No. 879,834. PATENTED FEB. 18, 1908.

J. BODA.

TRIPPING AND BUNDLE COUNTING MECHANISM FOR GRAIN SHOCKERS.

APPLICATION FILED SEPT. 6, 1907.

3 SHEETS—SHEET 1.

Fig. 2

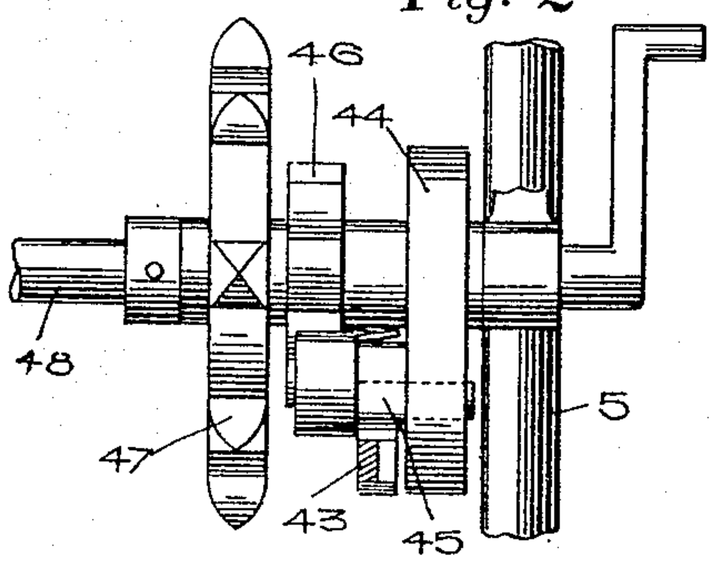
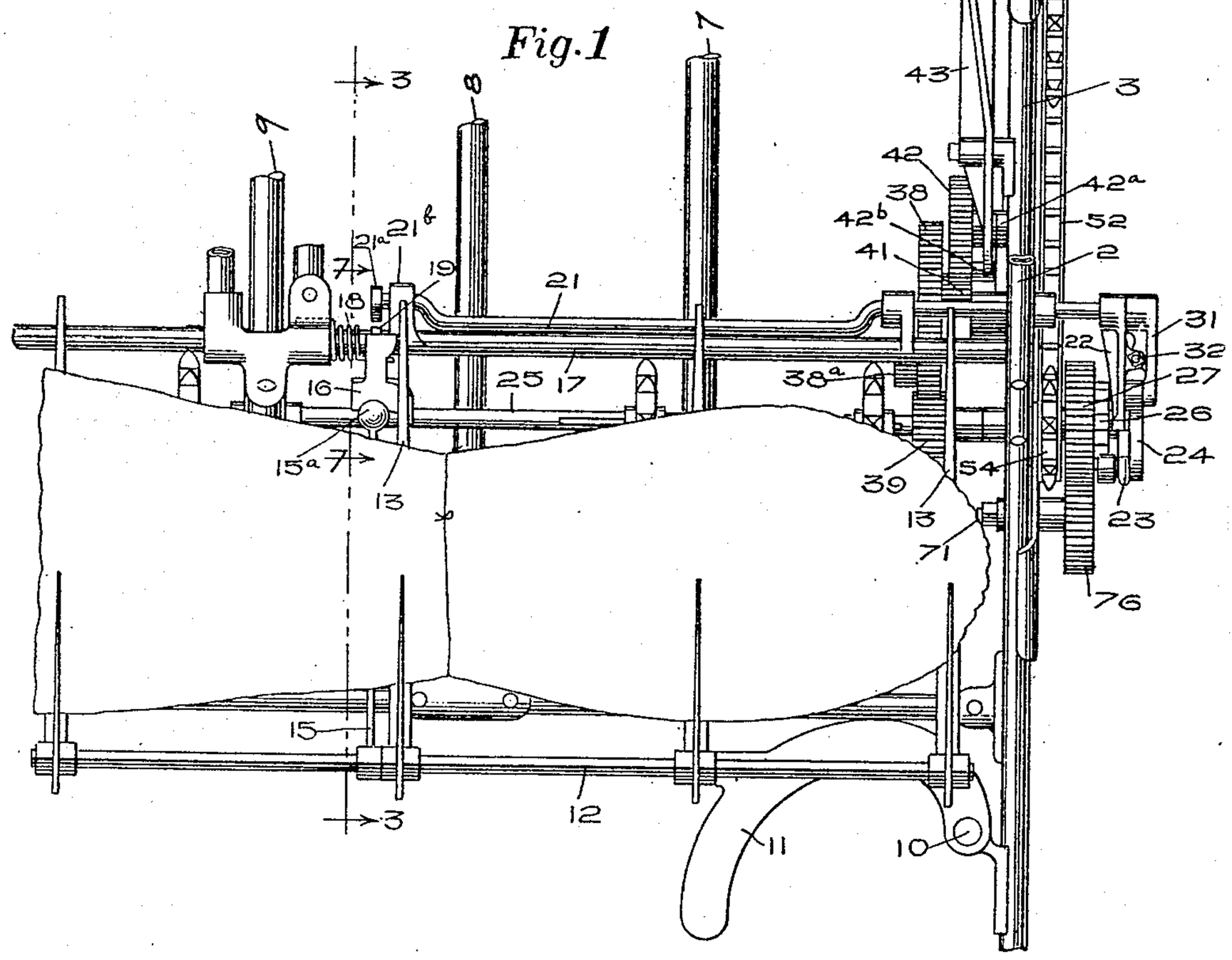


Fig. 1



WITNESSES:
John M Culver
J S Abbott

INVENTOR
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by Benton Burton
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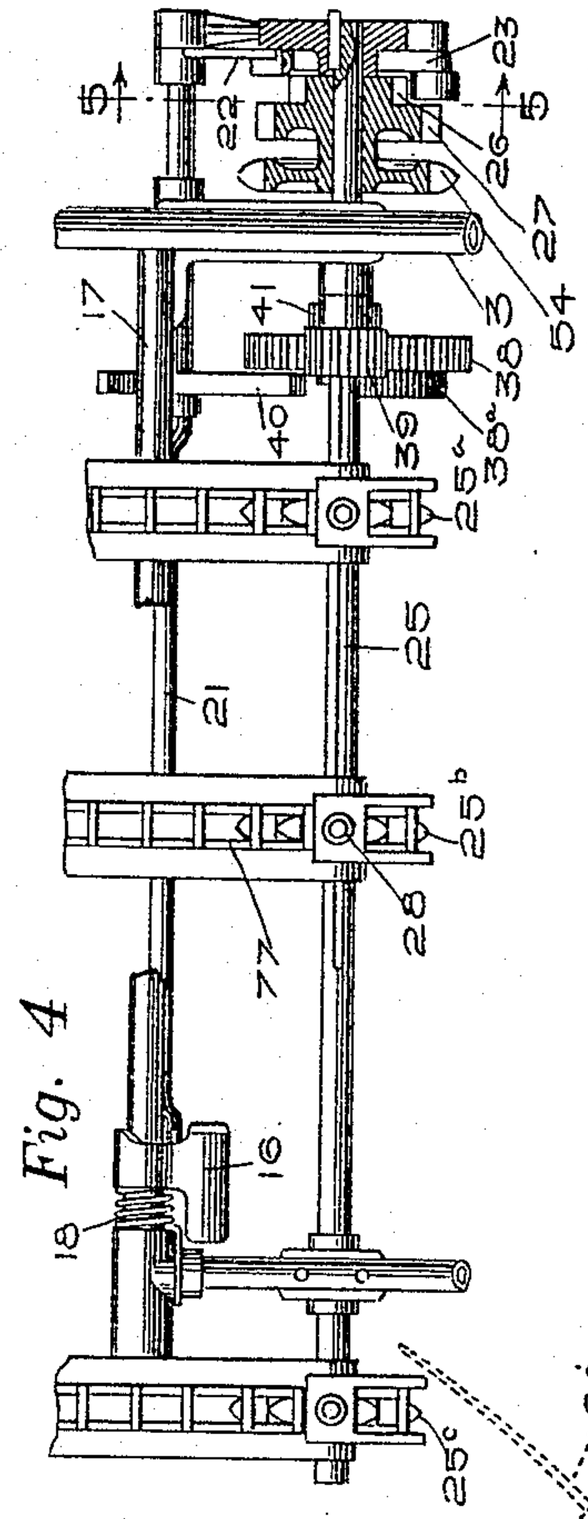

Fig. 4

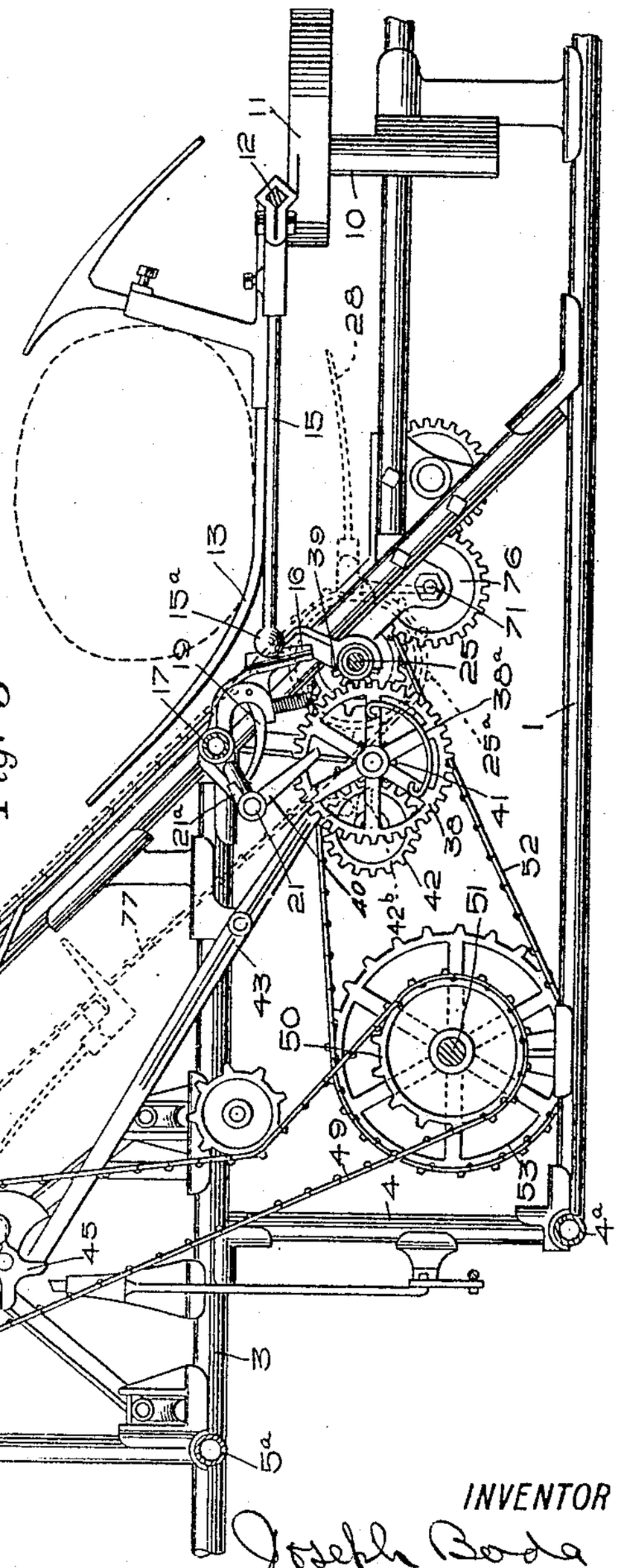

Fig. 3

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3 SHEETS—SHEET 3.

Fig. 8

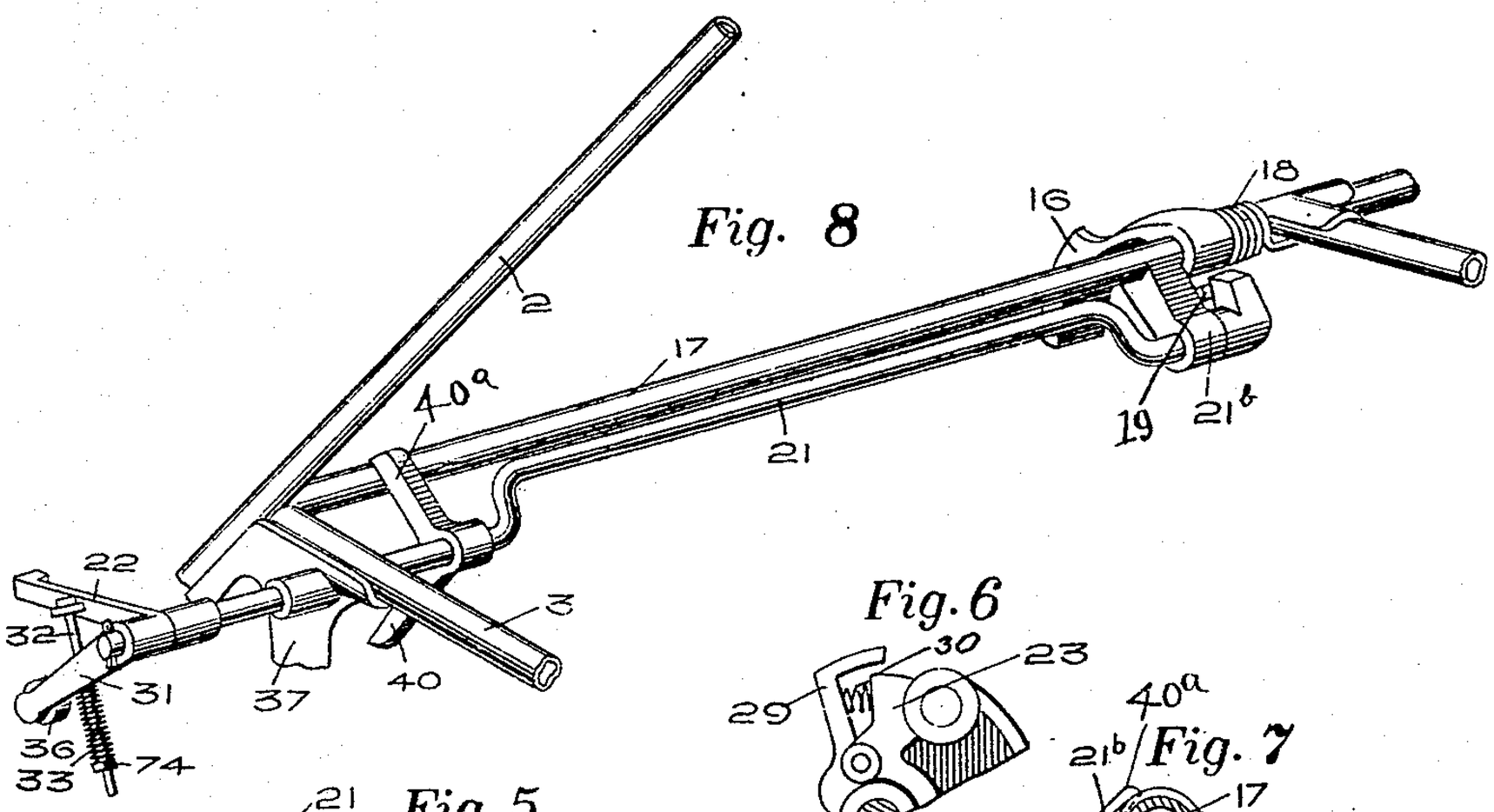


Fig. 5

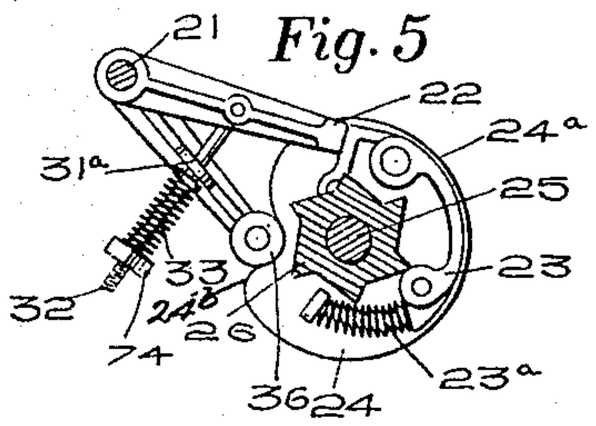


Fig. 6

Fig. 7

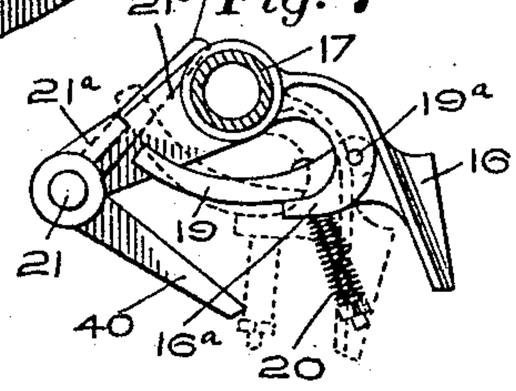


Fig. 9

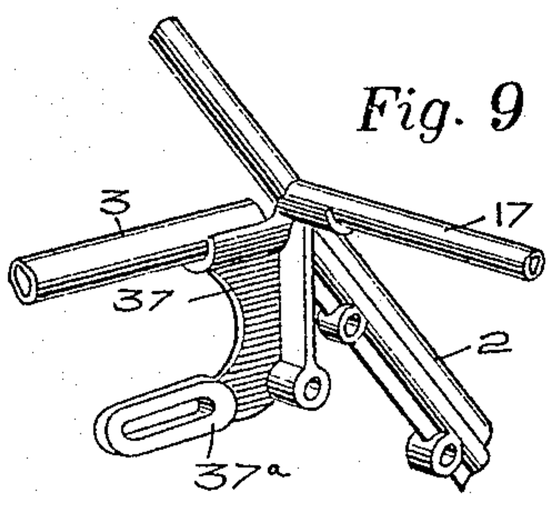
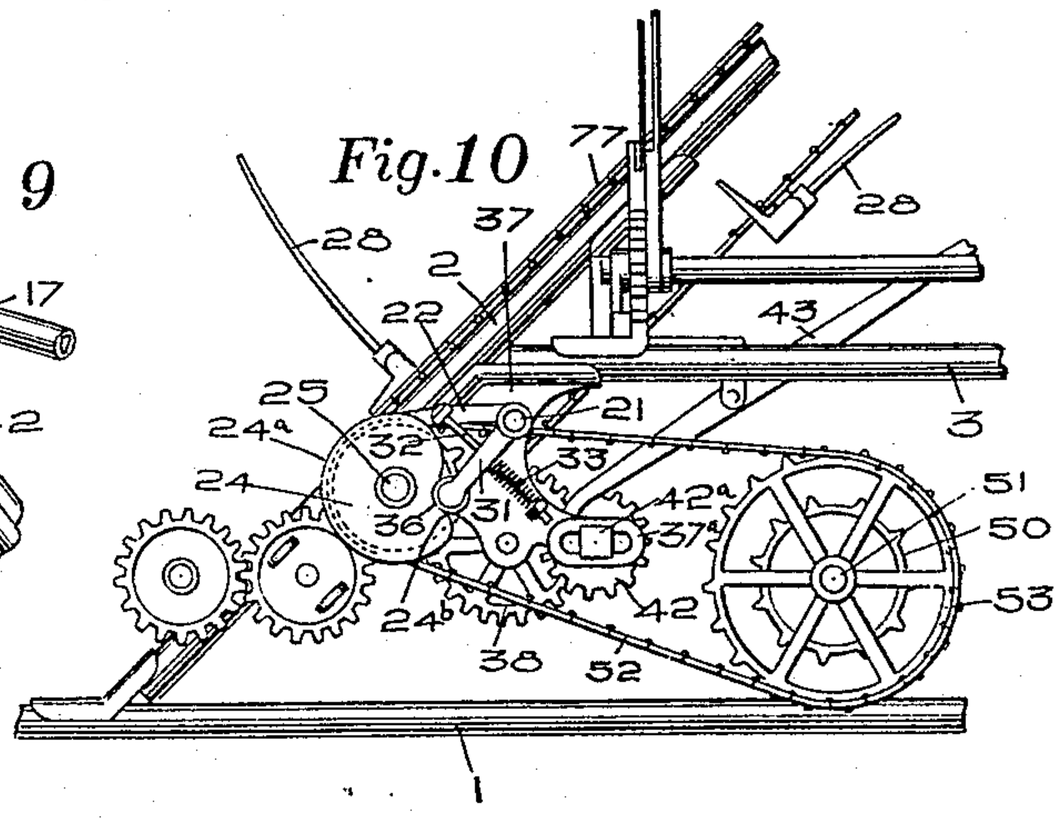


Fig. 10



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UNITED STATES PATENT OFFICE.

JOSEPH BODA, OF PLANO, ILLINOIS, ASSIGNOR TO INDEPENDENT HARVESTER COMPANY, OF PLANO, ILLINOIS, A CORPORATION OF MAINE.

TRIPPING AND BUNDLE-COUNTING MECHANISM FOR GRAIN-SHOCKERS.

No. 879,834. Specification of Letters Patent. Patented Feb. 18, 1908.

Original application filed January 16, 1907, Serial No. 352,544. Divided and this application filed September 6, 1907. Serial No. 391,721.

To all whom it may concern:

Be it known that I, JOSEPH BODA, a citizen of the United States, residing at Plano, in the county of Kendall and State of Illinois, have invented new and useful Improvements in Tripping and Bundle-Counting Mechanism for Grain-Shockers, of which the following is a specification, reference being had to the drawings forming a part thereof.

This application is a division of my application No. 352,544, for grain shocker, filed January 16, 1907.

It relates to the portions of the shocker mechanism shown in that application which have to do with the tripping of the elevating mechanism for causing the sheaves to be delivered in groups of predetermined number to the shock receptacle, and determining how many sheaves shall constitute each group, and how many groups shall constitute the complete shock.

It consists of the features of construction which are shown and described in the drawings and indicated in the claims.

In the drawings:—Figure 1 is a partial plan view of the portion of the elevator mechanism of a shocker in which are contained the devices constituting the invention covered by this divisional application. Fig. 2 is a detail plan view of the binder clutch wheel and adjacent parts. Fig. 3 is a fore-and-aft section of the elevator at the plane indicated by the line 3—3 on Fig. 1. Fig. 4 is a partly sectional detail elevation looking rearward of the lower portion of the elevating devices, section being made axially through the driving sprocket wheel and tripping devices connected therewith. Fig. 5 is a detail section at the line 5—5 on Fig. 4. Fig. 6 is an enlarged view of certain tripping devices shown in Fig. 5. Fig. 7 is a detail section on an enlarged scale at the line 7—7 on Fig. 1. Fig. 8 is a perspective view of the tripper shaft and its bearings and arms. Fig. 9 is a perspective view of a frame bar junction and shaft bearing bracket secured at such junction. Fig. 10 is a grainward side elevation of a part of the frame and gearing train.

In the above described drawings there are shown only such parts of the shocker frame and mechanism beside those concerned directly in the invention of the present application as are necessary for indicating the position and relation of the parts thus concerned. The parts thus incidentally shown comprise portions of the elevator frame which consist of triangular elements of which there is shown in Fig. 3 the grainward element comprising the fore-and-aft lower sill, 1, the grainward elevator slant bar, 2, joined at its lower forward end to said sill, 1, a fore-and-aft horizontal sill, 3, at a distance above the sill, 1, joined at its forward end to the elevator slant bar, 2, and upright posts, 4 and 5, the former connecting the horizontal fore-and-aft sills, 1 and 3, and the latter connecting the upper sill, 3, with the upper end of the slant bar, 2. It may be understood that other triangular frames parallel with the one seen in Fig. 3 are provided and connected with the triangular frame shown by horizontal transverse bars, of which there appear in the drawings the transverse tubular bar, 4^a, at the junction of the sill, 1, and the post, 4, a similar transverse tubular bar, 5^a, at the junction of the sill, 3, and the post, 5, and the transverse tubular bar, 17, which connects the slant bars of the different triangular frames being joined to the bar, 2, at the junction therewith of the horizontal sill, 3.

In Fig. 1 are shown the slant bars, 7, 8 and 9, of the several additional triangular frames which go to make up the complete elevator frame which is not otherwise fully shown, but may be sufficiently understood from the above described parts to indicate its relation to the mechanism which is to be more particularly described.

It will be understood that the shocker of which the tripping mechanism herein described and claimed constitues a part is designed to be connected with a harvester (not shown in the drawings) so as to receive the sheaves from such harvester; and there is provided as a part of the shocker a cradle for receiving the sheaves and carrying them to the elevating mechanism. This cradle is partly shown pivoted at 10 to the sill, 1, a cam, 11, which has to do with the means of swinging the cradle—not further shown or described—constituting the immediate connection comprising a rock shaft, 12, carried on the cam, 11, and having the cradle arms, 13, 13, 13, for holding the bundle. The cradle makes a 90-degree swing from the position at which a bundle is received to a position transverse thereto for delivering the

bundle to the elevator, being shown in the latter position in Fig. 1; and for tripping the elevator into action to cause it to carry the bundle for one step and present a new set of carrier arms or fingers in position to receive the next bundle, there is provided on the cradle shaft, 12, a rigidly projecting arm or tripper, 15, the end of which, 15[a], collides in the finishing part of the swing of the cradle with a trip, 16, which is mounted loosely on the transverse frame bar, 17, of the elevator frame, and is acted upon by a coiled spring, 18, stopped at one end on the arm of the trip, 16, and at the other end on the elevator frame so as to be put under tension by the rocking of the trip arm, 16, which is caused by the collision therewith of the tripper, as above described.

19 is a finger pivoted at 19[a] on the arm of the trip, 16, and held by a spring, 20, against a seat, 16[a], on said arm, the spring permitting it to turn about its pivot away from the seat,—that is, toward the frame bar, 17.

21 is a rock-shaft mounted in bearings projecting from the frame bar, 17, having a short lever arm, 21[a], in position to be encountered by the ends of the finger, 19, when the arm of the trip, 16, is swung inward by the encounter of the tripper, 15, and such encounter rocks the shaft, 21. Such shaft extends grainward beyond the elevator slant bar, 2, on which bar it is afforded bearing; and beyond its grainward bearing there is mounted on it a tripper arm, 22, which at the normal position of the shaft,—that is, before the encounter of the tripper, 15, with the trip, 16,—extends in position to stop a trip dog, 23, on a disk, 24, which is fast on the grainward end of the shaft, 25, said shaft extending across the elevator frame and actuating the sprocket wheels, 25[a], 25[b] and 25[c], for operating the elevator chains, as hereinafter more particularly described.

Upon the rocking of the shaft, 21, by the encounter of the tripper, 15, with the trip, 16, the arm, 22, is disengaged from the dog, 23, and the dog is thereby forced by its spring, 23[a], into engagement with a tooth of the ratchet hub, 26, on the gear wheel, which is continuously rotated by the engagement of the gear, 76, on the initial shaft, 71, of the shocker train, and thereby the elevating mechanism is set in motion for carrying up by means of the arms, 28, of the elevator chains, 77, the bundle which has been deposited upon those arms by the cradle in the same movement which tripped the elevator mechanism into action as described. The rock-shaft, 21, after being rocked by the encounter of the tripper, 15, with the trip, 16, may quickly recover its position, because the finger, 19, riding up on the short arm, 21[a], as seen in dotted line in Fig. 7, ceases to positively hold the shaft, 21, even before the cradle retreats after that encounter; and in order that the tripper arm, 22, may not drop back and reëngage the dog, 23, before the latter has time to become engaged with the ratchet hub, 26, the dog is provided with a spring-pressed terminal, 29, which directly receives the encounter of the tripper arm, 22, with the dog and is thrown back by its spring, 30, instantly when the trip arm is rocked out from behind it; and it thereby prevents the trip arm from coming back behind it, even if the engagement of the dog with the ratchet hub, 26, should be delayed. Loose on the rock-shaft, 21, outside the trip arm, 22, there is a second arm, 31; and a link, 32, extends from the arm, 22, through the arm, 31, which is provided with an eye, 31[a], for that purpose; and beyond the arm, 31, a spring, 33, is coiled around the link, 32, and stopped by a nut, 74, on the end of the link, reacting to force the two lever arms, 22 and 31, toward each other and resist their angular spread. The arm, 31, bears against a cam edge, 24[a], of the disk, 24, and this lodgment or stoppage of the arm, 31, causes it to act as a stop for the spring, 33, so that the spring resists the rocking of the shaft, 21, in the movement which disengages the trip arm, 22, from the dog and tends to return said arm to position for stopping the dog when the latter completes a revolution. When the finger, 19, collides with the lever arm, 21[a], for rocking the shaft, 21, it runs past the end of that lever arm after rocking the shaft a certain distance, thus permitting the shaft trip, 16, to be rocked through an angle not limited by the rocking of the shaft, 21; and as soon as the cradle starts on its return movement away from the elevator to position for receiving another bundle and withdraws the tripper, 15, from the trip, 16, the spring, 18, rocking back the trip, 16, retracts the finger, 19, over the end of the lever arm, 21[a]. In running back beyond the end of the lever arm, 21[a], the finger, 19, is deflected, the spring, 20, yielding for that purpose, leaving both the trip, 16, and the shaft, 21, free to rock back to normal position. The shaft, 21, rocking back thus, the trip arm, 22, is drawn back by the spring, 33, into the path of the terminal of the dog, 23, where it is stopped by arm, 40[a], on the rock shaft, 21, colliding with the frame bar, 17, (see Fig. 8.) upon the completion of one revolution of the shaft, 25, the dog, 23, collides with said trip arm, such collision bringing the shaft and the entire elevating mechanism to rest.

The cam edge, 24[a], of the disk, 24, comprises a radial shoulder, 24[b], and is spirally shaped from the inner to the outer end of the shoulder, so that as the disk rotates, the tension of the spring, 33, is increased by the crowding back of the lever arm, 31, and the abutment— a stud-and-roll, 36,— at the end of the arm which rests upon the edge of the spiral cam runs off the shoulder and becomes

engaged in the spirally shaped portion of the cam edge when the encounter of the dog 23 with the lever arm, 22, halts the rotation of the shaft. Such engagement of the lever, 31, with the shoulder prevents the reverse rotation of the elevating mechanism, which might otherwise be caused by the weight of the bundles carried on the elevator tending to run it back. The distance to which the elevator is moved up its inclined path by one rotation of the shaft, 25, is about half the entire length of that path, so that a bundle received at the foot of the elevator is halted about midway, and a second bundle received upon the next trip of the cradle is carried to the middle, while the preceding one is carried to the top.

It is the intention of the mechanism as constructed to deliver three bundles from the upper end of the elevator over into the shock receptacle by the travel of the elevator at the time the third bundle is received; and to give the elevator the necessary longer travel for each third bundle delivered to it, there is journaled in a hanger or bracket, 37, mounted on the frame, a gear, 38, which is meshed with a pinion, 39, on the shaft, 25, the gear, 38, having upon one side a flange, 38ª, extending through about 120 degrees about the axis of the wheel, and the rock shaft, 21, has a lever arm, 40, projecting in position to be encountered by the flange, 38ª, and lodged thereon through the portion of the rotation of the wheel, 38, corresponding to the angular extent of the flange. While the lever arm is thus lodged on the cam, the shaft, 21, is prevented from rocking to carry the trip arm, 22, back into the path of the dog, 23, and the rotation of the shaft, 25, and the action of the elevator is continued, therefore, during the portion of the rotation of the gear, 38, corresponding to the extent of its said flange. The gear, 38, has five times the number of teeth of the pinion, 39. During the first two revolutions of the pinion, 39, the flange, 38ª, is passing through a portion of its course out of the way of the lever arm, 40, and the pinion, 39, is therefore without effect upon the tripping of the elevator; but during the third revolution of the gear, 38, the flange, 38ª, encounters the lever arm, 40, and before the completion of that revolution that lever arm is lodged on the flange so as to hold the shaft, 21, in position to keep the trip arm, 22, out of the path of the dog; and the extent of the cam as stated,—about 120 degrees,—is sufficient to keep the lever in this position until the fifth revolution of the shaft, 25, so that after being tripped at the end of the first and second revolutions, the dog is again encountered by the trip arm and the elevating mechanism disengaged and brought to rest only at the end of the fifth revolution, and during the last three revolutions the first two bundles which have been received and carried up,—the first, one step, and the second, two steps,—are carried over and dropped into the shock receptacle, and the third bundle received at the commencement of the third revolution is carried three steps and thereby also dropped into the receptacle.

In the mechanism as constructed, it is designed that three or four successive groups of three bundles each shall be deposited in the shock receptacle to form a shock before the shock-binding mechanism is tripped to bind them and the tilting mechanism is operated for setting up and discharging the shock. In order to control the number of groups of three bundles each which are thus put into the shock receptacle before its binder is tripped, there is provided, rigid with the gear, 38, a pinion, 41, which meshes with a gear, 42. This gear is journaled on a bearing, 42ª, which is adjustable toward and from the axis of the pinion which drives it, as shown by the slotted arm, 37ª, of the bracket, 37. (See Fig. 10.) The purpose of this adjustability is to provide for the substitution of gears of different sizes at this point, said gear, 42 when designed for controlling the delivery of three groups of bundles of three each to form a shock of nine bundles, having three times the number of teeth of its driving pinion, and being substituted by a gear having four times that number for delivering four such groups; and the same means may be employed to any extent by providing additional interchangeable gears having teeth to a number of a still larger multiple of the number of teeth of the pinion.

On the elevator frame there is fulcrumed a lever, 43, having one end extending alongside the gear, 42, and the other end alongside the cam wheel, 44, of the shock binder, and in position to encounter the tail of the dog, 45, for tripping it out of engagement with the ratchet hub, 46, on the sprocket wheel, 47, which is loose on the binder driving shaft, 48, in a manner well understood. On the face of the gear wheel, 42, there is an abutment, 42ᵇ, which encounters the lower end of the lever, 43, once in each rotation of the gear, 42, and rocks said lever, 43, for disengagement of its upper end from the trip dog, thereby throwing the binder into action. The binder (not shown in full) may be understood as being a familiar form of harvester binder, which performs one complete action in the rotation of the binder shaft, 48, and the abutment on the wheel, 42, having run past the lever arm, 43, immediately after the latter is actuated for tripping the binder, said lever arm is back in position for encountering the trip dog, bringing the binder to rest when its rotation is completed. In order that the binder may be thus tripped into action, the wheel, 47, is continuously

driven by the chain, 49, passing about said wheel, 47, and about the sprocket wheel, 50, fast on the shaft, 51, which is continuously rotated in journal bearings mounted on the frame bars, 5 and 8, by means of a chain, 52, passing around the sprocket wheel, 53, on the grainward end of said shaft, 51, and around the sprocket wheel, 54, which is rigid with the gear, 27, which is continuously driven, as hereinbefore explained.

I claim:—

1. In a shocker for a grain harvester, in combination with a bundle-elevating mechanism and means for delivering the bundle thereto; means by which the delivery of each bundle trips the elevator into action; means for arresting the elevating action upon the completion of a given movement after each tripping; a wheel rotated in the elevator train; a device for interfering with the operation of the elevator-arresting device, and an element rotated by the last-mentioned wheel which operates said interfering means to cause the elevator to perform extra travel after a predetermined number of operations with ordinary travel.

2. In a grain shocker, a bundle elevator and means for delivering the bundles thereto; elevator-operating mechanism which operates in steps with rest intervals and in a cycle consisting of a predetermined number of such steps and intervals and which is tripped into action by the delivery of each bundle to the elevator; means for terminating each step of the elevating action normally after a limited amount of elevation less than the whole height of the elevator; a device for interfering with the action of said step-terminating means; a wheel in the elevator train which makes one complete revolution for each full cycle of the elevator's action; a device on said wheel which operates said interfering device to cause the elevator to operate periodically with an increased step.

3. In a grain shocker, a bundle elevator comprising bundle carriers and a train for operating them; means operated by the delivery of the bundle to the elevator for tripping the train into engagement with the driving power and means for disengaging it from the driving power to cause it to operate normally in steps corresponding to one rotation of a shaft in said train; means for interfering with the disengaging device to multiply the length of the step of the elevating action; a wheel rotated in the elevator train having a device which actuates said interfering means, said wheel being geared with the train to make one complete revolution for the complete cycle of the elevator's action including a predetermined number of normal steps and one multiplied step, such device being extended throughout the portion of the circumference of said wheel corresponding to the length of the multiplied step.

4. In a grain shocker, a bundle-elevating mechanism; means for delivering the bundles thereto; means for tripping the elevating mechanism into operation when the bundles are delivered to it, comprising a tripper on the bundle-delivering mechanism; a trip on the elevator frame with which the tripper collides upon the delivery of the bundle; a rock shaft mounted on the elevator frame; connections by which it is rocked by said collision of the tripper with the trip; a continuously rotating wheel; a clutch device for connecting such wheel with the initial operating shaft of the elevator, said trip rock shaft having a detent arm which engages the clutch dog to hold it out of operating connection with the continuously rotating wheel; a spring which tends to throw it into connection when relieved from the detent arm; a trip dog having a terminal with which said detent arm directly collides when it encounters the dog, said terminal being spring-pressed in the direction of such encounter and adapted to be retracted by its spring under the detent when the latter is lifted, and to prevent said detent from dropping in behind the dog again before the clutch engagement is effected.

5. In a shocker for a grain harvester, in combination with a bundle-elevating mechanism and means for delivering the bundles thereto, means by which the delivery of each bundle trips the elevator into action; means for arresting the elevating action upon the completion of a given movement after each tripping, the elevator train having a wheel provided with a part rotating with it for interfering with the elevator-arresting device at a predetermined part of the revolution of said wheel, said part being extended to continue such interference for a predetermined portion of said revolution to cause the elevator to perform a predetermined amount of extra travel after a predetermined number of operations in its ordinary travel.

6. In a shocker for a grain harvester, in combination with a bundle-elevating mechanism, means for delivering the bundles thereto comprising a rock shaft and means for rocking it; a tripper arm on the rock shaft and a driving dog which encounters the tripper arm for disengaging the elevator train, said rock shaft having an additional lever arm; a wheel in the elevator train comprising a part which is carried thereby into the path of movement of the last mentioned arm during a predetermined portion of the rotation of said wheel, said part being positioned during its travel in said path for arresting the arm to prevent the rocking of the shaft into position for causing the tripper arm to encounter the dog.

7. In a shocker for a grain harvester, in combination with a bundle-elevating mechanism consisting of an elevator driving train

comprising a clutch wheel; tripping devices comprising a rock shaft having two arms, one operating as a tripper arm for disengaging the clutch; a wheel in the driving train having a segment flange positioned on the wheel for being carried thereby in the path of the other arm of the rock shaft, said wheel being timed with respect to the remainder of the elevator train to make one complete revolution for a predetermined maximum number of full rotations of the clutch wheel, said flange occupying an angular portion of said wheel, leaving unoccupied a portion corresponding to a minimum number of rotations of the clutch wheel.

In testimony whereof, I have hereunto set my hand, in the presence of two witnesses, at Plano, Illinois, this 29th day of August, 1907.

JOSEPH BODA.

In presence of—
G. C. CAMPBELL,
B. M. OLSEN.