

No. 705,516.

Patented July 22, 1902.

J. B. DENLINGER.
BAND CUTTER AND FEEDER.

(Application filed Mar. 5, 1901.)

(No Model.)

2 Sheets—Sheet 1.

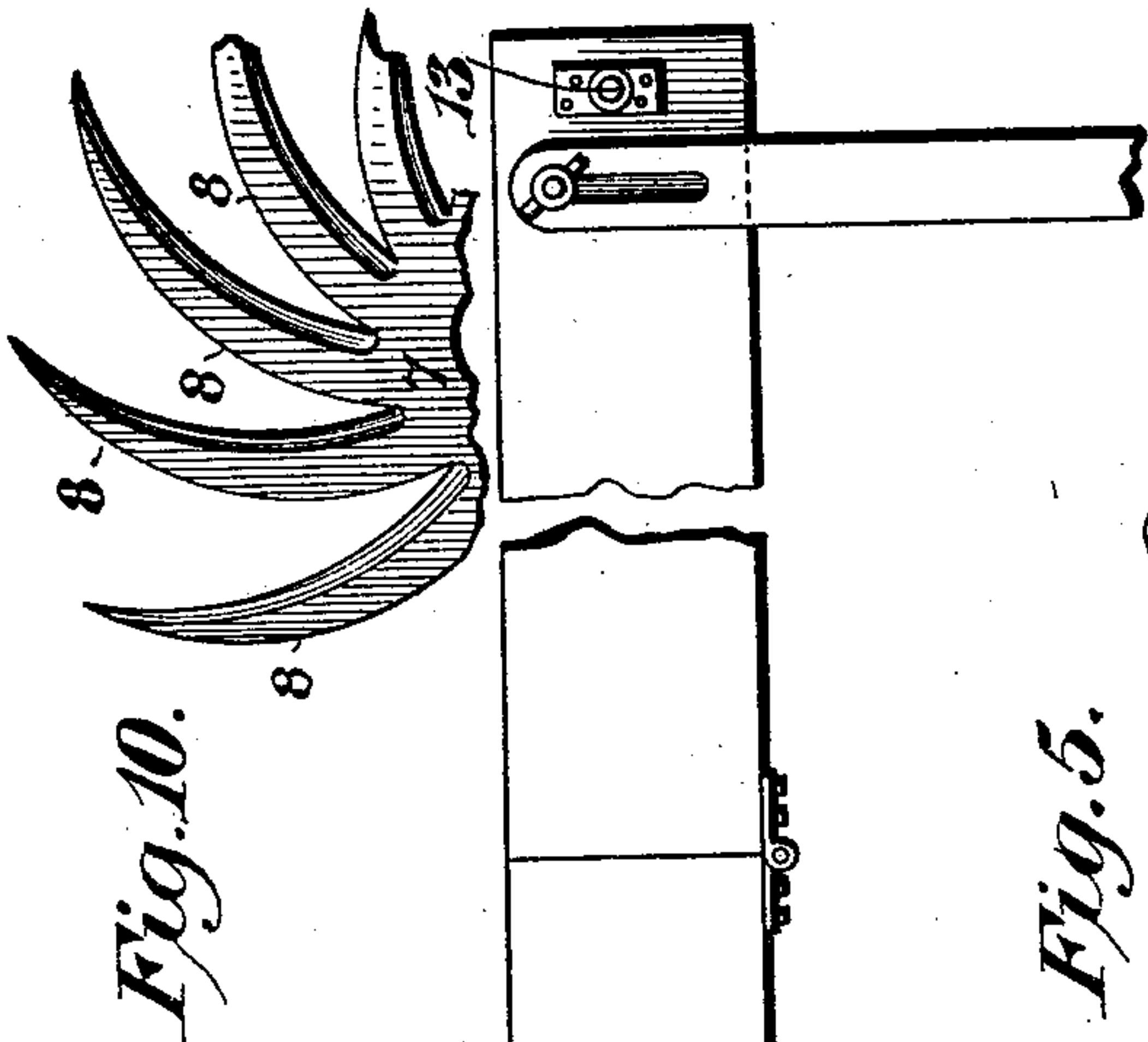


Fig. 5.

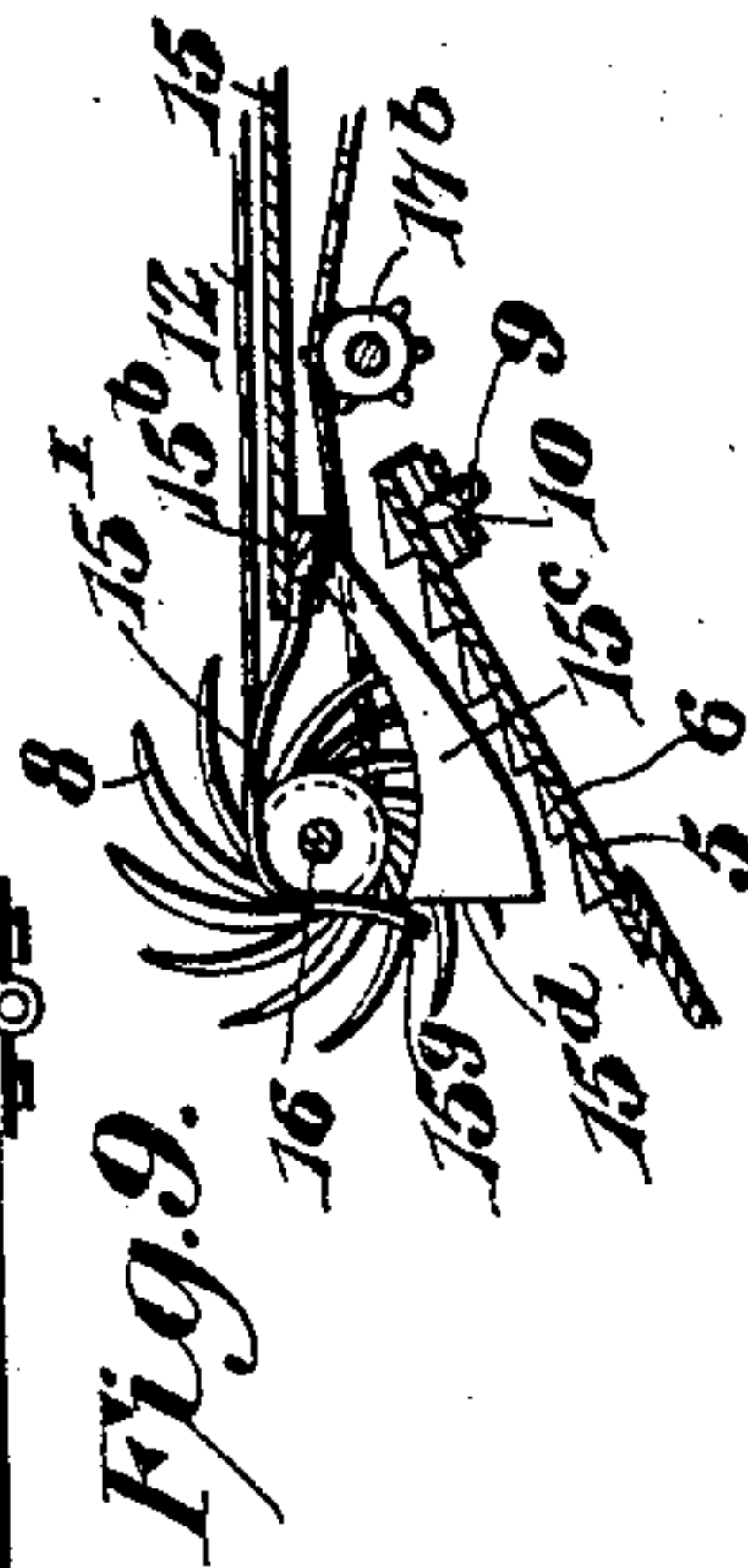
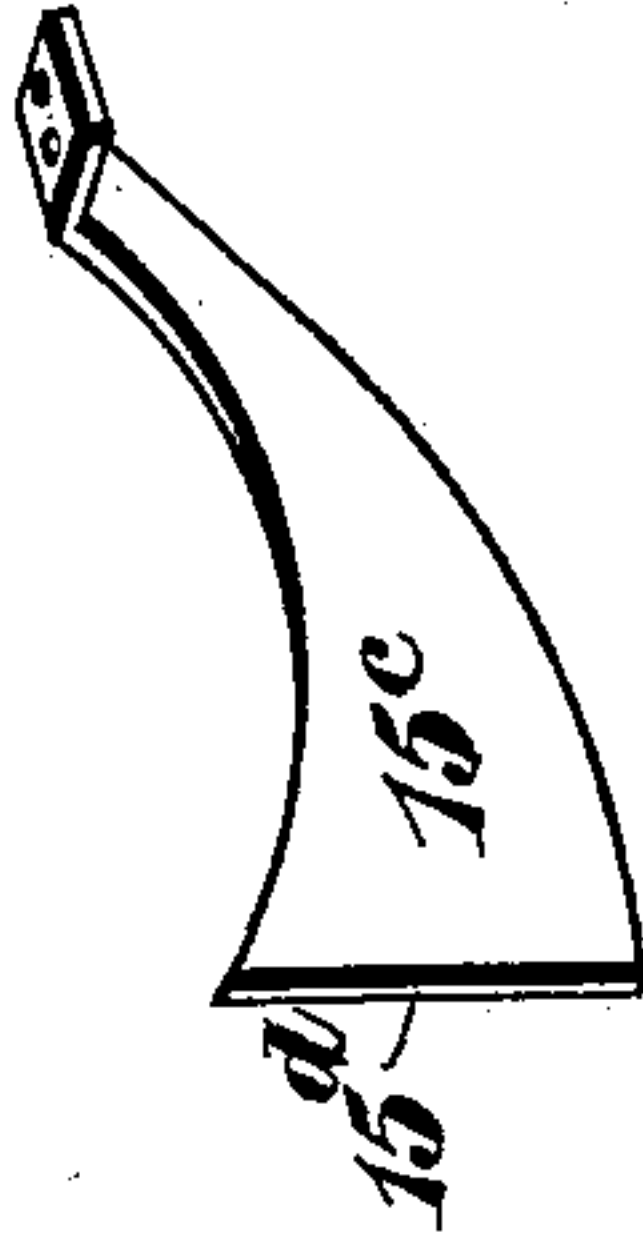


Fig. 8.

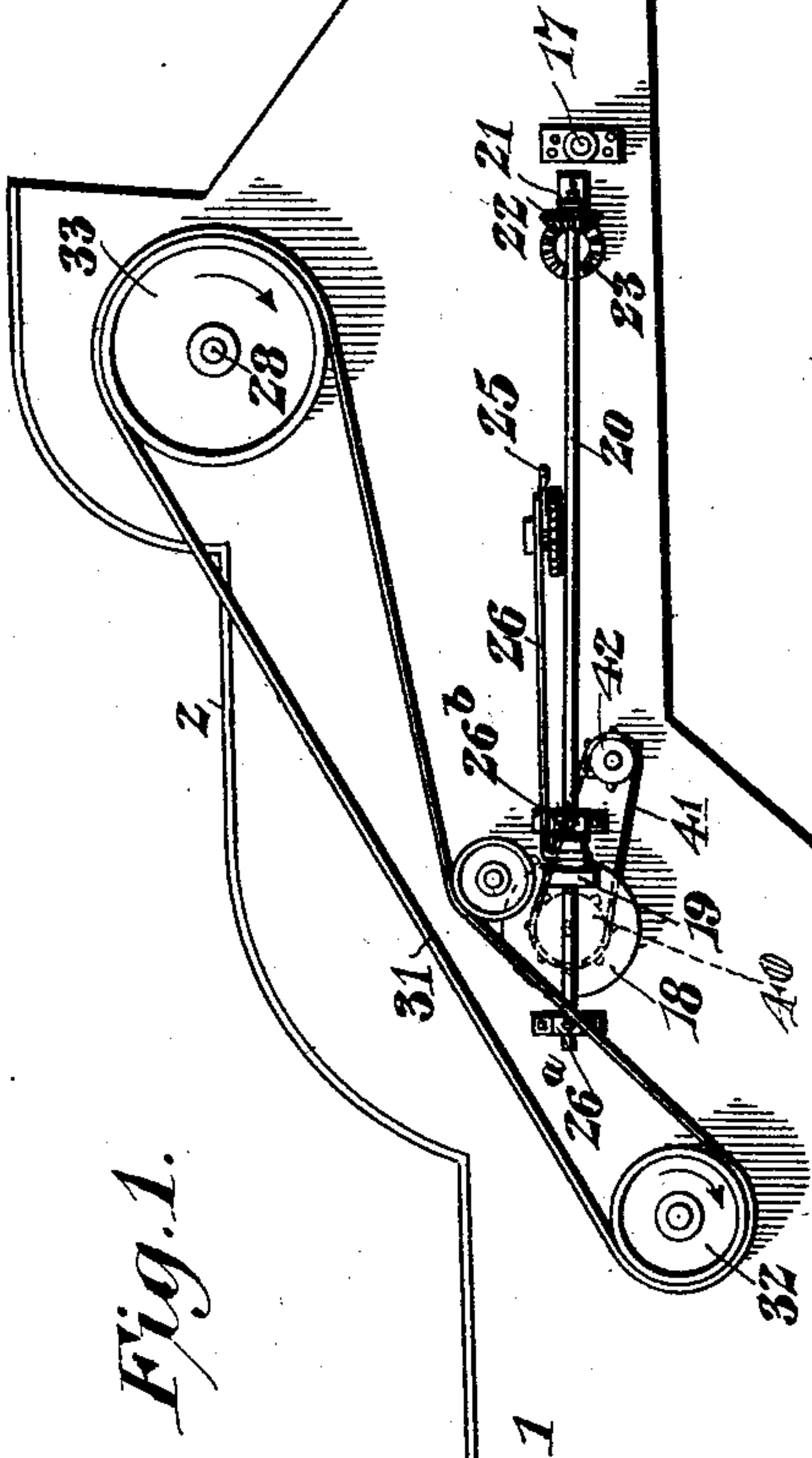


Fig. 1.

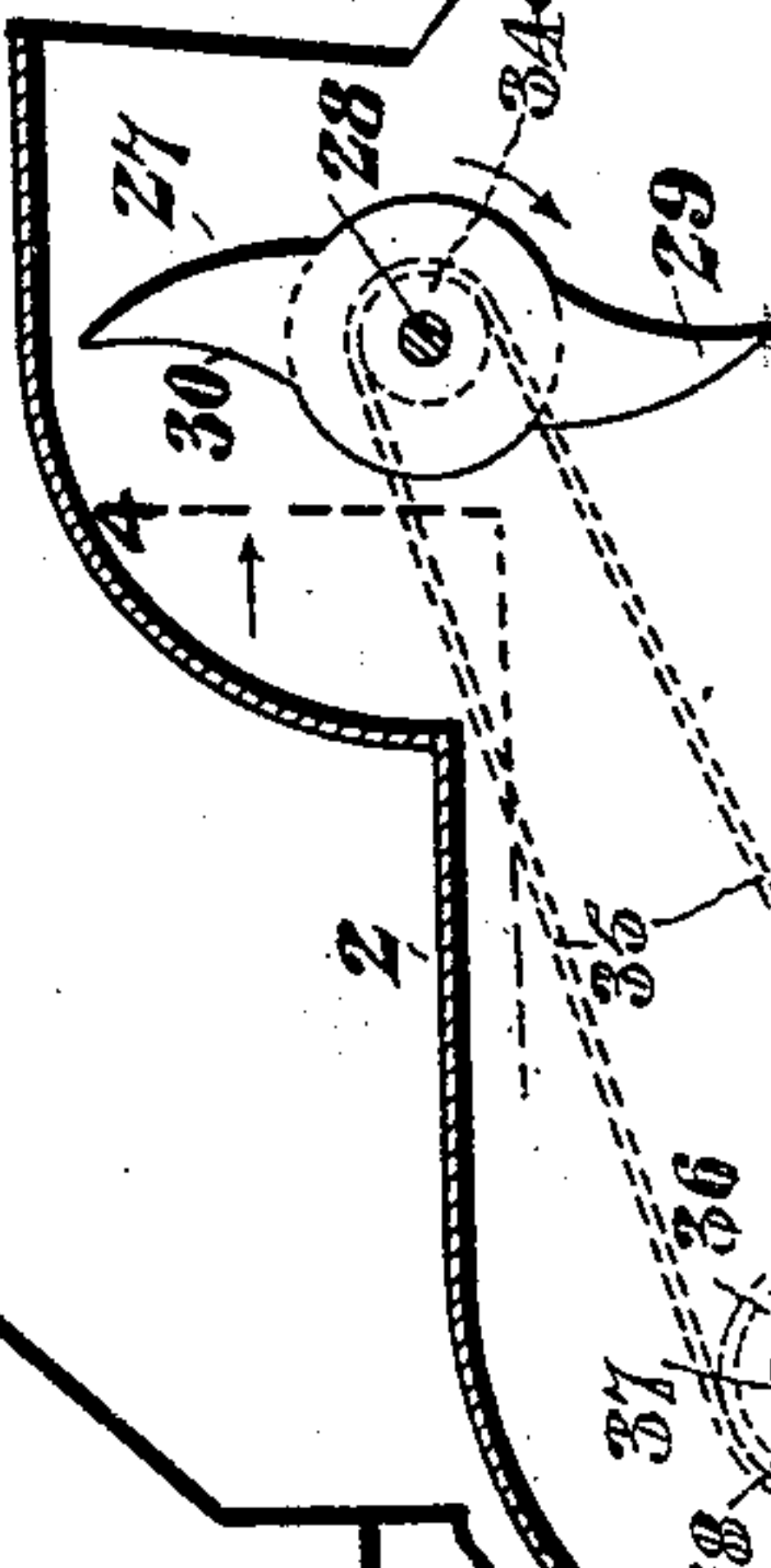


Fig. 2.

John B. Denlinger, Inventor.

By

E. G. Singer

Attorney

Witnesses
Jas. K. McCathran
Louis G. Julian

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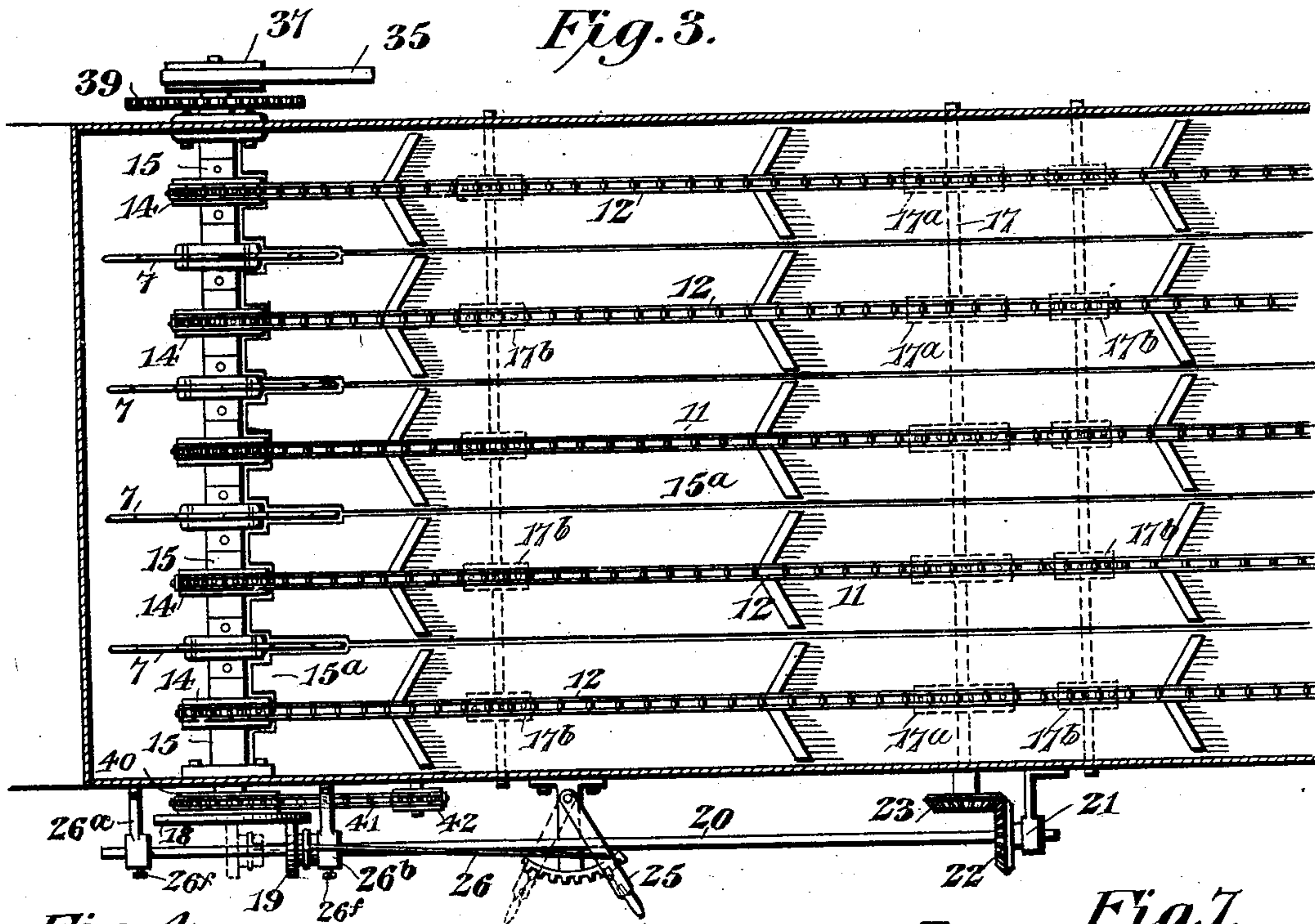


Fig. 4.

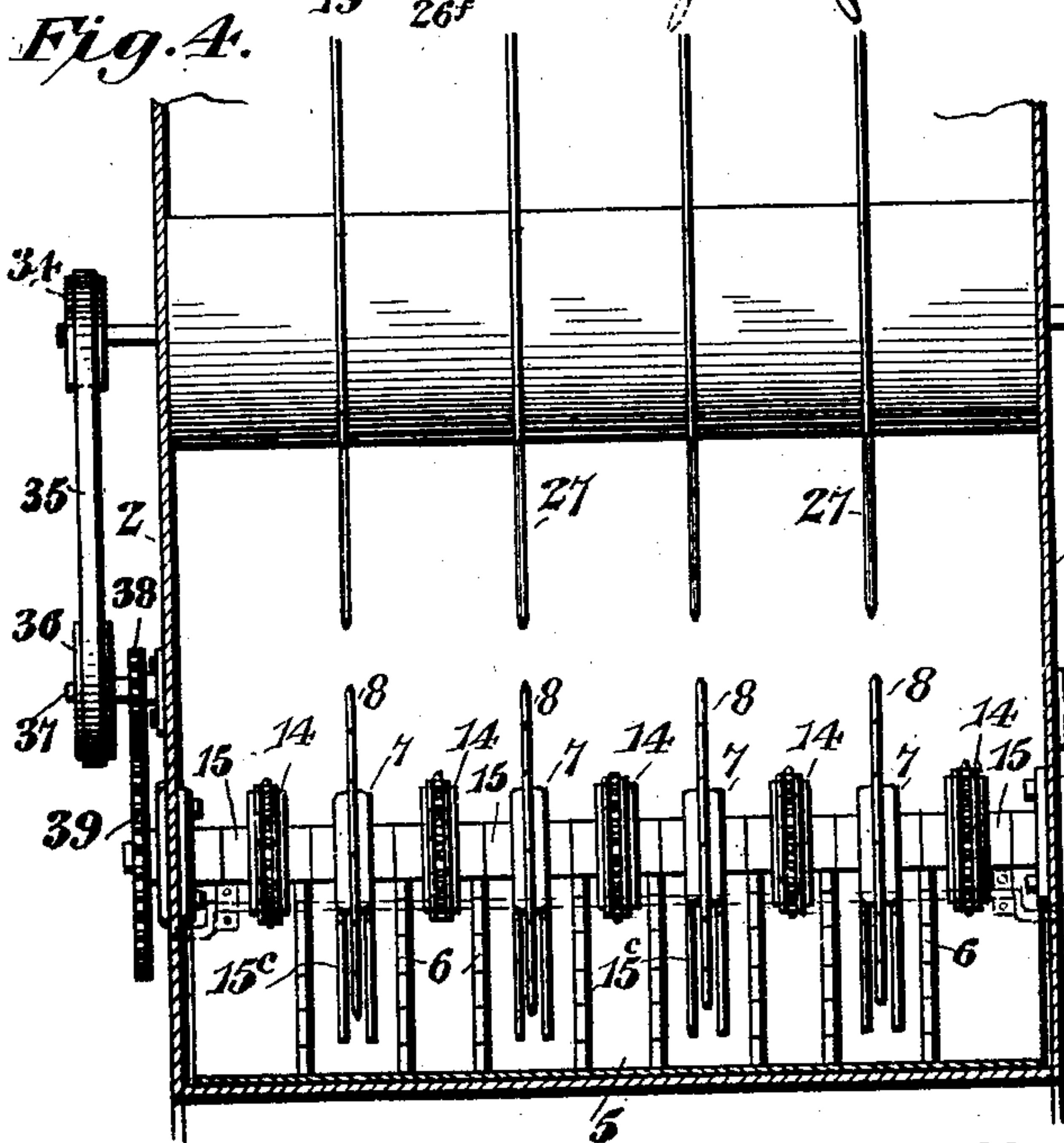


Fig. 7.

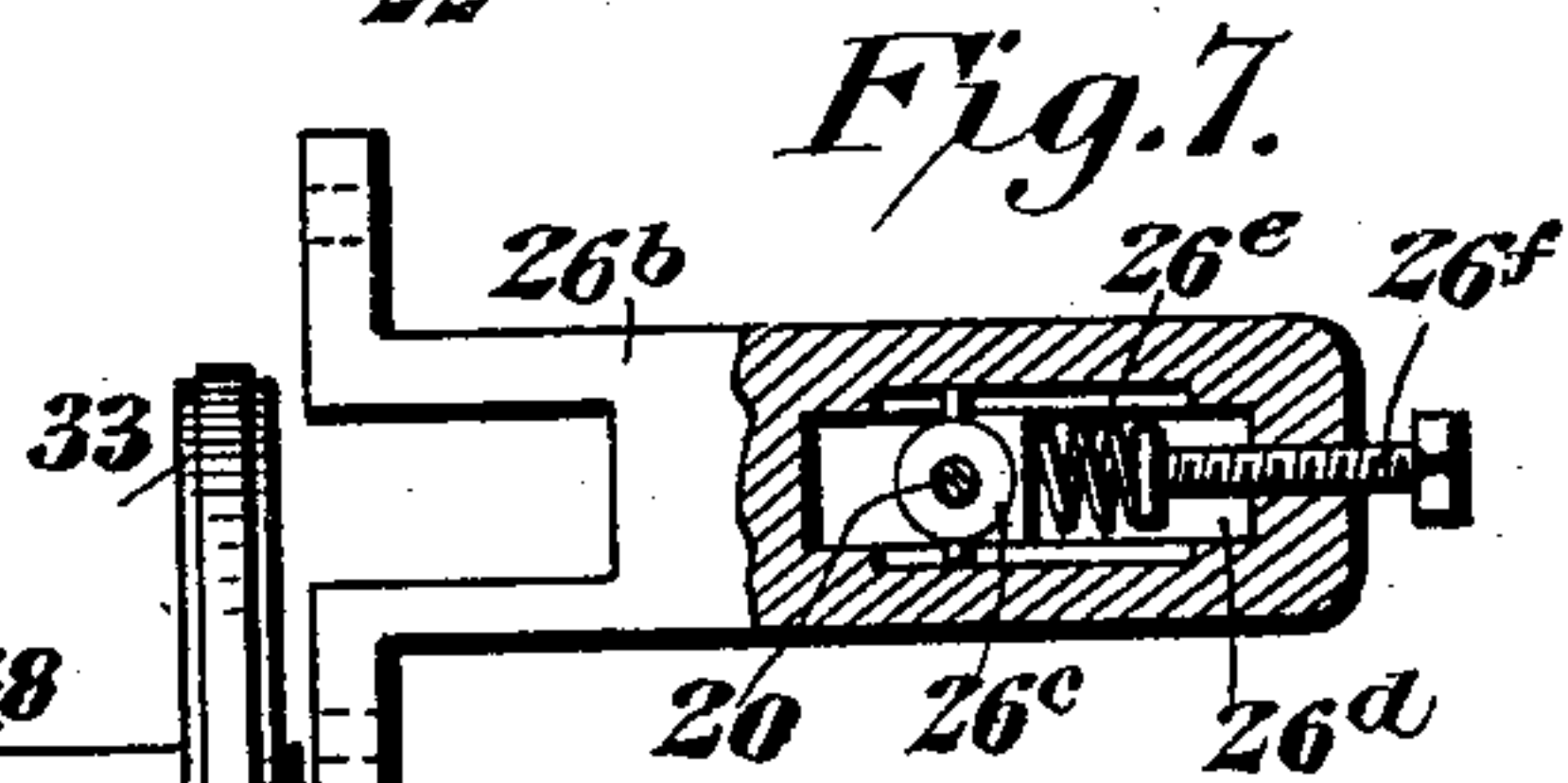
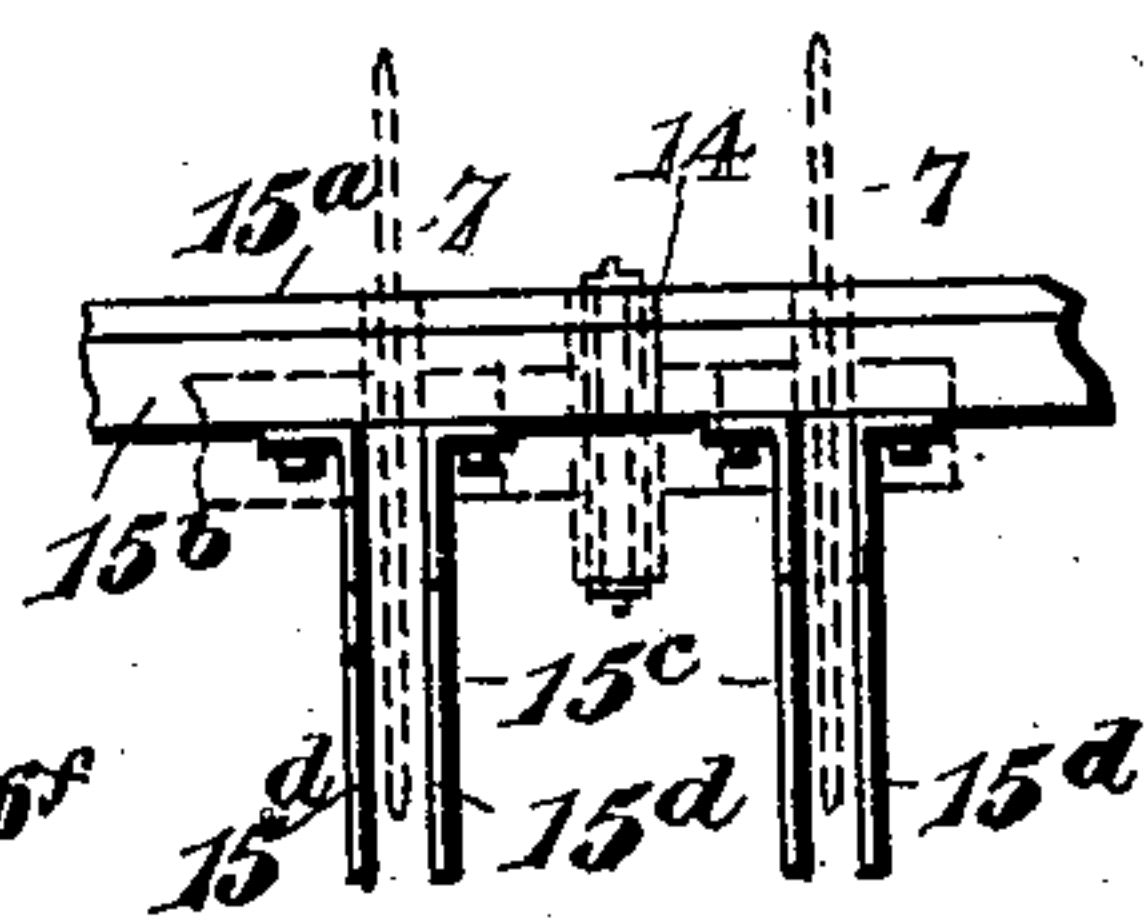


Fig. 6.



John B. Denlinger, Inventor

By

E. G. Siggers

Attorney

Witnesses
Jas. K. McLachlan
Louis J. Julihn

UNITED STATES PATENT OFFICE.

JOHN B. DENLINGER, OF UNION CITY, INDIANA, ASSIGNOR OF ONE-HALF
TO BENJAMIN E. DENLINGER, OF UNION CITY, INDIANA.

BAND-CUTTER AND FEEDER.

SPECIFICATION forming part of Letters Patent No. 705,516, dated July 22, 1902.

Application filed March 5, 1901. Serial No. 49,858. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. DENLINGER, a citizen of the United States, residing at Union City, in the county of Randolph and State of Indiana, have invented a new and useful Band-Cutter and Feeder, of which the following is a specification.

This invention relates to improvements in band-cutters and feeders of that type described and claimed in Patent No. 666,473, granted to me January 22, 1901.

The object of the invention, generally considered, is to improve the construction disclosed in the patent aforesaid to facilitate the feeding of the headed and bundled grain into the cylinder of the threshing-machine in orderly and evenly-distributed arrangement.

Considered somewhat more specifically, the object of the invention is to provide means for preventing the clogging of the return-board and rotary distributor, and to effect such reorganization of the gearing intermediate of the distributor-shaft and bundle-carrier as will enable the frame of the feeder to be folded for transportation without necessity for uncoupling or otherwise disorganizing such gearing, as in the patented construction.

A still further object is to improve the variable gearing illustrated in the patent in order to permit the complete stoppage of the cutter and feeder without interfering with the continued operation of the threshing-machine or of the power-transmitting member employed to drive the feeding and cutting mechanism.

With these and other objects in contemplation, as will more fully appear hereinafter, the invention consists in the novel construction and arrangement of parts to be described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a band-cutter and feeder constructed in accordance with my invention. Fig. 2 is a central longitudinal section through the subject-matter of Fig. 1. Fig. 3 is a plan view of the feeding and discharging mechanism, together with the intermediate gearing, the frame or casing of the machine being shown in section. Fig. 4 is a sectional view on the line 4 4 of Fig. 2, showing the cutting, feeding, and discharging mechanism in elevation. Fig. 5 is a detail perspective view of

one of the distributor clearers or guards. Fig. 6 is a detail view illustrating the manner in which the guards are attached to one of the beams or supporting-bars of the bundle-carrier platform. Fig. 7 is a detail sectional view of one of the shaft-supporting brackets, illustrating the manner in which the power-transmitting shaft is supported and yieldingly urged in a lateral direction to maintain proper frictional contact between members of the variable gearing. Fig. 8 is a detail view similar to Fig. 6 and illustrating a possible variation comprehending the uniting of each pair of guards by an intermediate shield; and Fig. 9 is a detail sectional view of a modification or variation of the construction shown in Fig. 2, and contemplating the addition of guard-fingers interposed between the distributors and augmenting the guards. Fig. 10 is a detail view of one of the rotary distributors, illustrating the sharpened edges of one of the distributor-fingers.

Referring to the numerals employed to designate corresponding parts throughout the views, 1 indicates a portion of a threshing-machine frame, 2 the cutter and feeder-box of ordinary construction, 3 the concave, and 4 the threshing-cylinder, all constructed and related in a manner well understood in the art. Immediately in front of the concave 3 is disposed the grain-return board 5, inclined at the desired angle and having a series of longitudinally-disposed toothed bars 6, located below the rotary feed regulators, retarders, or distributors 7, the curved distributing-fingers 8 of which extend between the bars 6 of the return-board to permit the latter to detach the straw which may have become entangled in the fingers of the regulators. It will be observed that the number of distributor-fingers illustrated in the present embodiment of the invention is considerably greater than the number of fingers shown in the patented construction, the reason for this variation being that the grain will be effectively distributed without necessitating the movement of the bundle-carrier at a higher rate of speed than is desirable for the most effective handling of the grain. It should also be observed that the concaved sides or edges of the distributing-fingers 8 are sharp-

ened for the purpose of insuring the clear running of the machine by the cutting of the straw in the event of the latter becoming intertwined or tangled between the fingers in a manner which would cause the clogging of the parts and the stoppage or derangement of the feeder were it not for the clearing action of these knife-edges. Under ordinary circumstances these sharpened fingers are not intended to sever the straw, but are provided merely for the purpose of assisting the guards in clearing the distributors in the event of unusually-tangled straw being fed into the thresher—that is to say, if the straw becomes entangled in these distributor-fingers and materially resists the downward pull exerted by the threshing-cylinder in its attempt to withdraw the straw from the fingers said straw will be drawn with considerable force against the concaved cutting edges of the distributors and will be severed into short lengths and released before any considerable strain is exerted upon either the threshing-cylinder or the distributing mechanism.

For vibrating the return-board I provide a rock-shaft 9, connected to the board by a crank connection 10, as shown, and operated by suitable gearing in substantially the manner illustrated and described in my patent.

The bundle-carrier or feed-conveyer 11, disposed horizontally, as shown, and having its inner end located above the return-board and in position to discharge the grain between the concave 3 and cylinder 4, is made up of a transverse series of endless sections or chains 12. At the outer end of the conveyer the several chains or sections pass around and are supported by a conveyer-shaft 13, having sprockets 13^a engaging the chains, as shown in Figs. 2 and 3, and at the inner end of the conveyer these sections or chains pass around a series of sprocket-idlers 14, loosely mounted for independent rotation and having extended cylindrical hubs 15, constituting spaces for the regulators or distributors 7. The regulators or distributors 7 are mounted, as shown in Figs. 2 and 3 of the drawings, in coaxial relation and intermediate of the chains, so that the curved distributor-fingers 8 will move in a path disposed between the toothed bars 6 of the return-board 5 and between both the upper and lower runs of the bundle-carrier sections. This arrangement of the parts permits the grain fed to the machine to be advanced to and deposited between the fingers of the distributor for delivery thereby to the threshing-cylinder in such evenly-distributed orderly arrangement as will best facilitate the effective operation of the device.

In that embodiment of the invention which I now consider preferable a feed table or platform 15^a is disposed within the frame of the cutter and feeder immediately under the upper run of the bundle-carrier, as shown in Figs. 2 and 3, in order to assist in the support of the grain as it is carried into the

thresher by the movement of the conveyer-chains 12. This table or platform 15^a is supported in any desired manner, but adjacent to its forward end is preferably located a transversely-disposed supporting bar or beam 15^b, which serves the dual function of a support for the inner end of the table and for the rear ends of a series of forwardly-extending distributor clearers or guards 15^c, which, however, may be supported in any desired manner and to any suitable part of the mechanism, the attachment of the guards to the supporting-bar 15^b being preferable, but not essential. These guards constitute an important feature of the present improvements, inasmuch as they are designed to prevent shattered grain or straw from being carried back upon the return-board by the distributor-fingers. It has been found in practice that the rapid rotation of these distributors sometimes results in the clogging of the machine by the packing of straw between the adjacent parts of the return-board, distributor mechanism, and conveyer, and therefore one of the principal objects of the present invention is to provide means for insuring the detachment of the grain and straw from the distributors and the delivery thereof to the threshing-cylinder 4. The guards 15^c have been found effective for this purpose and are preferably arranged in pairs for the interposition of the distributor and are extended between the hubs of the distributors and the return-board beyond the vertical plane of the hubs, as best shown in Figs. 2 and 5. Each of the guards is longitudinally curved and of tapering form, as shown, and its inner or rear vertical edge is disposed immediately above the return-board in a manner to constitute an abutment against which straw carried under by the adjacent distributor will strike and be held to effect its detachment through the continued rotation of the distributing-fingers. Thus any straw which would otherwise be carried under and forward by the distributors is with certainty detached and dropped upon the return-board for delivery to the concave.

In handling some classes of grain it has been found desirable to connect the opposed guards of adjacent pairs by means of transversely-disposed shields 15^d; (illustrated in Fig. 8 of the drawings,) as these shields constitute abutments of greater extent than the edges 15^d of the guards and are consequently more effective in removing from the clearers such light soft straw as might be sufficiently flexible to pass with the fingers between the guards. Under ordinary circumstances, however, the guards 15^c, with the shields 15^d, have been found to be effective as distributor-clearing devices.

As stated in the specification of my patent already recited, it is necessary to provide means for loosening the straw by a more or less rapid rotation of the distributors, according to the condition of the grain, and in said patent is therefore described a simple form

of speed-changing gearing disposed intermediate of the distributor-shaft 16 and the driving-shaft of the conveyer, which latter in the patented structure is located at the extreme rear end of the bundle-carrier in the position now occupied by the supporting-shaft 13. In the illustrated construction the variable gearing, with some modifications which will be pointed out, is preserved; but instead of this gearing being disposed intermediate of the distributor-shaft and the shaft located at the extreme outer end of the bundle-carrier said gearing is disposed between the distributor-shaft 16 and the carrier-shaft 17, located nearer the inner end of the conveyer than the outer end thereof and having sprockets 17^a, meshing with the lower run of the conveyer or bundle-carrier chains 12, the engagement of the chains and sprockets and the tension of the former being insured by the employment of sprocket-idlers 17^b, as shown in Fig. 2. This speed-changing gearing, designed to be shifted by the operator to obtain such relative speeds as may be necessary to secure the most effective operation of the mechanism under all conditions, comprises a comparatively large friction-disk 18, mounted upon one end of the distributor-shaft 16 and in frictional contact with a small friction-pinion 19, keyed to but longitudinally movable upon a power-transmitting shaft 20, journaled at one end in a bearing 21 and provided adjacent to said bearing with a bevel gear-wheel 22, meshing with a similar gear-wheel 23, keyed upon one end of the carrying-shaft 17. It will now appear that as the friction-pinion 19 engages the friction-disk 18 nearer to or farther from the axis of the latter the speed of the bundle-carrier relative to the distributor will be increased or decreased, as desired. Means must therefore be provided for shifting the pinion 19 to vary or regulate the speed, and a preferred embodiment of said means comprehends the employment of a speed-changing lever 25, carried by the frame of the cutter-box and provided with a shifting rod 26, having suitable connection with the hub of the pinion 19 to effect the shifting of the pinion upon the shaft without interfering with the rotary movement of said pinion under the impulse of the rotating disk 18, which it frictionally engages. The construction of this variable gearing as thus far described is practically the same as in the patented construction, excepting, as already stated, that the power-transmitting shaft is geared to the bundle-carrier at a point intermediate of the ends of the latter instead of at the extreme outer end of the carrier. In the previous construction, however, was employed a bearing common to both the power-transmitting shaft 20 and the distributing-shaft 16, and it therefore followed that the friction-pinion 19 could not be shifted to a position directly opposite the axis of the disk 18, and it was consequently impossible to completely stop the conveying and

distributing mechanism as long as the threshing-machine or other power-transmitting mechanism geared to the shaft 16 was kept in motion. In said construction, furthermore, no adequate provision was made for maintaining proper frictional contact between the disk 18 and pinion 19 after these elements had been in use a sufficient time to become worn. Therefore another feature of the present improvement resides in providing the power-transmitting shaft with bearings located in a manner to permit the friction-pinion 19 to be moved to a point directly opposite the axis of the disk and to be constantly urged into effective contact with the disk, and thereby compensate for the wear of the parts.

As shown in Fig. 1 of the drawings, the distributor-shaft 16 is not extended beyond the outer face of the disk 18, so that said outer surface is left entirely unobstructed for the free passage of the pinion 19 to any position thereover. At diametrically opposite sides of the disk a pair of bearing-brackets 26^a and 26^b extend from the side of the frame 1 for the support of sliding journal-boxes 26^c, located and guided within slots 26^d in the brackets and constantly urged in a direction to present the pinion 19 to the disk 18 by springs 26^e, the tension of each of which is regulated by a tension-screw 26^f. (See Fig. 7.) The end of the power-transmitting shaft 20 opposite the bracket 21, being supported in these spring-urged journal-boxes 26^c, is constantly urged laterally to maintain an effective engagement between the members of the variable gearing.

The bands of the sheaves fed to the machine are severed by the band-cutters 27, carried upon a cutter-shaft 28 and having their opposite ends 29 and 30 laterally deflected, as illustrated in the patent, or straight, as desired.

The form of the operating mechanism for the various shafts may be varied; but I prefer to employ a belt 31, passing around pulleys 32 and 33 upon the shaft of the cylinder 5 and the shaft 28, respectively. A somewhat-smaller pulley 34, carried by the shaft 28 at the end opposite the pulley 33, is geared in turn by a belt 35 to an idle pulley 36, mounted upon a shaft 37, having a gear-wheel 38, meshing with a somewhat-larger gear-wheel 39 upon the shaft 16, upon which just behind the disk 18 is keyed a sprocket-wheel 40, geared, as by a chain 41, to a small sprocket 42 upon the rock-shaft 9 for vibrating the return-board.

The shortening of the power-transmitting shaft 20 in the manner shown permits the outer section of the feed-box, which is hinged, as shown, to be folded back under the box to facilitate the transportation and storage of the machine.

In Fig. 9 I have illustrated a modification of the construction described, or rather a further development of the guard idea. In this figure, in addition to the guards 15^c, I have

provided guard-fingers 15^c, extending forwardly from the supporting-bar 15^b and over the hubs of the regulators, in front of which the angular ends 15^s of these fingers depend.

5 If desired, these guard-fingers may be employed in lieu of the guards 15^c; but I now consider it preferable to employ either the guards 15^c, as shown in Fig. 2 of the drawings, or such guards in conjunction with the
10 guard-fingers, as shown in Fig. 9.

From the foregoing it will be observed that I have produced a number of structural features which constitute improvements of the band-cutter and feeder described in my recently-issued patent; but it is evident that
15 the construction by means of which these improvements are carried into effect may be varied without departing from the spirit of the invention, and I therefore reserve the right
20 to effect such changes, modifications, and variations of the illustrated structure as may be properly comprehended within the scope of the protection prayed.

What I claim is—

25 1. The combination with an endless bundle-carrier, a rotary shaft, a series of distributing-fingers mounted thereon, and a grain-return board, of a series of clearers or guard-fingers supported in advance of the shaft and
30 extending under and to the rear thereof, said clearers or guard-fingers forming at their rear edges abutments for doffing the straw from the distributing-fingers.

2. In a band-cutter and feeder, the combination with the endless bundle-carrier, a series of rotary distributors disposed at one end
35 of the upper run thereof, a return-board located below the distributors, a table disposed below the upper run of the bundle-carrier,
40 and a supporting-bar for said table, of a series of longitudinally-curved and tapering distributor clearers or guards secured at their front ends to said supporting-bar and extended between the distributors immediately
45 above the return-board, said guards being arranged in pairs, each of which pairs is arranged for the reception of a distributor, the rear vertically-disposed end edges of the guards being disposed to form abutments
50 against which the straw is caught and detached from the distributors.

3. In a band-cutter and feeder, the combination with an endless bundle-carrier, a distributor-shaft located at one end thereof, distributors carried by said shaft, a carrier-shaft geared directly to the bundle-carrier at

a point intermediate the ends of the latter, a power-transmitting shaft geared to the carrier-shaft, a shiftable pinion mounted upon the power-transmitting shaft, a friction-disk
60 carried by the distributor-shaft and having its outer face entirely unobstructed, movable journal-boxes supporting the inner end of the power-transmitting shaft and located at opposite sides of the friction-disk, springs disposed to urge the journal-boxes to maintain
65 the contact between the friction-pinion and the disk, and means for regulating the tension of said springs.

4. In a band-cutter and feeder, the combination with a bundle-carrier, a distributor-shaft, and a threshing-cylinder disposed beyond the distributor-shaft, of a series of rotary distributors supported by the shaft and comprising longitudinally-curved fingers rotated in a direction to present their convex
75 edges to the straw to distribute the same to the cylinder, and having their concaved edges sharpened, whereby straw tangled around the fingers will be drawn against the sharpened
80 edges of the latter and severed as the straw is carried down by the threshing-cylinder.

5. In a band-cutter and feeder, the combination with an endless bundle-carrier, a series of rotary distributors disposed at one end
85 of the upper run thereof, of a series of longitudinally curved and tapered distributor clearers or guards secured at their front ends and extended between the distributors, said guards being arranged in pairs, each of which
90 pairs is arranged for the reception of a distributor, and vertically-disposed shields secured to and extending between the rear end edges of opposed guards of adjacent pairs.

6. In a band-cutter and feeder, the combination with an endless bundle-carrier, a distributor-shaft, a series of rotary distributors, and a return-board, of a series of distributor clearers or guards supported in front of the distributor and extended rearwardly under
100 and beyond the distributor-shaft, said clearers or guards being of increasing width toward their rear ends which are vertically disposed to constitute abutments facilitating the removal of the straw from the clearers.
105

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

JOHN B. DENLINGER.

Witnesses:

JOHN W. SIGGERS,
EDWIN E. VROOMAN.