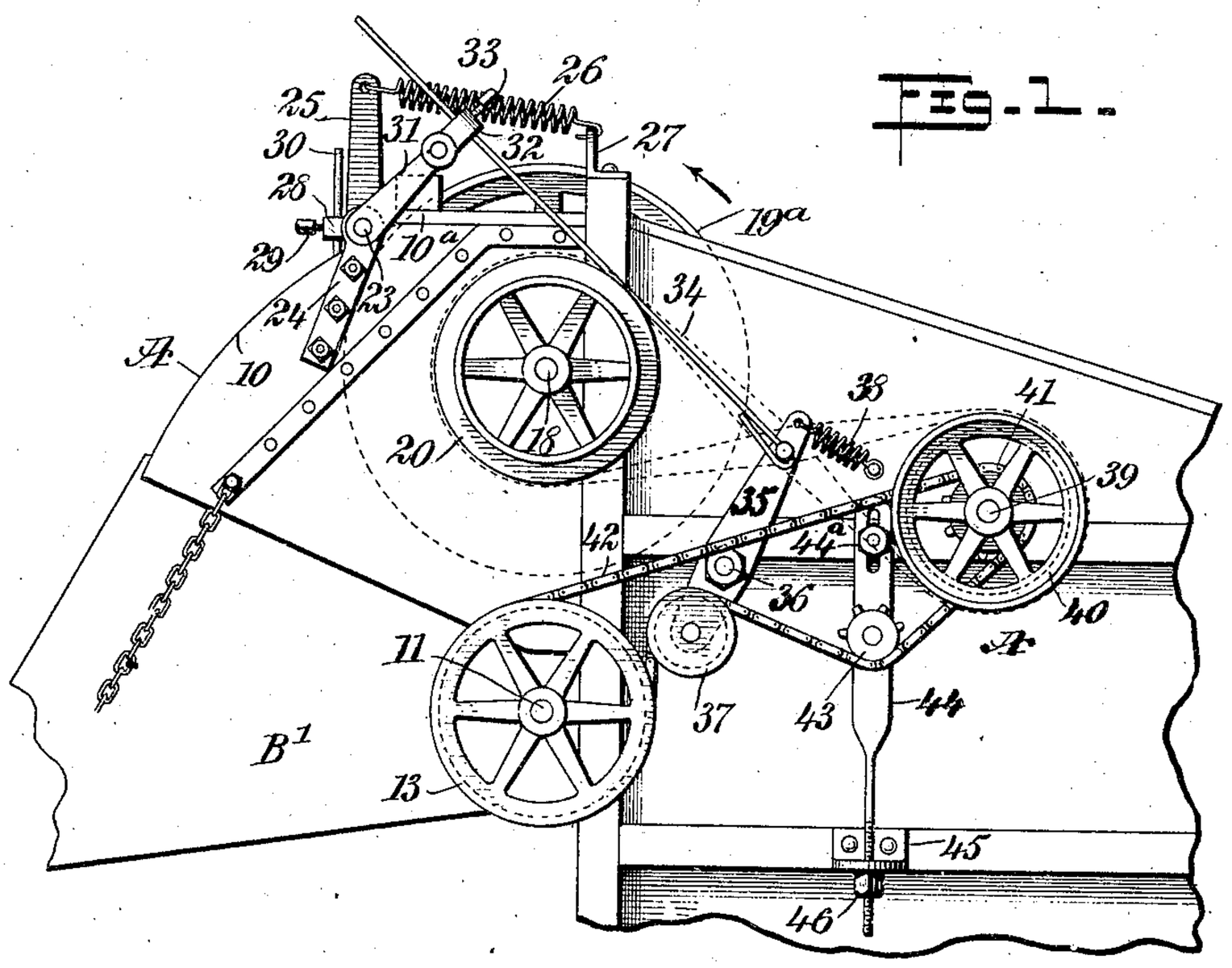
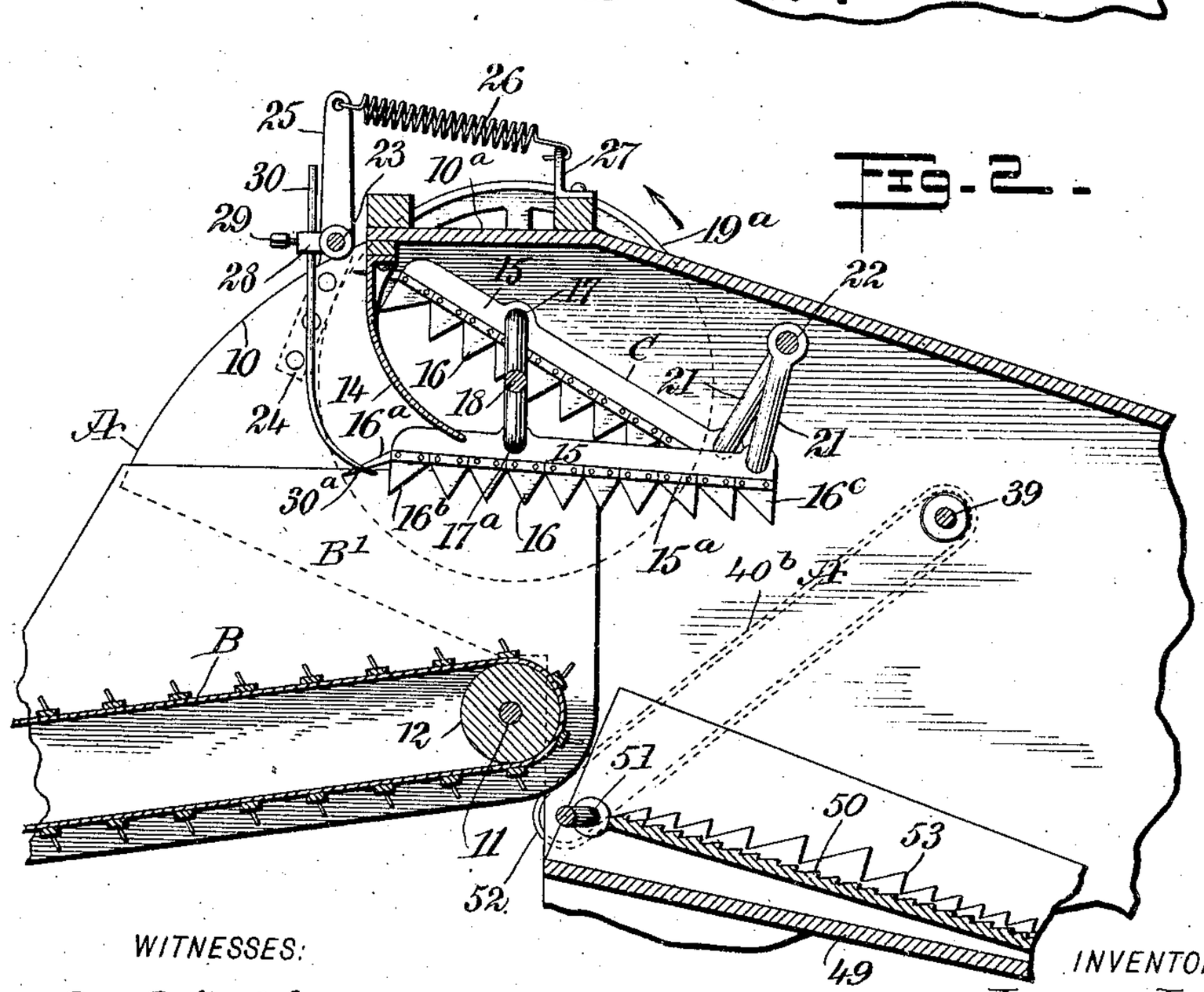


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

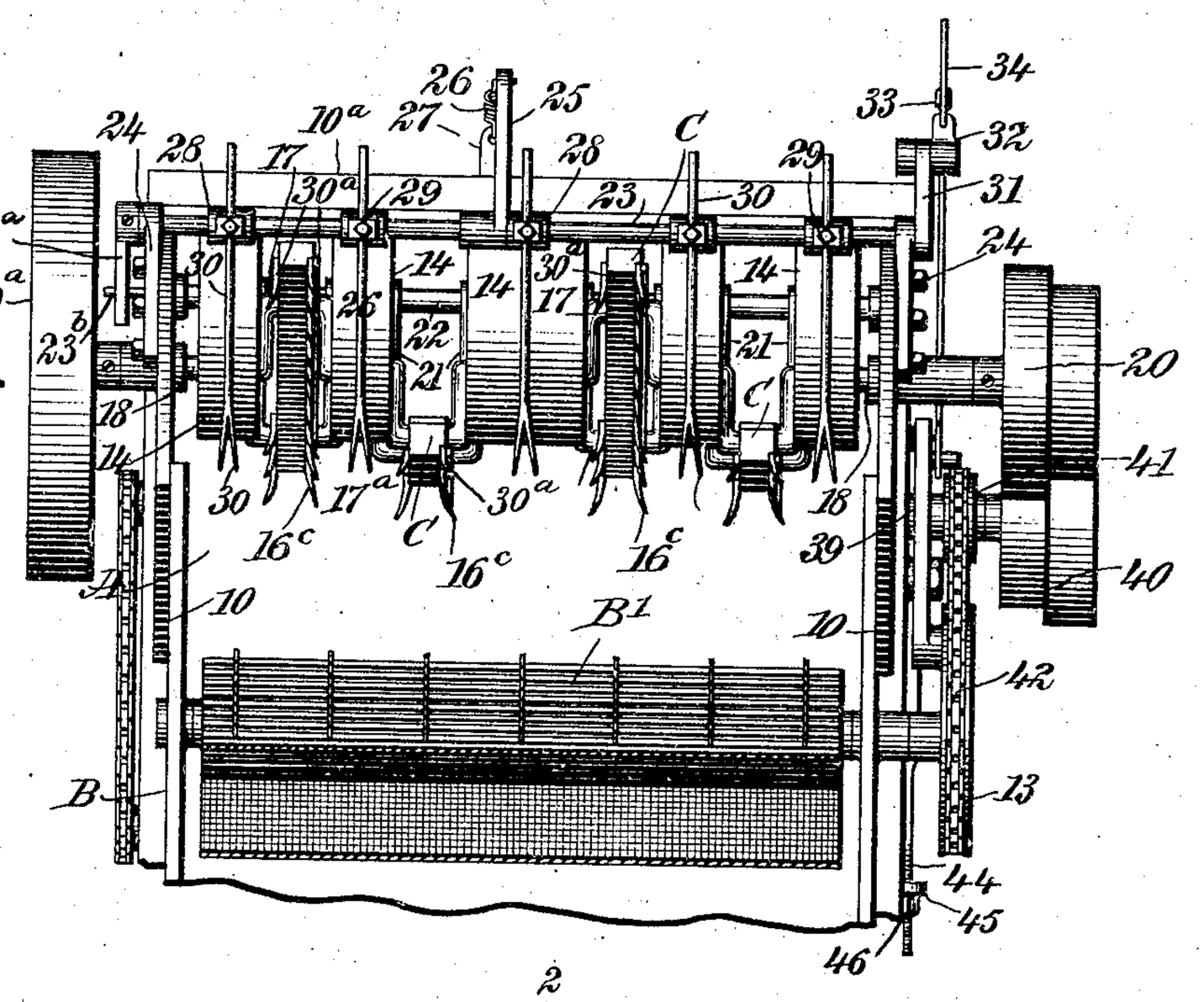
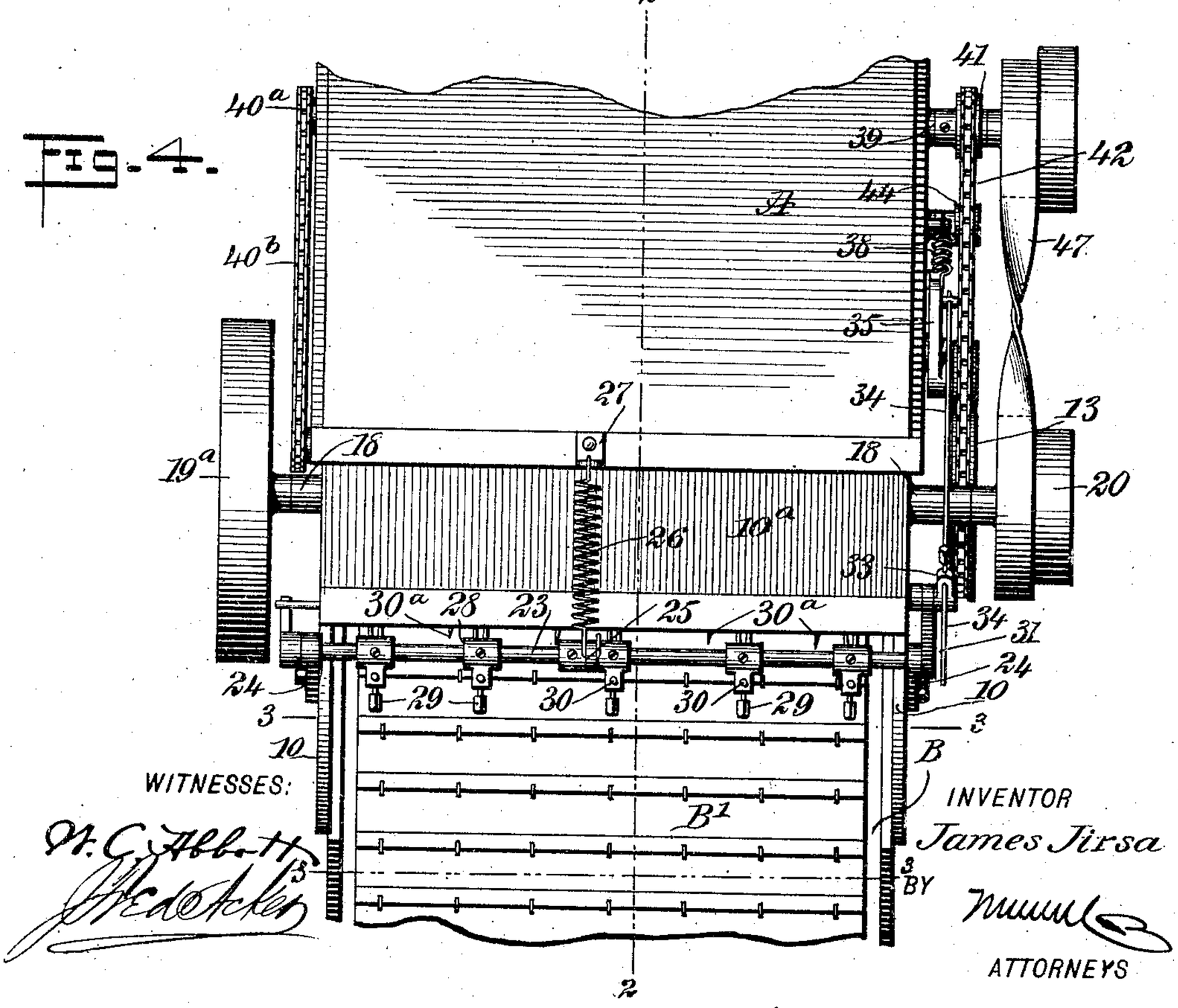


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

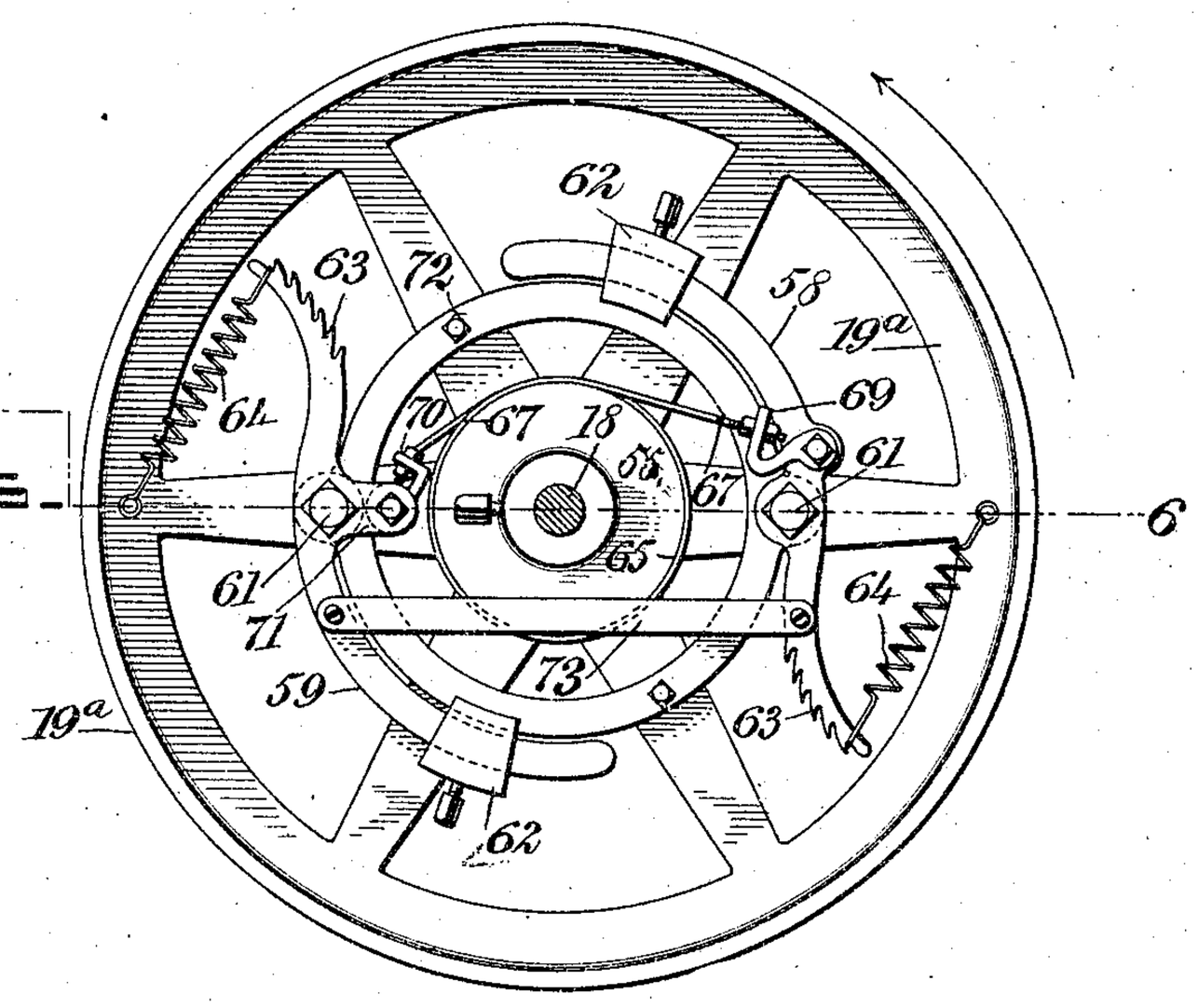


Fig. 6.

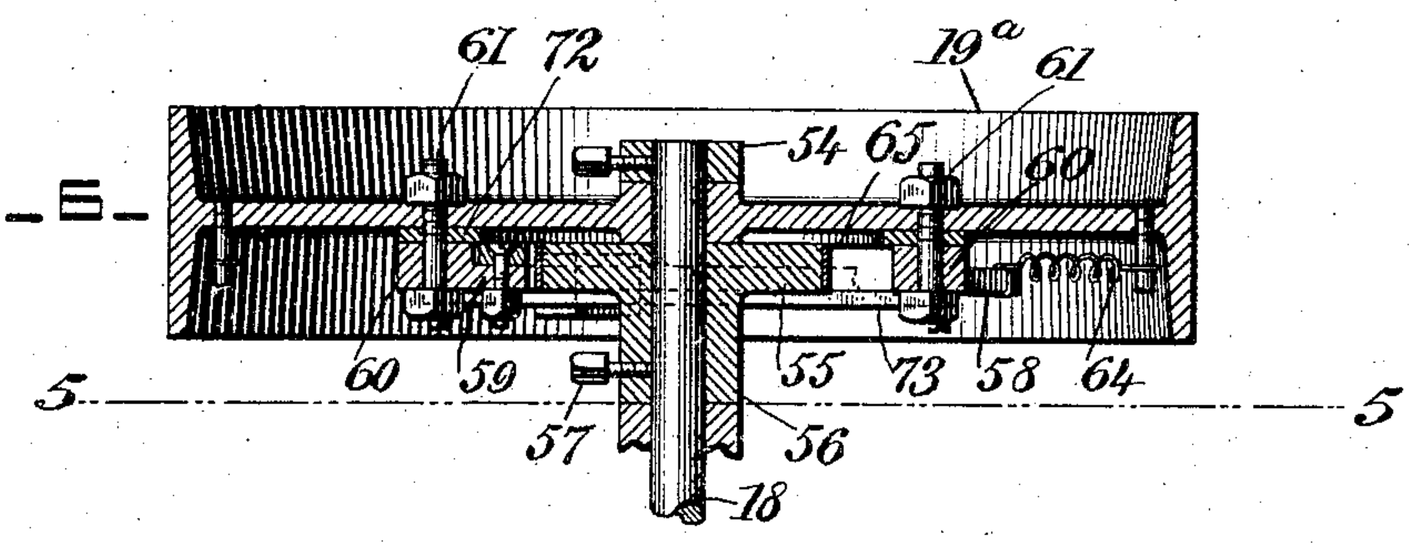
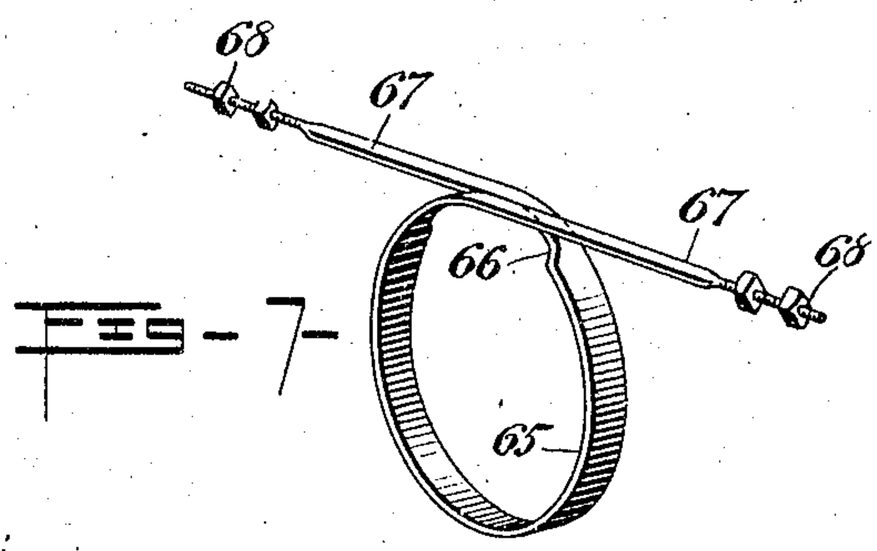


Fig. 7.



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No. 785,496. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

JAMES JIRSA, OF DORCHESTER, NEBRASKA.

SELF-FEEDER FOR THRESHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 785,496, dated March 21, 1905.

Application filed March 24, 1904. Serial No. 199,684.

To all whom it may concern:

Be it known that I, JAMES JIRSA, a citizen of the United States, and a resident of Dorchester, in the county of Saline and State of Nebraska, have invented a new and Improved Self-Feeder for Threshing-Machines, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide a simple, durable, and economic self-feeder for threshing-machines so constructed that when a surplus of straw is fed to the band-cutters by the bundle-carrier the band-cutters will continue to act upon the bundles, but the motion of the bundle-carriers will be automatically stopped until the normal amount of straw is at the entrance to the machine and in position to be delivered to the concave and cylinder, at which time the driving mechanism for the bundle-carrier will again and automatically act to set the bundle-carrier in motion, and so prevent clogging and ineffective work where the bundle-carrier connects with the body of the threshing-machine.

Another purpose of the invention is to so construct the controlling mechanism that it can be operated by hand and, furthermore, to so construct the entire feeding attachment that there will be practically no unnecessary expenditure of power and, further, in fact, to provide an automatically-operating governor for the feed mechanism which will not fail to act.

Another purpose of the invention is to so construct the attachment that it will comprise comparatively few parts, all of which are of great strength and when grouped for operation require little attention.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the receiving end of a threshing-machine and a side elevation of the self-feeding attachment. Fig. 2 is a vertical central longitudinal section through the interior of the main parts shown in Fig. 1, the section being taken substantially on the line 2 2 of Fig. 4. Fig. 3 is a transverse section taken practically on the line 3 3 of Fig. 4. Fig. 4 is a plan view of the parts shown in the other views. Fig. 5 is a side elevation of the driving-pulley for the band-cutting device and the clutch for the same, the driving-shaft being in section, taken on the line 5 5 of Fig. 6. Fig. 6 is a section taken practically on the line 6 6 of Fig. 5, and Fig. 7 is a perspective view of the band-brake for the clutch mechanism.

A represents the receiving end of the threshing-machine, or that end in which the concave and cylinder are located and where the conveyer B of the bundle-carrier B′ connects with the interior of the threshing-machine. The body or frame A of the threshing-machine at its receiving end is provided with a horizontal top section 10^a, which extends over the delivery end of the conveyer of the bundle-carrier, and to the ends of this top section 10^a the usual side sections 10 are secured.

The delivery end of the conveyer B of the bundle-carrier is mounted to turn, as usual, with a drum 12, mounted on a shaft 11, journaled in the sides of the bundle-carrier, and, as shown in Fig. 1, at one end of the shaft 11 a wheel 13 is secured, which wheel is a friction-wheel, and therefore is not provided with peripheral teeth.

At the upper portion of the body A of the threshing-machine a series of shields 14 are arranged, the shields being at desired distances apart, and the said shields are curved downwardly and in direction of the interior of the threshing-machine, as is best shown in Fig. 2.

Band-cutters C operate with a rotary reciprocating movement in the spaces between the shields 14, and in their downward action the said band-cutters extend out beyond the said shields, as is also illustrated in Fig. 2. The body portions of these band-cutters may be of any suitable or approved formation. As shown, they consist of body-bars 15, having sickle-teeth 16 attached between their ends, and the teeth 16 extend downward or are vertically located with respect to the said body-bars, and the said sickle-teeth are of

triangular formation. The body-bars of the band-cutters C are pivotally connected between their centers and their outer ends with oppositely-extending crank-arms 17 and 17ª, formed upon a band-cutter shaft 18, which band-cutter shaft extends through the sides of the threshing-machine at that portion which is over its straw-receiving opening, so that as the crank-shaft 18 is revolved alternate band-cutters will have a downward and outward throw and the other band-cutters an upward and inward throw, as is indicated in Fig. 2.

Side strips 15ª are attached to the body-bars 15 of the band-cutting devices, and downwardly and forwardly hooked extensions 16ª are located at the forward ends of the said strips. These hooked extensions will not allow the bundles to crawl forward should they pile up when presented to the band-cutters. Teeth 16ᵇ are located at each side of each body-bar 15 at its forward end, extending downwardly therefrom, and these teeth 16ᵇ have straight forward edges and inclined rear edges, as is shown in Fig. 2. The teeth 16ᵇ prevent the grain from being drawn inward when the carrier is stopped by the action of the governing-forks 30, to be hereinafter described. The intermediate or sickle teeth 16 are those teeth which act upon the bands of the bundles to sever the same, and preferably three inner teeth 16ᶜ extend down from the straps 15ª of each body-section of the band-cutting device, and the inner or rear edges of these teeth 16ᶜ are straight, and their forward edges are upwardly inclined. These teeth 16ᶜ I denominate "kickers," as they serve to force the released grain into the machine, forcing the said grain to the concave and cylinder of the machine. These kickers 16ᶜ will cause the top of the grain to pass to the cylinder much faster than the feed of the hopper-bottom 50, to be hereinafter described, as the latter works with a short stroke, and this hopper-bottom is provided with fish-back teeth, as will also be hereinafter particularly set forth.

A power-pulley 19ª is located at one end of the band-cutter shaft 18, as is shown in Figs. 3 and 4, and at the opposite end of the said band-cutter shaft a driven cone-pulley 20 is attached. The inner ends of the band-cutters C are supported by hangers 21 of any suitable or approved construction, metal or wood, pivoted to the band-cutters and mounted to turn on a fixed shaft 22, suitably located in the upper portion of the body A of the threshing-machine. The power or driving pulley 19ª is provided with a clutch mechanism, which is shown in Figs. 5, 6, and 7, and this clutch mechanism is provided in order that when the machine is started the band-cutting mechanism will not be set in motion until the driving mechanism has attained its full speed. This clutch mechanism is further provided so that when the power is turned off the band-cutting shaft will almost immediately stop its motion. The pulley 19ª is loosely mounted on the band-cutter shaft 18, being held from slipping therefrom by a suitable collar 54. A disk 55 is located within the said pulley 19ª adjacent to the web thereof, and this disk is provided with a hub 56, secured to the band-cutting shaft 18 by means of a set-screw 57. Opposing brake-levers 58 and 59, provided near their central portions with collars 60, are pivoted to the web of the driving-pulley 19ª by means of suitable bolts 61 or their equivalents, and opposite end portions of the said levers 58 and 59 are concentric with the disk 55. At these ends of the said levers weights 62 are adjustably secured. The opposite ends of the levers 58 and 59 are outwardly curved in opposite directions, and these outwardly-curved ends are provided with teeth 63, and at any one tooth 63 a spring 64 is secured to the levers 58 and 59, the said springs being attached to the marginal portion of the web of the pulley 19ª, as is best shown in Fig. 5. In connection with the disk 55 a strap-brake 65 is employed. This strap-brake is adapted to encircle the marginal portion of the disk 55 and to engage with the said marginal portion, and the body portion of the strap-brake 65 is provided with a recess 66, so that the terminals 67 of the said strap-brake may pass one in front of the other in diametrically opposite directions, having at their point of crossing a contact no wider than the width of the body portion of the strap-brake. The ends of the terminals of the strap-brake 65 are threaded to receive nuts 68, and the threaded end of one terminal 67 is passed through a hook attachment 69, secured to the brake-lever 58 at a point between its weighted end and its fulcrum adjacent to the latter, as is shown in Fig. 5, while the opposite terminal 67 of the said strap-brake is attached to an angular extension 70, which is secured to the inward extension 71 from the pivotal portion of the brake-lever 59. In order that the said levers may be properly attached to the said pulley 19ª and in order to strengthen the said pulley 19ª where the said brake-levers are applied, a metal ring washer 72 is secured to one face of the web portion of the said pulley. Under this construction of a driving-pulley it is obvious that the pulley will not be affected by the driving-belt until the belt shall have had such influence on the pulley as to force the weighted ends of the brake-levers 58 and 59 outward against the tension of the springs 64, and thus bring the strap-brake 65 in close and binding frictional engagement with the disk 55, secured on the shaft 18, and at such time only will the said band-cutter shaft 18 be revolved. When the speed is lessened beyond a normal degree, the weights 62 will act to bring the ends of the levers 58 and 59, carrying such weights, toward the center of the pulley, and thus relieve the brake-band 65 from frictional contact with the disk 56, and

the pulley 19ª at such time will turn loosely on the band-cutter shaft 18, the latter remaining idle. In order that the two brake-levers 58 and 59 shall act in unison, a cross-bar 73 is pivoted to the lever 59 between its pivot-point and its weight and is pivoted also to the opposing lever 58 between its pivot-point and its notched end, or that end to which the spring 64 is attached.

A shaft 23 is held to rock in bearings 24, extending up from the side shields 10 at the outer end of the top section 10ª of the body of the threshing-machine. An arm 25 extends normally upward from the central portion of the rock-shaft 23, and one end of a spring 26 is attached to this crank-arm, and the other end is secured to a bracket 27, located at the upper or roof portion of the threshing-machine. The said rock-shaft 23 is further provided with series of rigid collars 28, each collar having a set-screw 29 attaching the same, and these collars are located opposite the curved shields 14 at the front of the threshing-machine body. These collars are adapted to receive the shanks of what I term "governing-forks" 30, the shanks of the governing-forks being straight to a point near their lower ends, where the said shanks are inwardly curved and are bifurcated, as is shown in Fig. 3. When a superabundance of bundles is at the delivery end of the bundle-carrier or sufficient to possibly choke the machine, the bundles will engage with the inwardly-curved bifurcated ends of the governing-forks and will force the said bifurcated ends inward and upward, thus rocking the shaft 23, so as to place the springs 26 under tension. This action, as will be hereinafter described, causes the motion of the conveyer of the bundle-carrier to be stopped, and said motion is not resumed until the normal number of bundles is located at the receiving end of the threshing-machine. At such time the forks are relieved from pressure and return to their normal position, likewise the shaft 23, and the driving mechanism for the conveyer B is then again automatically set in motion. This action just referred to is accomplished in substantially the following manner: An arm 23ª extends down from the left-hand end of the shaft 23, adapted to engage with a stop 23ᵇ on the frame, and such engagement takes place when the pressure on the governing-forks 30 is relieved, so as to prevent the said forks at such time from moving too far forward. An arm 31 is secured to one end of the rock-shaft 23, and this arm is provided with a pivotally-secured loop extension 32, carrying a set-screw 33. A rod 34 is passed through this loop extension of the crank-arm 31 and is adjustably held in position by the aforesaid set-screw 33. The rod 34 extends downward and rearward at one side of the body of the threshing-machine, being attached at its lower end to the upper portion of a lever 35, fulcrumed between its ends on a stud 36, located on the side of the threshing-machine, as is shown in Fig. 1, and at the lower end of the said lever 35 a belt-tightener 37 is located in the form of a smooth-faced pulley. A spring 38 is attached to the upper end of the lever 35 and to a point on the threshing-machine to the rear of the lever, as is also shown in Fig. 1, which spring 38 is adapted to hold the lever 35 in normal position. The spring 38 is placed under tension only when the spring 26, connected with the rock-shaft 23, is also under tension, at which time the belt-tightener 37 is moved rearward.

A shaft 39 extends through the threshing-machine at a point to the rear of the band-cutting mechanism. A sprocket-wheel 40ª is mounted on one end of the shaft and stepped pulley 40 is mounted upon the opposite end of the shaft, having a connected sprocket-wheel 41, and a belt 42, preferably a chain-belt, is passed over the sprocket-wheel 41, over the belt-tightener 37, and around the friction-wheel 13, connected with the driving-shaft of the conveyer B. As long as the belt-tightener 37 is in its normal position the belt 42 is held in such frictional engagement with the friction driving-wheel 13 as to turn said wheel as the chain belt 42 is moved; but when the belt-tightener 37 is carried rearward the belt 42 is loosened, and consequently the said belt will simply slip over the friction driving-wheel 13 and will not turn the same, consequently stopping the motion of the conveyer B. The chain belt 42 is adjustable with relation to the belt-tightener 37 by means of an adjusting toothed pinion 43, mounted to turn on a rod or plate 44, having sliding engagement 44ª at its upper end with the body of the threshing-machine, and the lower end of this rod or plate is threaded to pass through an apertured bracket 45, also located on the body of the threshing-machine. The rod or plate 44 is adjustable up or down through the medium of a controlling-nut 46, located on the threaded portion of the rod and engaging with the said bracket 45, as is best shown in Fig. 1. A cross-belt 47 is carried from the driven cone-pulley 20 to the cone-pulley 40, whereby the chain belt 42 is set in motion through the movement of the driving crank-shaft 18.

In operation should a large quantity of bundles accumulate at the delivery end of the conveyer B the uppermost bundles will press the governing-forks 30 inward and upward, rocking the shaft 23 and placing the springs 26 and 38 under tension, and through the medium of the rod 34 the lever 35, at its lower end, is carried rearward, thus also carrying the belt-tightener 37 from tightening connection with the belt 42, and, as has been stated, at this time the belt 42 is loosened to such an extent that it will have no driving influence on the wheel 13, but will simply slide over the same. When this action takes place, the

motion of the conveyer-belt is stopped; but the motion of the band-cutters continues, so that the band-cutters act upon the uppermost bundles and cut the band and draw the straw to the concave and cylinder. After the jam has been relieved the governing-forks return to their normal position, likewise the springs 26 and 38, and as the shaft 23 is rocked the connecting-rod 34 brings the lever 35 to its normal position, causing the belt-tightener 37 to again tighten the belt 42, bringing it in driving relation to the pulley 13, whereupon the conveyer B is again set in motion.

A feed-board 49 is located below and in front of the conveyer B, which is attached to the machine in any approved manner so that it may be dropped to gain access to the cylinder and concave, and in this feed-board a hopper-bottom 50 is held to reciprocate, being actuated by a crank-shaft 51, having a sprocket-wheel 52 secured thereon, driven from a chain belt 40^b, which passes from the sprocket-wheel 40^a on the shaft 39. This hopper-bottom is provided with fish-back teeth 53, increasing in height from the receiving end to the center and decreasing in height from the center to the delivery end, so as to obtain a perceptible retarding action on the under portion of the grain, and the grain passes from the hopper-bottom over the usual feed-board to the cylinder of the machine. The feed-board 49 shown acts in conjunction with the usual feed-board and serves to prevent the loss of any of the grain.

It will be observed that the governing-forks 30 are adjustable, so that they may be used with grain of different kinds, and as the forks are inwardly curved at their lower ends they do not interfere with the feeding of the straw, and their bifurcated lower portions form a wide bearing for engagement with the bundles when the forks are to be brought into action.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a self-feeder for threshing-machines, a frame, a bundle-carrier, a friction-wheel, and a sprocket-wheel mounted on said frame, means for continuously driving said sprocket-wheel, a sprocket-chain passing around said wheels, a pulley over the face whereof said chain passes, governor-forks mounted on said frame and projecting toward said bundle-carrier, means actuated by said forks for displacing said pulley, and means for driving said bundle-carrier.

2. In a self-feeder for threshing-machines, a frame, a bundle-carrier mounted thereon, band-cutters coöperating with said carrier, a sprocket-wheel, a friction-wheel, a sprocket-chain passing around said wheels, a pulley disposed normally against said chain, a lever carrying said pulley and holding the face thereof against said chain, governor-forks mounted on said frame and projecting toward said bundle-carrier, and a connection between said governor-forks and said lever controlling said lever.

3. In a self-feeder for threshing-machines, a bundle-carrier, a friction-wheel connected with the driving-shaft of the bundle-carrier, a spring-controlled rock-shaft supported above the bundle-carrier, governing-forks extending from the rock-shaft in direction of the bundle-carrier, a driven shaft, means for driving the said shaft, a belt operated from the driven shaft, being in frictional engagement with the driving-wheel for the conveyer, a spring-controlled lever, a crank-arm extending from one end of the rock-shaft, a connection between the said crank-arm and the spring-controlled portion of the said lever, and a belt-tightener carried by the said lever, adapted for engagement with the said belt, the said rock-shaft when moving in one direction operating to carry the belt-tightener from engagement with the belt, and when acting in an opposite direction serving to bring the belt-tightener in tightening relation to the belt, substantially as described.

4. In a self-feeder for threshing-machines, a bundle-carrier, a friction-wheel connected with the driving-shaft of the bundle-carrier, a spring-controlled rock-shaft supported above the bundle-carrier, governing-forks extending from the rock-shaft in direction of the bundle-carrier, a driven shaft, means for driving the said shaft, a belt operated from the driven shaft, being in frictional engagement with the driving-wheel for the conveyer, a spring-controlled lever, a crank-arm extending from one end of the rock-shaft, a connection between the said crank-arm and the spring-controlled portion of the said lever, a belt-tightener carried by the said lever, adapted for engagement with the said belt, the said rock-shaft when moving in one direction operating to carry the belt-tightener from engagement with the belt, and when operating in an opposite direction serving to bring the belt-tightener in tightening relation to the belt, band-cutters, a drive-shaft on which the band-cutters are mounted, and a connection between the drive-shaft and the driven shaft, operating the belt controlling the operation of the conveyer, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES JIRSA.

Witnesses:
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