No. 779,855. PATENTED JAN. 10, 1905.

E. P. KILLINGER.

AUTOMATIC FEEDING MECHANISM FOR THRESHING MACHINES.

APPLICATION FILED JUNE 6, 1904.

2 SHEETS—SHEET 1.

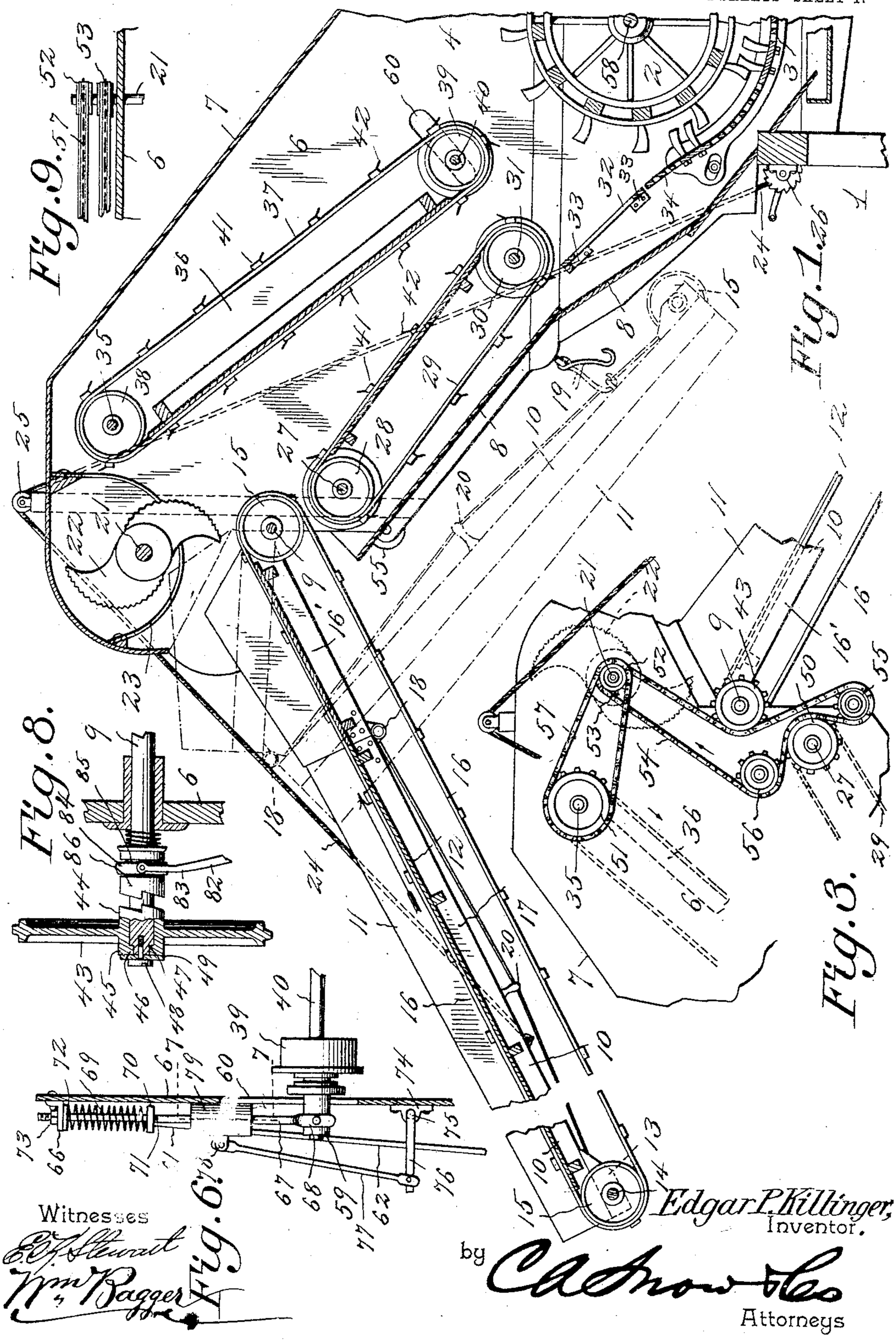

Fig. 1.

Fig. 6.

Fig. 8.

Fig. 3.

Witnesses
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2 SHEETS—SHEET 2.

Fig. 1.

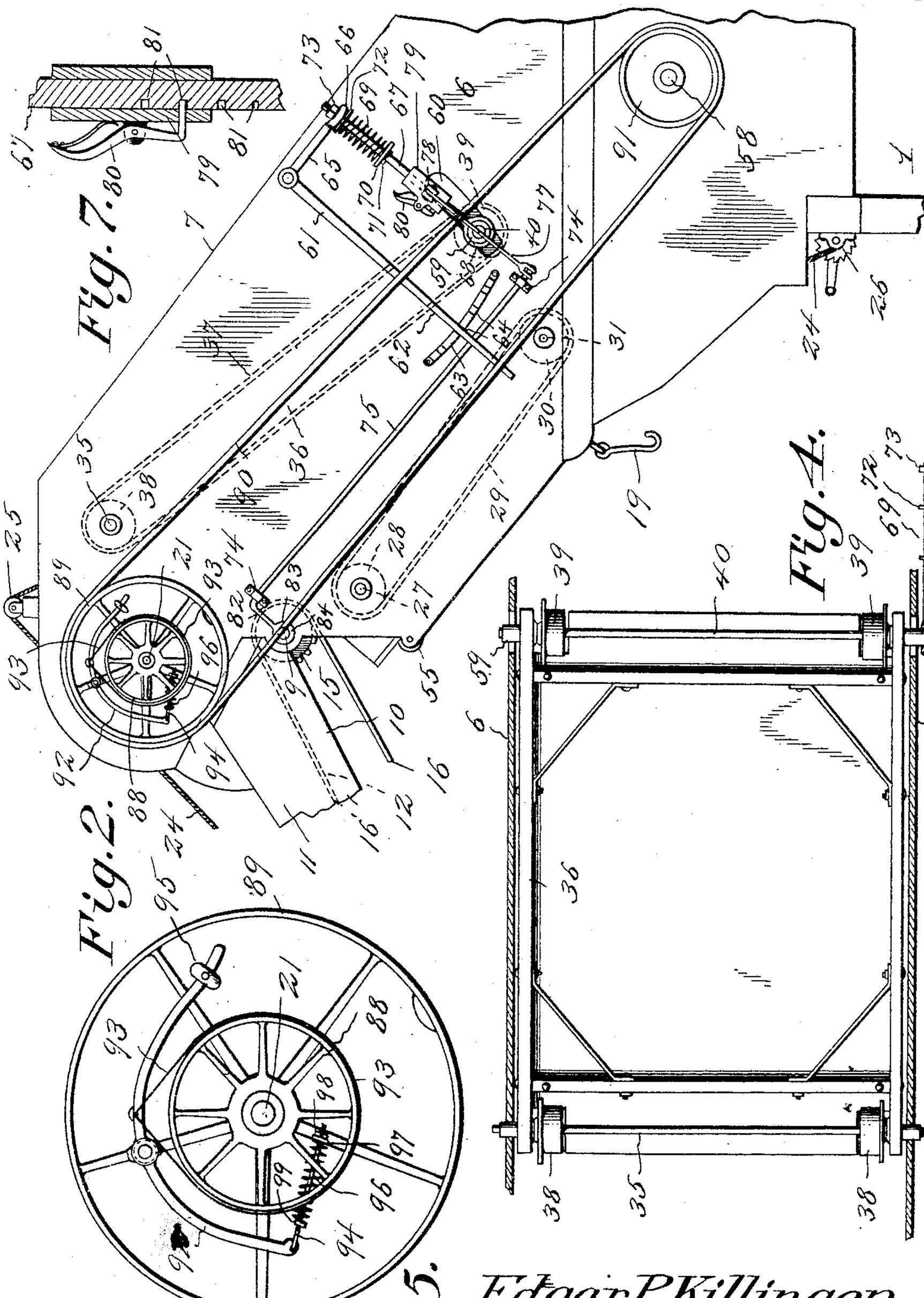

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses

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No. 779,855. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

EDGAR P. KILLINGER, OF SEVENMILE FORD, VIRGINIA.

AUTOMATIC FEEDING MECHANISM FOR THRESHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 779,855, dated January 10, 1905.

Application filed June 6, 1904. Serial No. 211,331.

To all whom it may concern:

Be it known that I, EDGAR P. KILLINGER, a citizen of the United States, residing at Sevenmile Ford, in the county of Smyth and State of Virginia, have invented a new and useful Automatic Feeding Mechanism for Threshing-Machines, of which the following is a specification.

This invention relates to feeding mechanism for threshing-machines and grain-separators; and it has for its object to provide a device of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency, in which the full capacity of the feed mechanism shall not be developed until the cylinder of the threshing-machine has attained its full speed, thereby enabling it to handle all the material fed thereto, and in which overfeeding shall be rendered impossible by the instantaneous and automatic throwing out of gear of the direct-feed mechanism as soon as the latter becomes clogged or choked.

With these and other ends in view the invention consists in the improved construction and novel combination and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to all changes, alterations, and modifications which may be resorted to within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a longitudinal vertical sectional view of a threshing-machine feeding mechanism constructed in accordance with the principles of the invention. Fig. 2 is a side elevation of the same. Fig. 3 is a detail side elevation seen from the opposite side. Fig. 4 is a detail plan view of the frame of the movable feeder-carrier, showing also, in section, a portion of the sides of the feeder-casing. Fig. 5 is a detail side view of the frictional speed-governing device. Fig. 6 is a sectional view taken through one side of the feeder-casing, showing in elevation a portion of the free end of the movable feeder-carrier and related parts. Fig. 7 is a sectional detail view taken on the line 7 7 in Fig. 6. Fig. 8 is a sectional detail view taken through the shaft at the upper end of the bundle-carrier and illustrating the clutch mechanism whereby the latter may be thrown into and out of gear. Fig. 9 is a detail plan view showing one end of the band-cutter-carrying shaft and the means for transmitting motion from said shaft to the bundle-carrier and to one of the feed-carriers.

Corresponding parts in the several figures are indicated by similar numerals of reference.

For purposes of illustration my invention has been shown as applied to a threshing-machine, of which 1 designates the front truck. 2 is the cylinder, and 3 the concave, both of which are located in the feed-throat 4 of the machine.

My improved feeding mechanism includes in the construction thereof a casing 5, which is to be suitably connected with the throat of the threshing-machine or separator with which it is to be used. The casing 5 comprises mainly side pieces 6 6, a deck 7, and bottom boards 8 8, which latter are fitted between the side pieces 6 6 and are made removable in order that the interior of the casing may be conveniently accessible. The removable bottom boards 8 8 overlap each other, as shown, and the lowermost bottom board is so disposed as to discharge into the grain-pan of the threshing-machine.

A shaft 9, journaled in suitable boxes in the sides of the feeder-casing, supports the frame 10 of the bundle-carrier, said frame including side pieces 11 and a sheet-iron bottom-plate 12. The side pieces of the frame are provided near their outer ends with bearings 13 for a transverse shaft 14, upon which and upon the shaft 9 are mounted pulleys 15, supporting the endless carrier 16, which may be of any suitable description. When the endless carrier is composed of a webbing of canvas or other similar material, the sheet-iron bottom 12 of the carrier-frame may be dispensed

with, and I desire it to be understood that the same applies to the construction of other carriers which form parts of my invention and which are to be hereinafter described.

The carrier-frame 10 is for convenience constructed in two separate parts—namely, the upper or inner member 16′ and the lower or outer member 17, which are suitably connected by means of a hinge 18, whereby the lower member when the machine is not in use may be folded to the position indicated in dotted lines, where it may be secured by means of a hook 19 or other suitable means. This position will also be assumed when the machine to which my improved feeding device is attached is transported from one place to another. The outer member 17 of the bundle-carrier may be strengthened or reinforced by means of a truss, which has been shown at 20.

The sides 6 of the feeder-casing are provided at a suitable distance above the end of the bundle-carrier with bearings for a transverse shaft 21, carrying a plurality of suitably constructed and arranged band-cutters 22, between which guards 23 are to be interposed in order to prevent straw from becoming wrapped upon the shaft. These band-cutters have been shown as provided with curved and serrated cutting edges, which, said band-cutters being properly spaced apart from the shaft, will engage and cut the bands of the sheaves that are being fed to the machine. These band-cutters will also serve to spread or scatter the straw upon the endless carrier of the bundle-elevator. It should be stated that the free end of the latter is capable of vertical adjustment by means of a rope or flexible member 24, suitably connected with the outer section of said bundle-carrier and guided over a suitably-disposed guide-pulley 25 to a windlass 26, with the drum of which it is suitably connected. It is obvious that by this simple mechanism the free or receiving end of the bundle-carrier may be very easily and quickly adjusted to a convenient position for receiving the sheaves or bundles placed thereon.

A short distance below the upper or discharge end of the bundle-carrier the side pieces of the feeder-frame are provided with bearings for a shaft 27, provided with pulleys 28, supporting the upper end of an endless carrier 29, the lower end of which is supported by pulleys 30 upon a shaft 31, which is likewise journaled in the sides of the feeder-casing. The lower extremity of this endless carrier is to be suitably spaced from the cylinder of the threshing-machine to enable the material passing over said carrier to be taken hold of by the teeth of the cylinder and carried under the latter in engagement with the concave. For the purpose of assisting in the proper guidance of the material that is to be operated upon by the cylinder a grate 32, supported removably upon cleats 33, extends from the lower end of the carrier 29 to the feed-board proper, 34, at the front edge of the concave. It is obvious that this grate will serve to guide all the material in the direction of the proper inlet between the cylinder and concave with the exception of loose kernels of grain which may escape between the bars of said grate and drop onto the removable bottom boards 8, whereby such grain will be conducted directly to the grain-pan of the threshing-machine.

A short distance in rear of and above the horizontal plane of the shaft 21, carrying the band-cutters, the frame of the feeder is provided with bearings for a shaft 35, which pivotally supports the frame 36 of an endless carrier 37, which is mounted upon pulleys 38, secured upon said shaft 35 and upon pulleys 39 on a shaft 40 at the lower free end of the carrier-frame 36. The carriers 29 and 37 are each provided with transverse slats 41, which are provided with inclined teeth 42, the latter being so disposed as to face forwardly upon the active or operating leads of the two carriers, thereby causing the said teeth to serve for the purpose of retarding the straw, which being laid hold of by the threshing-cylinder is pulled by the action of the latter from between the discharge ends of the two carriers. The object of this will be readily understood. It is obvious that the active leads of the two carriers 29 and 37 convey the material which is to be operated upon in the direction of the cylinder. The cylinder is rotated at a rate of speed greatly exceeding that of the carriers. Hence the material which is to be operated upon will be drawn forcibly by the action of the cylinder from between the carriers and but for the presence of the retarding-fingers might be torn out in bunches which would be too large for the immediate capacity of the cylinder. By the construction which has been herein described the material to be threshed will be fed evenly and will be spread out thinly as it is being fed to the cylinder, which will thereby be enabled to operate in the most efficient and satisfactory manner.

Means are provided for the purpose of throwing the bundle-carrier out of operation when the space between the carriers 29 and 37 becomes overcrowded to an extent which shall cause the free end of the carrier-frame 36 to be elevated from its normal position. This mechanism I shall now proceed to describe.

Loosely mounted upon one end of the shaft 9, which supports the upper end of the bundle-carrier and by which said carrier is driven, is a sprocket-wheel 43, having upon its inner face a clutch member 44. This sprocket-wheel is supported upon the shaft in such a manner as to be incapable of a sliding or axial movement upon the latter, this being in the present instance effected by providing the hub 45 of the sprocket-

wheel 43 with an annular flange 46, engaging a shoulder or offset 47 upon the end of the shaft, the sprocket-wheel being secured upon said shaft by means of a bolt 48, engaging a screw-threaded recess in the end of the shaft and a washer 49, interposed between the head of said bolt and the flange 46 of the hub. The sprocket-wheel 43, it will thus be seen, is capable of free rotation upon the shaft, but is secured against axial movement upon the latter. The shaft 27 of the carrier 29 and the shaft 35 of the carrier 37 are likewise provided with sprocket-wheels, (designated, respectively, 50 and 51,) which are fixedly connected with said shafts, which serve to drive the respective carriers. Suitably mounted upon the shaft 21 are a pair of sprocket-wheels, (designated, respectively, 52 and 53.) Over one of these sprocket-wheels passes a chain 54, which is guided over the sprocket-wheel 43 upon the head or shaft of the bundle-carrier, thence over an idler 55, thence over the sprocket-wheel 50 upon the shaft 27 of the lower feed-carrier, thence over an idler 56, and finally back over the sprocket-wheel 52, from which motion is thus transmitted to the bundle-carrier when the latter is in operation and to the lower feed-earrier. Another chain, 57, connects the sprocket-wheel 53 upon the band-cutter shaft with the sprocket-wheel 51 upon the shaft 35 of the upper feed-carrier, which is thereby operated in the proper direction. The shaft 21, carrying the band-cutters, receives motion direct from the shaft 58 of the threshing-cylinder 2 by means to be hereinafter described.

The shaft 40, which supports the lower end of the endless carrier 37, is provided with boxings 59, which extend through slots 60 in the sides 6 of the feeder-casing, said slots being concentric with the shaft 35, as will be readily understood. The lower end of the carrier 37 may thus be adjusted at any desired distance from the discharge end of the carrier 29, and this adjustment may be effected by means of a bell-crank lever 61, fulcrumed upon the exterior of the feeder-casing and having its long arm 62 extended downwardly and in engagement with a quadrant 63, secured to the side of the feeder-casing and having a plurality of notches 64, with any one of which the lever-arm 62 may be retained in engagement by the resiliency inherent in itself or by any other suitable well-known and approved means. The short arm 65 of the bell-crank lever is provided near its free end with a slot or opening 66, through which extends a rod 67, having at its lower end an eye 68 engaging the adjacent boxing 59 of the shaft 40.

69 designates a spring which is coiled upon the rod 67 between a washer 70, which is supported upon said rod by means of a transverse pin or key 71, and a washer 72, which abuts upon the under side of the lever-arm 65. The upper end of the rod 67 is screw-threaded and is provided with a nut 73, which may be tightened down against the lever-arm, so as to regulate the tension of the spring.

Suitably journaled in brackets 74 upon the outer side of the feeder-casing is a rock-shaft 75, having at one end a laterally-extending arm 76, which is connected, by means of a link 77, with lugs 78 upon a sleeve 79, which is vertically adjustable upon the rod 67 by means of a spring-actuated lever or catch 80, connected with the sleeve and capable of engaging any one of a plurality of slots 81 in the rod 67. These slots, be it noted, should correspond in number with the notches 64 in the quadrant 63 and should, like said notches, be spaced equidistantly apart. The opposite end of the rock-shaft 75 is provided with an arm 82, having a bifurcated terminal 83, which is connected pivotally with a ring or collar 84, engaging an annular groove 85 in a clutch member 86, which is mounted slidably upon and rotatably with the driving-shaft 9 of the bundle-carrier. A suitably-disposed spring 87 serves to force the clutch member 86 in the direction of the sprocket-wheel 43, having the corresponding clutch member. It is obvious that when the slidable clutch member 86 is in engagement with the clutch member 44 upon the inner side of the sprocket-wheel 43 rotary motion imparted to the latter will be transmitted to the shaft 9 and through said shaft to the bundle-carrier. When the clutch members 86 and 44 are out of engagement, the wheel 43 will rotate freely on the shaft.

By manipulating the bell-crank lever 61 and adjusting the arm 62 of said lever in one of the notches 64 in the quadrant 63 the free end of the carrier-frame 36 may be raised or lowered, thus adjusting its free end at a greater or less distance from the discharge end of the carrier 29, and retaining the adjustable frame at the proper adjustment. The adjustment will be determined by the kind and condition of grain that is to be operated upon. If the straw is damp or if for any other reason it is desired to feed the material to the threshing mechanism slowly; the free end of the carrier-frame 37 will be adjusted close to the discharge end of the carrier 29. If the grain is in a good condition for threshing, the free end of the carrier-frame 36 will be elevated, thereby increasing the size of the discharge-opening between the carriers which serve to deliver the material to the threshing-machine. When the free end of the carrier 37 is thus adjusted, it becomes necessary at the same time to properly adjust the position of the sleeve 79 upon the spring-actuated rod 67 in order that the proper distance may be preserved between the engaging faces of the clutch members 86 and 44, as will be readily understood. Normally of course the said clutch members will be in engagement with each other. When the free end of the car-

rier is adjusted, however, in the manner just described, the rock-shaft whereby the position of the slidable clutch member 86 is controlled will be rocked in its bearings, thus tending to move the slidable clutch member either toward or away from the stationary clutch member. Inasmuch as movement in the one direction will be impossible and movement in the other direction would leave the clutch members in inoperative position, it is necessary that the independent adjustment of the rock-shaft in the manner described be provided for, in order that, as stated, the proper distance may be preserved between the engaging faces of the clutch members 89 and 84. Then when material fed by the bundle-carrier into the space between the carriers 29 and 37 accumulates too rapidly the pressure exerted against the under side of the free end of the carrier-frame 36 will elevate the latter, thus oscillating the rock-shaft 75 in its bearings and causing the clutch-collar 86 to be disengaged from the clutch member 44, thereby causing the sprocket-wheel 43 to rotate loosely upon the drive-shaft of the bundle-carrier, which latter is thus temporarily thrown out of operation until the pressure against the under side of the free end of the feed-carrier 37 is relieved. As soon as this takes place the weight of the free end of the carrier-frame 36, assisted by the tension of the spring 87, will tend to throw the clutch members 86 and 44 into engagement, thus restoring the bundle-carrier to operative condition.

I desire it to be understood that while the rod 67, the spring 69, and related parts have been shown and described as being applied to one side of the machine only these members may be duplicated on the opposite side by constituting the fulcrum of the bell-crank lever 61 into a rock-shaft movable in suitable bearings in the sides or upon the deck of the feeder-casing and providing the opposite side of the said rock-shaft with an arm similar to the arm 65, such arm to be provided with connecting means whereby it is connected with the boxing 59 at the opposite end of the shaft 40. This, however, is not deemed necessary or essential to the successful operation of the device.

The shaft 21, carrying the band-cutters and from which motion is transmitted to the drive-shafts of the several endless carriers which conjointly constitute my improved feeding mechanism, carries a friction-wheel 88 and a loose driving-pulley 89, which is connected by a belt 90 with a pulley 91 upon the shaft 58 of the threshing-machine cylinder. Suitably fulcrumed to one of the spokes of the pulley 89 is a lever 92, which is connected at a short distance from its fulcrum with the ends of a friction-band 93, which partially encircles the friction-wheel 88. The lever 92 carries near the end of one of its arms an adjustable weight 95. Its opposite end is spring-actuated by means of a spring 96, coiled upon a link 94, one end of which is connected with said lever, while its opposite end extends through a perforated lug 97 upon one of the spokes of the wheel 89. The link 94 has a threaded end extending through the lug 97 and provided with a nut 98. An additional nut 99 upon a threaded portion of the link 94 compresses the spring in the direction of the lug 97, thus operating to throw the weighted end of the lever in the direction of the axis of the shaft 21. It is obvious that when the driving-pulley is rotated the weighted end of the lever 92 will be thrown by centrifugal action in an outward direction, thus tightening the friction-band 93 upon the friction-wheel 88, which is mounted fixedly upon the shaft 21, thus transmitting a rotary motion to said shaft. It is likewise obvious that the shaft 21 will not attain its full speed and that consequently the several carriers will not attain their full rate of speed until the full rate of speed has been acquired by the shaft carrying the threshing-cylinder, for the reason that while the latter rotates at a low rate of speed the driving-pulley 89 will be correspondingly slowly rotated and the friction-band 93 will thus slip upon the friction-wheel 88. As the speed increases, however, the friction-band will be tightened and the speed of the feeder will be increased in precisely the ratio at which the threshing-cylinder is driven. For the same reason when the threshing-cylinder is overfed and its speed is slackened the feeding mechanism will be instantly and automatically correspondingly slackened.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my improved feeding mechanism will be readily understood by those skilled in the art to which it appertains. The construction of the device is extremely simple, and the lack of complication not only enables the operation to be easily understood by those upon whom it devolves to operate the device, but the simplicity of the machine also obviously reduces the expense of production, and my improved feeding mechanism is capable of being applied to and operated in connection with almost any threshing-machine of well-known and approved construction.

Having thus described the invention, what is claimed is—

1. A feeder-casing, a bundle-carrier frame mounted pivotally upon a shaft supported in the sides of the casing, a feeder-carrier disposed between the sides of the casing upon shafts supported in said sides with its receiving end below the discharge end of the bundle-carrier, a band-cutter-carrying shaft above the discharge end of the bundle-carrier, an upper auxiliary feeder carrier-frame mounted pivotally upon a shaft disposed in a horizontal plane above the band-cutter-carrying

shaft, means for flexibly and adjustably supporting and adjusting the free end of said carrier-frame, a carrier-supporting shaft near the free end of said frame extending through segmental-slots in the sides of the feeder-casing, a rock-shaft supported upon the side of the feeder-casing and having a laterally-extending arm, connecting means between said arm and the shaft at the free end of the carrier-casing, an arm at the opposite end of the rock-shaft, a clutch-collar slidable upon and rotatable with the drive-shaft of the bundle-carrier, connecting means between said clutch-collar and the arm of the rock-shaft, a driving-wheel connected rotatably with the drive-shaft of the bundle-carrier and having a clutch-face, and means for imparting motion to said driving-wheel.

2. In feeding mechanism for threshing-machines, a pivotally-supported carrier-frame, a carrier-supporting shaft at the free end of said frame, extended through slots in the sides of the feeder-casing, a rod loosely connected with the end of said shaft, a bell-crank lever fulcrumed upon the feeder-casing and having an arm provided with an eye through which said rod extends, a tension-spring coiled upon said rod between a washer thereon and the arm of the bell-crank lever, and a notched quadrant coöperating with the long arm of said bell-crank lever to retain the free end of the carrier-frame in adjusted position.

3. In a feeding device for threshing-machines, a casing, a carrier-frame supported pivotally upon a shaft mounted in said casing, a carrier-supporting shaft at the free end of said frame, extending through slots in the sides of the casing, a bundle-carrier supported upon a shaft mounted in the sides of the casing, a driving-wheel on said shaft, having a clutch member, a clutch-collar slidable upon and rotatable with said shaft and adapted to engage the clutch member of the driving-wheel, a rock-shaft having a bifurcated arm connected with said clutch-collar, an arm extending laterally from the opposite end of said rock-shaft, a vertically-adjustable spring-pressed rod connected with the shaft at the free end of the carrier-frame, a sleeve adjustable upon said rod, and a link connecting said sleeve with the laterally-extending arm of the rock-shaft.

4. In a device of the class described, a feeder-shaft, spring-supported rods having bearings for said shaft, a sleeve upon one of said rods adjustably engaging the same, a clutch, a sprocket-wheel connected with a member of said clutch for driving the feeder, and connecting means between said clutch and the adjustable sleeve whereby adjustment of said sleeve will serve to regulate the distance between the engaging faces of the clutch members.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDGAR P. KILLINGER.

Witnesses:

G. H. FUDGE,

B. F. BUCHANAN.