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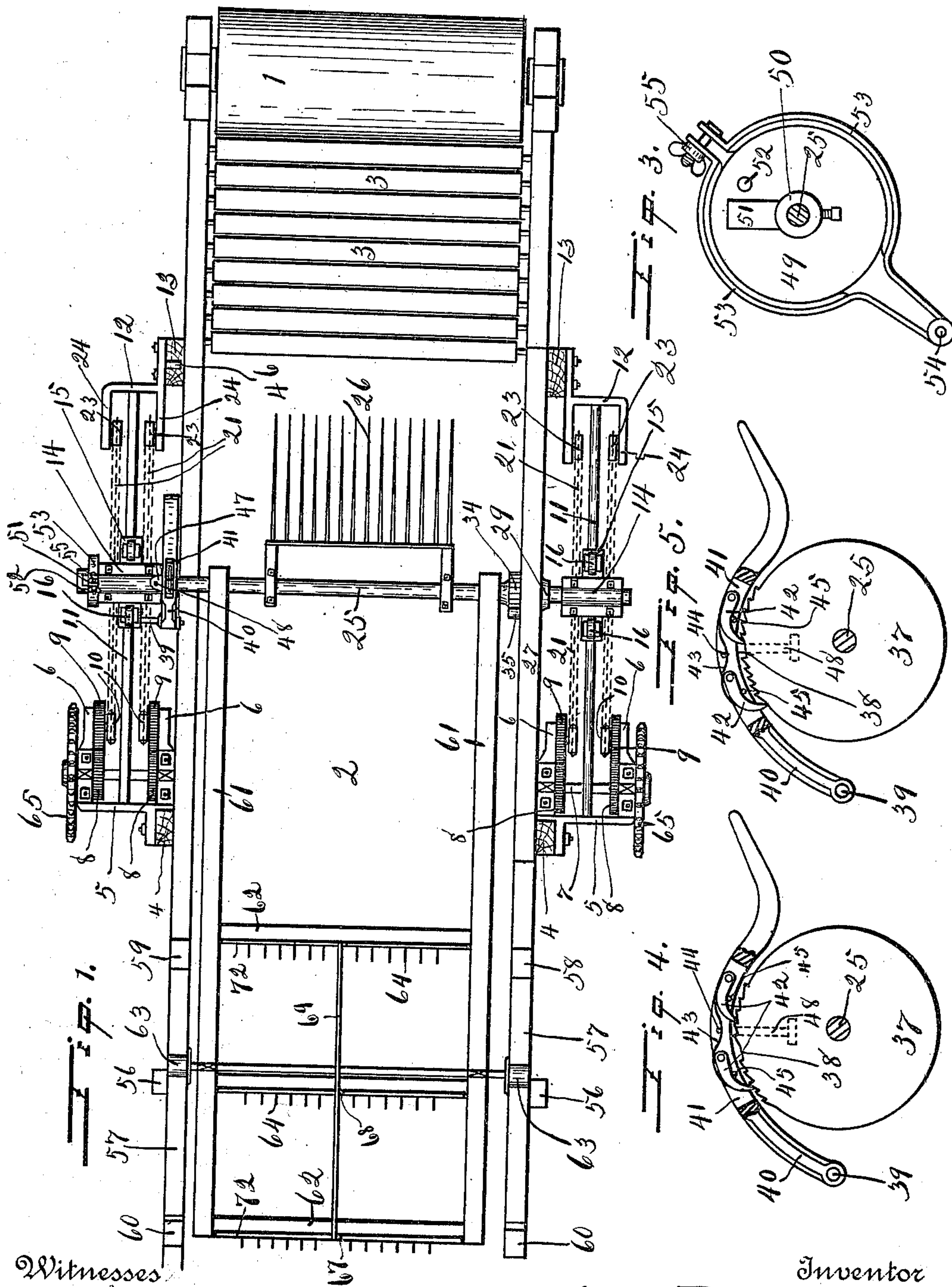
A. P. TATTERSON.

FORKING, ELEVATING, AND CONVEYING MACHINE.

(Application filed Dec. 6, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

M. Haynes.
Perley Haynes

Inventor

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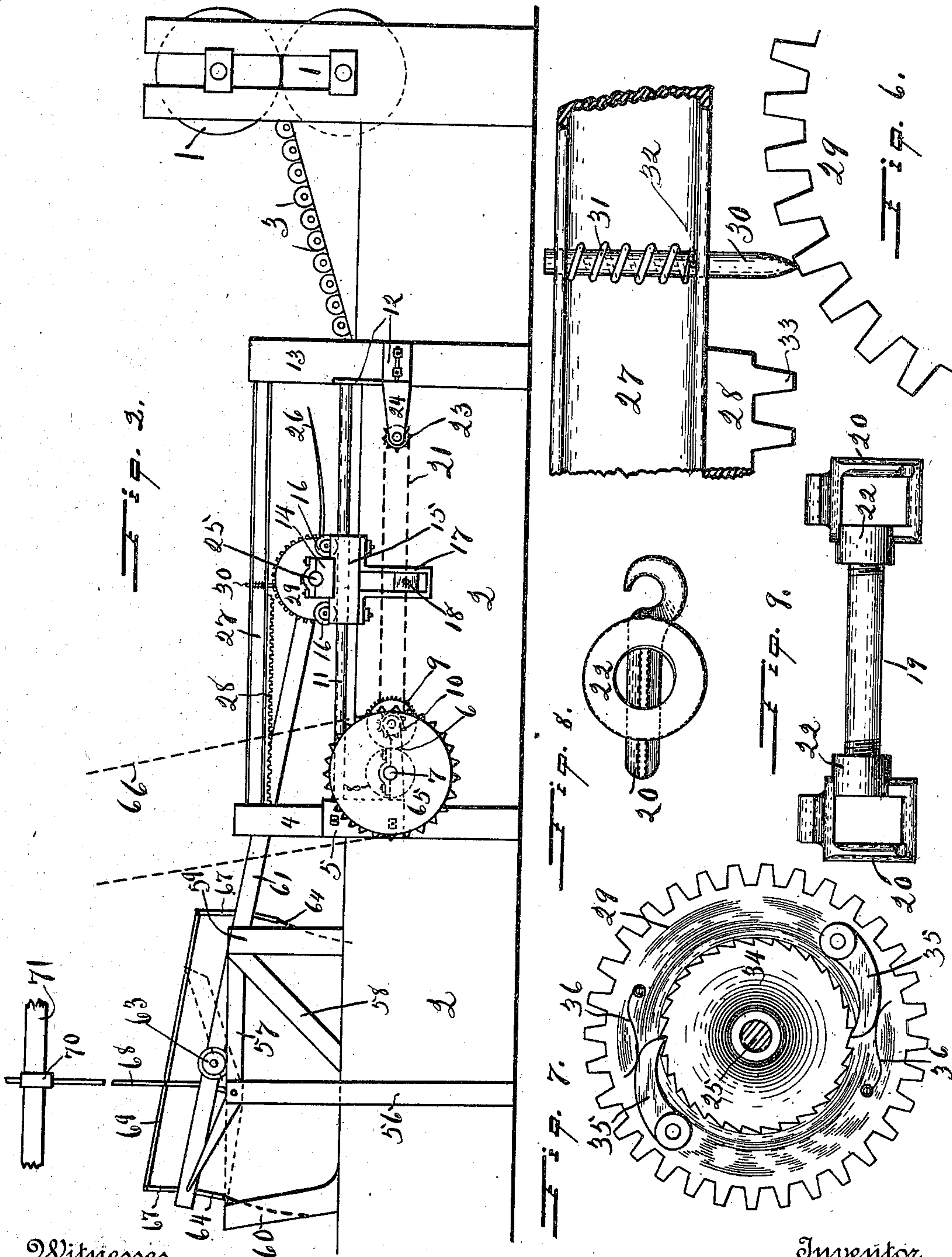
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UNITED STATES PATENT OFFICE.

ARTHUR P. TATTERSON, OF STOCKTON, CALIFORNIA.

FORKING, ELEVATING, AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,248, dated September 16, 1902.

Application filed December 6, 1901. Serial No. 84,897. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR P. TATTERSON, a citizen of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Forking, Elevating, and Conveying Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to certain improvements in that class of forking, elevating, and conveying machines used for handling fibrous and analogous material during the cleansing process, more particularly wool.

My object is to introduce a machine which will agitate the wool while in the washing tub or vat, convey the same to the end of said tub or vat, and then elevate said wool to a conveyor, which deposits it into the squeeze-rolls regularly by mechanical means automatically. This I accomplish by the peculiar construction, novel combination, and adaptation of parts hereinafter described, and particularly pointed out in the claims hereunto annexed, reference being had to the accompanying drawings for a better understanding thereof, in which—

Figure 1 is a plan view of my forking, elevating, and conveying machine. Fig. 2 is a side elevation of the same. Fig. 3 is a detached view of the friction device attached to the fork-shaft. Figs. 4 and 5 are detached enlarged views of the fork-supporting ratchet and pawls, showing different positions assumed by the same. Fig. 6 is an enlarged detail view of the spring-tooth in front of the cog-rack. Fig. 7 is a detail view of the fork-operating ratchet, showing the position and application of the double pawls. Figs. 8 and 9 are detail views of one of the chain-links, showing the connection with the carrying-block. Fig. 10 is a detached side elevation of the rake, showing the fork-swinging attachment. Fig. 11 is a detached top view showing the manner of journaling the rake-shaft to which the rakes are attached. Fig. 12 is a detail view of the oscillating pivot. Fig.

13 is a detached top view of the carriage located on the rear side of the tub, showing the position occupied by ratchet-wheel 37 and the shaft 25. Fig. 14 is an end view of the same, showing the attachment of the pin 39 to said carriage and the pin 19 in the block 18, located in the yoke or slotted member 17. Fig. 15 is a detached horizontal sectional view of the block 18 and slotted member 17, with the pin 19 in position in the block.

Similar figures of reference indicate corresponding parts throughout all the views.

I shall designate the squeeze-rolls 1, which are of the form and function in general use and are located in suitable bearings at one end of a suitable tub or vat 2, such as is used for washing wool or other analogous fibrous material. An apron or conveyer, formed, preferably, of a series of rollers 3, which are old in this class of machines, is located in juxtaposition to the squeeze-rolls 1, over the tub or vat 2, as shown in Figs. 1 and 2, for the purpose hereinafter described.

I arrange and attach posts 4 one on either side of and at a suitable point longitudinally on the vat or tub 2. To each post 4 I attach a bracket 5, which is of the form shown in Figs. 1 and 2, having the extending arms 6, adapted to support a shaft 7, which is journaled in suitable boxes on the same and adapted to carry two cog-wheels 8, which are rigidly attached to the same immediately within the said arms 6. Similar cog-wheels 9, adapted to engage with the said wheels 8, are journaled on suitable pins or studs rigidly inserted in the ends of the arms 6 of the brackets 5. Each of said wheels 9 has a small sprocket 10 rigidly attached on the inner side thereof for the purpose presently shown. Each of the brackets 5 has one end of a rod or track 11 inserted in the web, near the top thereof, which extends forward, and has its other end rigidly attached to a similar bracket 12, which is adjustably attached to posts 13, rigidly attached to the side of the tub or vat 2 at suitable points thereon, as shown in Figs. 1 and 2. These rods or tracks 11 are arranged horizontally on each side of the tub or vat 2, parallel with the same and with each other, as shown in Figs. 1 and 2. Each of said rods or tracks 11 is adapted to support and guide a journal-bearing 14, which may be rigidly

seated or formed on the top of a carriage 15, which has two roller-bearings 16 journaled therein and adapted to bear on the said track 11. A vertically-slotted member or yoke 17 (shown in Fig. 2) is rigidly attached beneath the said carriage 15 and depends therefrom. A block 18 is inserted in the slot of the said member 17 and is adapted to slide therein, and has a cross-head pin 19, transversely through the same, in an opening therefor in which said cross-head pin is adapted to turn, the same having threads cut on each end thereof which are adapted to receive an improved link-belt link 20, specially designed for this purpose and shown in Figs. 8 and 9, said link having a lug 22 formed on one side thereof, provided with a hole having internal threads cut therein to receive the threaded end of the pin 19. The lug 22 is arranged in a line with the center of the link 20, so that any tension or resistance brought to bear on the pin 19 will not tip said link 20 from its regular course or position in the belt.

As will be seen in Fig. 1, I employ two link belts 21 for the operation of each carriage 15, one belt on each side of the slotted member 17, each belt having a link 20 in its length, which links 20 are arranged opposite to each other, so as to each receive one end of the pin 19, having the block 18 thereon. The said belts 21 are adapted to be driven by the sprockets 10 and are supported at their extreme length by similar sprockets 23, which are journaled on pins or studs inserted near the ends of arms 24 on the brackets 12. The brackets 12 are placed on the posts 13 in a manner so as to be properly adjusted.

A shaft 25 is journaled transversely of the tub or vat 2 in the bearings 14 and has a fork 26 rigidly attached to the same, as shown in Fig. 1, so as to be operated in the tub or vat 2.

On one side of the tub or vat 2, between the posts 4 and 13, I attach a bar 27 parallel with the tub or vat and provide the same with a cog-rack 28 on its under side for a suitable distance on one end, as shown in Fig. 2. A cog-wheel 29 is loosely fitted on the shaft 25 immediately beneath the bar 27 and adapted to engage with the said cog-rack 28. A tooth 30 is inserted vertically in the bar 27 the space of two teeth from the end tooth 33 of the cog-rack 28 and has a coil or helical spring 31 inserted over the body thereof, which is adapted to bear against a pin 32, which is rigidly inserted in said tooth, so as to maintain the same in a depressed position. The lower end of the said tooth 30 I prefer to be pointed or chisel-shaped for the purpose hereinafter shown. I arrange a ratchet-wheel 34 in juxtaposition to the cog-wheel 29 and rigidly attach the same to the shaft 25. I pivot two pawls 35 on pins or studs inserted at opposite points in the side of the said cog-wheel 29 in a manner so as to engage the teeth of the ratchet 34 alternately, as shown in Fig. 7, thus reducing the lost motion to a minimum. Suitable springs 36 are attached to

the cog-wheel 29 and adapted to bear on the pawls 35 to maintain the same in engagement with the ratchet.

Near the bearing 14 on the rear side of the tub or vat 2 I rigidly attach a ratchet-wheel 37 to the shaft 25. (Shown in detail in Figs. 4 and 5.) The said ratchet-wheel 37 has a few teeth only, arranged on one side thereof, as shown, in the center of which one tooth is omitted at the point 38, thus making two groups of teeth for the purpose hereinafter shown.

A stem or stud 39 is rigidly attached to the bearing 14 and carriage 15 and extends to a point opposite the ratchet-wheel 37 and is adapted to receive a curved arm 40, which is pivoted thereon and adapted to rest over the said ratchet-wheel 37 and is provided with a slot 41 vertically in the same, in which said slot two pawls 42 are pivoted with their points extending downwardly, and they are arranged so as to engage the ratchet-teeth of the wheel 37 alternately. By means of such adjustment of the said pawls 42 the fork 26 is maintained in the position desired, reducing lost motion to a minimum. The pawls 42 are maintained in engagement with the teeth of the wheel 37 by means of a spring 43, which is placed between and at the back of the said pawls 42, adapted to engage each pawl, and is maintained at a tension by means of a pin 44 through the arm 40. The pawls 42 are prevented from continuous wear on the ratchet-wheel 37 as the same revolves by means of pins 45 through the said arm 40, on which they rest. The arm 40 is curved, as shown in Figs. 4 and 5, having the free end curved up, so as to engage the pin 46, located on the post 13, as hereinafter described. Said arm 40 is provided with a lug 47 on one side, through which the threaded end of a stud or pin 48 is inserted, as shown in Figs. 4 and 5, which said stud or pin 48 is adapted to rest on the cap of the journal-bearing 14, thus taking the weight of the arm 40 off the pawls 42, which would otherwise receive the same.

I attach a friction device to the rear end of the fork-shaft 25, a rear view of which is shown in Fig. 3. This is composed most essentially of a friction-wheel 49, having a smooth periphery loosely inserted on the end of the shaft 25. On the end of the shaft 25 next to the said wheel 49 a collar 50 is rigidly attached by means of a set-screw, said collar 50 having a finger or extension 51 extending from one side which is adapted to engage with a pin or stud 52, located in the side of the friction-wheel 49 to lug the same for the purpose presently shown. Two bands 53, adapted to fit over the surface of the wheel 49, are permanently attached at their base to the carriage 15 or bearing 14 by a pin or stud 54. The bands 53 are impinged upon the wheel 49 by means of a thumb-nut and bolt 55, introduced through openings in their free ends, which said thumb-nut is adapted to impinge upon a spring, so that when the said bands

53 wear said spring causes the bands 53 to maintain the same pressure upon the friction-wheel 49. To the rear of the posts 4 and the shaft 25 I arrange on either side of the tub or vat 2 a frame, as shown in Fig. 2, composed most essentially of a post 56, attached to the side of the tub or vat 2, to which a tilting rail 57, angular in shape, as shown, is pivoted. The front end of said rail 57 is adapted to rest on an inclined track 58, which is supported by a short post 59, resting on the side of the tub or vat 2. The other end is adapted to tilt against a post 60, which is rigidly located on the side of the tub, as shown, said post 60 having one side of its lower end curved for the purpose as will be shown.

I employ a rake, composed of the arms 61, which have one end journaled to the shaft 25 and whose other ends are secured together by cross-bars 62 and supported on trucks 63, which are adapted to rest on the track 57 58 60, as hereinafter described. The frame 61 62 has rock-shafts 72 pivoted or journaled in the side of the said arms 61, said rock-shafts being adapted to support and operate the forks or rakes 64, which depend therefrom and are rigidly attached thereto. The rock-shafts 72 each have a projecting arm 67 rigidly attached thereto, which is adapted to project upwardly and receive a connecting-rod 69, which is pivotally attached to their free ends. One of the said arms 68 is extended upwardly and adapted to protrude through an oscillating pivot 70, which has an opening therefor, and a stem 73, attached to one side thereof, which is journaled in a bar or beam 71, suitably located above the tub or vat 2. The stem 73 may be fastened in said beam 71 by a pin 74. (Shown in Fig. 12.)

The shafts 7 are each provided with a sprocket 65, which is rigidly attached to the outer end thereof and are driven by link belts 66, said sprockets being of the same size, so as to rotate the said shafts 7 at the same speed simultaneously. The cog-wheels 8 are all of equal diameter, also the cog-wheels 9 and the sprocket-wheels 10, thus operating and propelling the belts 21 at the same speed simultaneously, which, as will be seen, propels both ends of the shaft and its fork to and fro simultaneously. By driving the fork-shaft 25 at each end independently the tub or vat 2 is left clear of any obstruction to hinder the free manipulation of the wool or analogous material operated upon.

The mode of operating my improved forking, elevating, and conveying machine is as follows: After the parts are assembled, as described, power is applied to the belts 66. The sprocket-wheels 65 are thus set in motion, which, by means of the shafts 7, rotate the cog-wheels 8 and 9, which engage one another. The sprocket-wheels 10, which are rigidly attached to the said cog-wheels 9, are set in motion, which propel the link belts 21. The links 20 22, with the pin 19 arranged between the same, are carried to and fro over

the sprockets 10 and 23 as the same are put in motion. The blocks 18, through which the pins 19 are introduced, are inserted between the parts of the member or yoke 17. As the links 20 22 are carried forward by the link belts 21 the carriages 15 are propelled by reason of the members or yokes 17 being engaged by the said blocks 18, said carriages being supported and guided by the tracks 11, on which the roller bearings or trucks are adapted to bear. When the carriages 15 and their shaft 25 are carried rearwardly from the squeeze-rolls 1, the cog-wheel 29 engages with the spring-tooth 30. If the said cog-wheel 29 is at a certain point in its revolution, the spring-tooth 30 will engage the point of one of the teeth, as shown in Fig. 6. By reason of the spring 31 the tooth 30 is depressed by the gear-tooth until by reason of the friction caused by said spring 31 and the forward motion of the cog-wheel 29, carried by the shaft 25, the same slips off the point of the gear-tooth, thus bringing the cog-wheel into position for the correct engagement of the cog-rack 28. Without the use of this tooth 30 the points of the teeth of the cog-rack 28 and the cog-wheel 29 are very liable to come in contact with each other very frequently, which sometimes causes breakage. As the carriages and shaft 25 are propelled rearwardly and the cog-wheel 29 engages with the cog-rack 28, the said wheel 29 is allowed to turn on the shaft 25, by reason of the pawls 35 and ratchet 34, until the links 20 22 are carried over the sprockets 10, whereupon the pin 19 turns in the block 18 and the motion of the carriages and shaft 25 is reversed. As the cog-wheel 29 is revolved in a rearward direction one of the pawls 35 engages the teeth of the ratchet-wheel 34 and causes the shaft 25 to revolve, which carries the fork 26 over, the points of the tines of which describe an involute in their rotation around the shaft 25 and their forward movement toward the squeeze-rolls 1. As the carriages 15 and the shaft 25 move forward toward the squeeze-rolls 1, carried by the links 20 22 of the link-belts 21, engaging the members 17 beneath the said carriage 15, and as the said shaft 25 is rotated by the cog-wheel 29 and ratchet 34 the fork 26 dips down into the tub or vat 2 and raises a portion of its contents on the tines thereof, at the same time agitating the liquid in the tub or vat 2. The fork 26 is raised slightly above the apron or conveyer 3, whereupon the cog-wheel 29 reaches the end of the cog-rack 28, which is adjusted for that purpose, and the fork 26 is held in said position by one of the pawls 42 engaging the teeth of the wheel 37 until the said fork 26 is carried over the apron or conveyer 3 and dumped by means of the arm 40 engaging the pin 46, which raises said arm 40 and disengages the said pawls 42 from the ratchet-wheel 37, whereupon the fork, by its own weight and the weight of its load, drops upon the apron or conveyer 3, and said load is carried into the

squeeze-rolls 1. The fork 26 is allowed to drop at this point by reason of the collar 50, having the arm 51, which is rigidly attached to the shaft 25, which said arm 51 is adapted to engage a pin or stud 52 in the friction-wheel 49, so as to control the forward motion of the shaft 25 and fork 26, but which allows the free rearward movement of the said fork when not controlled by the ratchet-wheel 37 and pawls 42. Just before the fork 26 is dumped the pawls 42 engage the ratchet-wheel 37, as shown in Fig. 4, and immediately after being released the pawls 42 assume the position shown in Fig. 5, the ratchet-wheel 37 having been so adjusted on the shaft 25. After the fork 26 is dumped or almost simultaneously therewith the links 20 22 pass over the sprockets 23, and the rearward propulsion of the fork begins. The fork rests on the apron 3 and as the same recedes is allowed to bear on the said apron 3 by reason of the omission of a tooth in the ratchet-wheel 37, hereinbefore mentioned, which allows the fork to drop as it follows the declension of the apron 3, thus drawing the wool or other material from the tines of the fork. The carriages 15 move rearwardly for another load, and the operation of the fork is repeated. As the shaft 25 moves forward the rake, which has its arms 61 journaled thereto, is drawn forward, and the trucks 63 are adapted to follow up the track 58, whereupon the end of the rail 57 will be pressed upwardly by the trucks 63 until said trucks pass the end, when the rail 57 will assume its normal position, as shown in Fig. 2. With the reversed movement of the carriage 15 and shaft 25 the rake is pushed rearwardly, the trucks 63 traversing the rail 57, which tilts, as shown in dotted lines, Fig. 2, when the trucks pass the pivot, until said trucks reach the top of the post 60, beyond the end of the rail, whereupon the same will fall to its normal position. The motion of the shaft 25 and carriages 15 being reversed the trucks 63 follow the faces of the posts 60 downwardly, which causes the forks or rakes 64 to be depressed into the tub or vat 2, whereupon said forks or rakes 64 are drawn forward, pulling the contents of the tub or vat 2 forward toward the fork 26. The trucks 63 follow up the track 58, and the operation is repeated.

By having the rakes 64 attached to rocking shafts 72 and the arm or rod 68 passing through the pivot 70 the efficiency of the rakes is increased, as when the frame 61 62 is brought to its forward limit, as shown in Fig. 10, the points of the tines of the rakes 64 are brought forward of the rock-shafts 72, while at the beginning of the stroke the said tines reach rearwardly by reason of the arm or rod 68 engaging the pivot 70 and the connecting-rod 69 engaging the arms 67 and 68. As the frame 61 and 62 is brought forward the ends of the tines of the rakes 64 travel more rapidly and farther than the said frame, thus giving more of an impetus to the wool and

water near the ends of the tines of said rakes, which has a tendency to create a stirring or gyratory motion, thus effectually agitating the contents of the tub or vat while the same is being carried forward toward the fork 26.

A great advantage of my invention is the extreme simplicity and regularity of the propelling and reversing mechanism of my machine in the form of link belts operated over sprocket-wheels, with the block engaging the carriage.

I have dispensed in both the description and drawings with many features of my machine which I am well aware are not new in machines of this class and have shown such old parts only as are necessary to illustrate my invention.

The above features I do not claim broadly; but

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

1. In a machine of the class described, the combination with a suitable tub or vat of a shaft journaled on carriages arranged at each end thereof, the said carriages adapted to operate to and fro on tracks arranged at the sides of the tub or vat, a cog-wheel loosely journaled on the shaft aforesaid and adapted to engage with a cog-rack suitably mounted on the tub or vat, a ratchet-wheel rigidly attached to the shaft and adapted to be engaged by pawls pivoted to the said cog-wheel, a suitable fork rigidly attached to the shaft and suitable means for oscillating the said carriages to and fro all arranged and operating substantially as shown and described and for the purposes specified.

2. In a machine of the class described a fork rigidly attached to a shaft which is journaled in suitable bearings on carriages adapted to travel to and fro and suitable means for revolving said shaft, simultaneously with the forward movement of the carriages, in a manner so that the free ends of the tines of said fork will describe an involute in their rotation around said shaft all arranged and operating substantially as shown and for the purposes specified.

3. In a machine for the automatic washing of wool and analogous materials, a shaft driven intermittently by a cog-wheel which is loosely mounted thereon and adapted to engage a cog-rack, said cog-wheel having two or more pawls pivoted thereto, which are adapted to engage a ratchet-wheel as described, in combination with suitable journals for said shaft mounted on suitable carriages all arranged and operating substantially as shown and described and for the purposes set forth herein.

4. In a machine for washing wool or other analogous material a friction-wheel 49 loosely journaled on the main shaft and adapted to be engaged by a friction, the collar 50 provided with the finger or extension 51, adapted to engage the pin 52 in the side of the friction-wheel 49, rigidly attached to the main shaft aforesaid, said main shaft having a suit-

able fork rigidly attached and suitable means for operating said shaft all arranged and operating substantially as shown and described and for the purposes specified.

5 5. In a machine of the class described a ratchet-pawl composed of the curved arm 40 suitably pivoted on the pin or stud 39, and having the slot 41 arranged therein, the two pawls 42 pivoted in said slot, and adapted to
10 engage the teeth of a ratchet-wheel 37, as described, the spring 43 adapted to engage the pawls 42, the pins 45 and 44 inserted in the arm 40 beneath the pawls 42 and over the
15 spring 43 respectively, and the pin or stud 48 inserted in the lug 47 of the arm 40, in combination with the said ratchet-wheel 37 and the shaft 25 having the fork 26 and suitable means of operating said shaft all arranged and operating substantially as shown
20 and for the purposes specified.

6. In a machine of the class described the mode of propelling the shaft 25 and its carriages, comprising the yoke 17 having the block 18 located between its parts, the pin 19
25 inserted through said block 18, the link-belt links 20, having the lugs 22 on one side, attached one on each end of the pin 19 and forming a part of the two link belts, said link belts 21 adapted to run over sprockets suitably journaled and suitable means of imparting motion to said sprockets all arranged and operating substantially as shown and for the purposes specified.

7. In a machine of the class described, the
35 spring-tooth 30 inserted in the bar 27 and having the coil or helical spring 31 adapted to comprehend the same and bear against the pin 32, said tooth 30 being placed a suitable distance from the cog-rack 28 the bar 27
40 adapted to receive the tooth 30, said rack 28 attached to said bar 27 and the cog-wheel 29 which is adapted and calculated to travel toward said cog-rack, in combination with a suitable shaft suitably journaled on carriages
45 and having a fork rigidly attached thereto, all arranged and operating substantially as shown and described and for the purposes specified.

8. In a machine of the class described the
50 combination of a suitable fork 26 rigidly attached to a shaft arranged transversely on a tub or vat, said shaft, journaled at each end in boxes mounted on independent carriages, arranged on opposite sides of the said tub or
55 vat, the said carriages, which are adapted to operate to and fro on horizontal tracks rigidly attached on the sides of the tub or vat, the yoke 17 suspended from and rigidly attached to the said carriages and having the slot therein, the block 18 inserted in the yoke 17, the pin 19 introduced into an opening in the block 18, and having right and left screw-threads cut on either end thereof, the link-belt links 20 22 adapted to engage the said
60 pin 19, said link-belt links 20 22 being embodied in the link belts 21, said link belts 21 taking over the sprocket-wheels 23 and 10,

said sprocket-wheels 23 and 10 suitably journaled on brackets, the cog-wheels 9 rigidly attached to the sprockets 10, the cog-wheels 70 8 rigidly attached to a shaft 7 and engaging the wheels 9, said shaft 7 journaled on a bracket at the side of the tub or vat and suitable means for rotating said shaft 7 and the shaft 25, all arranged and operating substantially as shown and described, and for the purposes specified.

9. In a machine of the class described the combination with a suitable tub or vat of the shaft 25, having the fork 26, journaled on carriages 15 arranged on either side of the said tub or vat, said carriages 15, each mounted on a track and propelled to and fro by two link belts 21 which have the links 20 22 in their length, suitable power engaging said
85 link belts, a cog-wheel 29 loosely journaled on the said shaft 25 and having the pawls 35, the ratchet-wheel 34 rigidly attached to the shaft 25, and adapted to be engaged intermittently by the said pawls, a suitable cog-rack 90 28 mounted on the said tub or vat, and adapted to engage the cog-wheel 29, the spring-tooth 30 31 32 located immediately in front of the cog-rack 28 and adapted to regulate the cog-wheel 29 for engagement with the said
95 cog-rack 28, all arranged and operating substantially as shown and described and for the purposes set forth herein.

10. In a machine of the class described the combination with a suitable tub or vat, a fork 100 and its shaft suitably mounted on carriages adapted to be propelled to and fro and suitable means for rotating said shaft and fork, of a rake composed of two arms 61 journaled at one end to the said fork-shaft, and having
105 suitable cross-bars attached thereto, the free end being supported on trucks 63 adapted to rest on the track 57 58 60, said track 58 60 having the tilting rail 57 angular in form pivoted on the post 56, the rock-shafts 72 journaled in the arms 61 and adapted to support
110 rakes or forks 64, said rakes or forks which are rigidly attached thereto and depend therefrom, the arms 67 rigidly attached to the rock-shafts 72, the rod 69 attached to the free ends
115 of the arms 67, the arm 68 attached to the rod 69 and engaging the pivot 70 73, and said pivot 70 73 all arranged and operating substantially as shown and described and for the purposes specified herein.

11. In a machine of the class described a suitable tub or vat on which a shaft is mounted transversely thereto on carriages, said shaft having a suitable fork rigidly attached thereto, said carriages being adapted to oscillate
125 to and fro on the tub or vat, the chains or belts 21 adapted to engage the carriages, suitable cog-wheels adapted to communicate motion to the said chains or belts, a cog-wheel loosely mounted on the shaft aforesaid and
130 adapted to engage a cog-rack in a manner so as to rotate the shaft intermittently, the friction device 50 51 49 53 55, attached to the said shaft the retaining ratchet-wheel 37 and

its double pawls 40 41 42 43 44 45, which are adapted to engage the pin 46, and a rake attached to the said shaft so as to operate to and fro with the same, and suitable means
5 for changing the angle of the forks or rakes, all arranged and operating substantially as shown and for the purposes specified.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ARTHUR P. TATTERSON.

Witnesses:

GEO. W. TATTERSON,
M. HAYNES.