

No. 892,828.

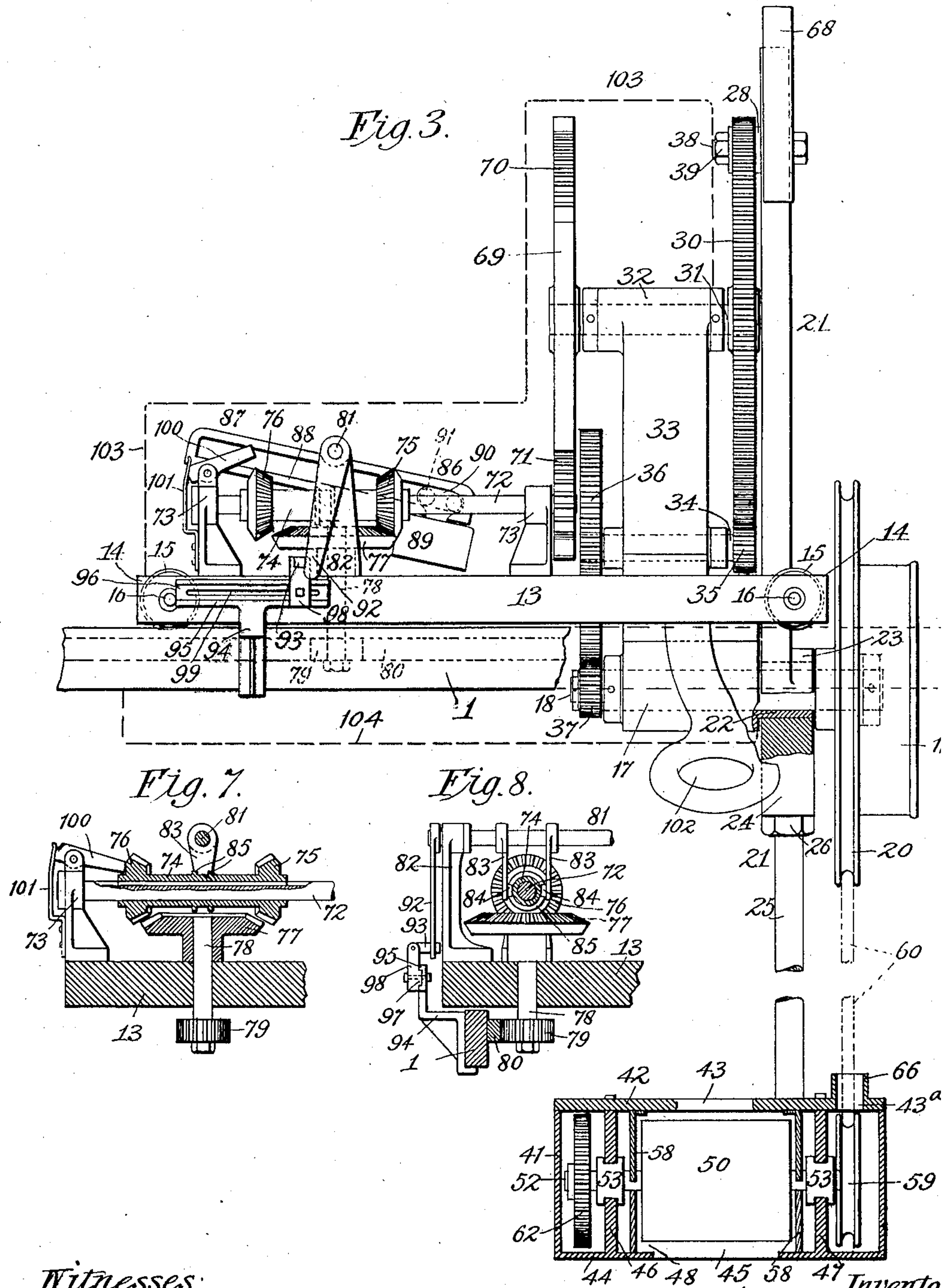
PATENTED JULY 7, 1908.

J. GREMMINGER.

MACHINE FOR AUTOMATICALLY FOLDING OR PLAITING GOODS
IN VATS OR KEIRS.

APPLICATION FILED MAR. 28, 1908.

4 SHEETS—SHEET 2.



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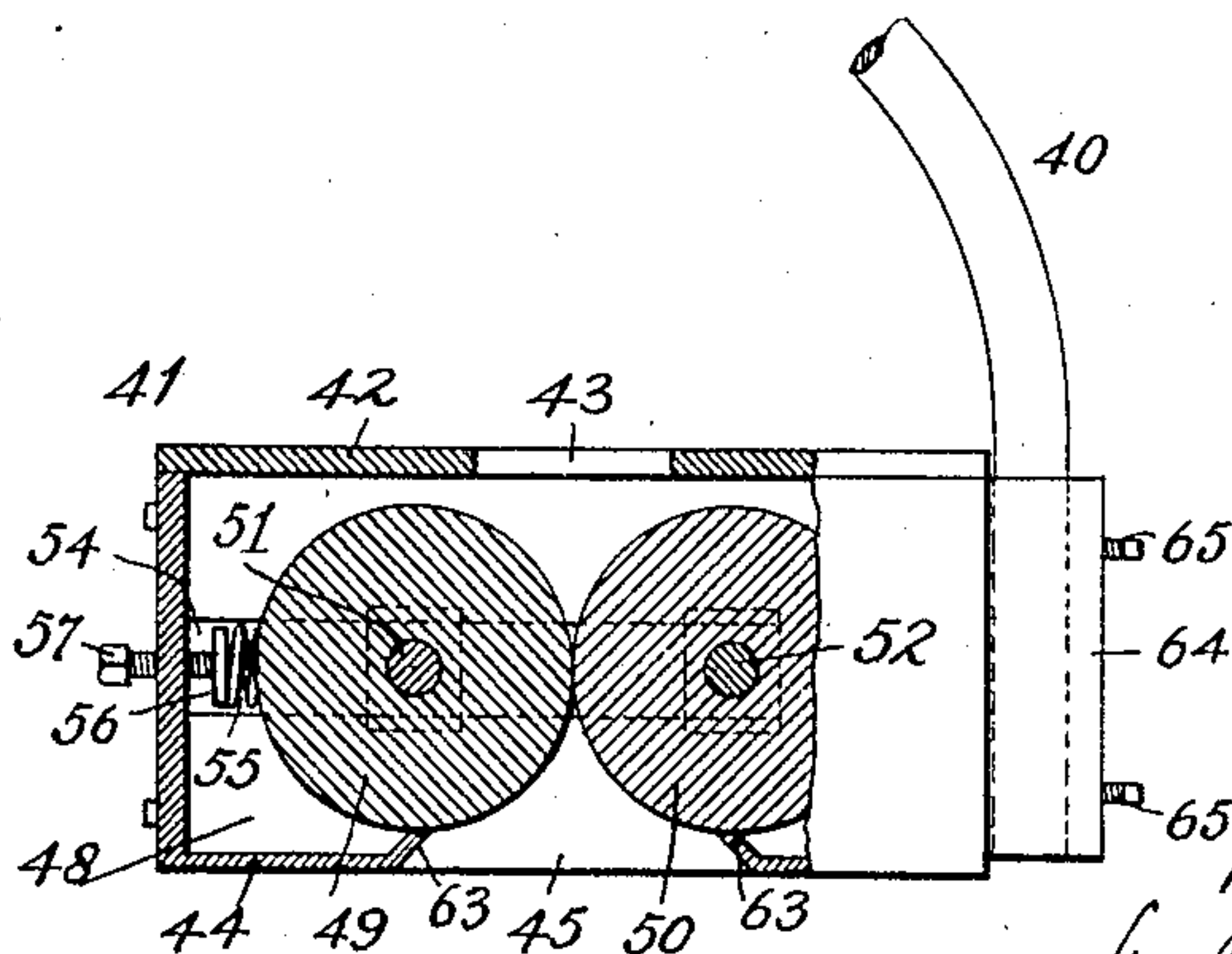
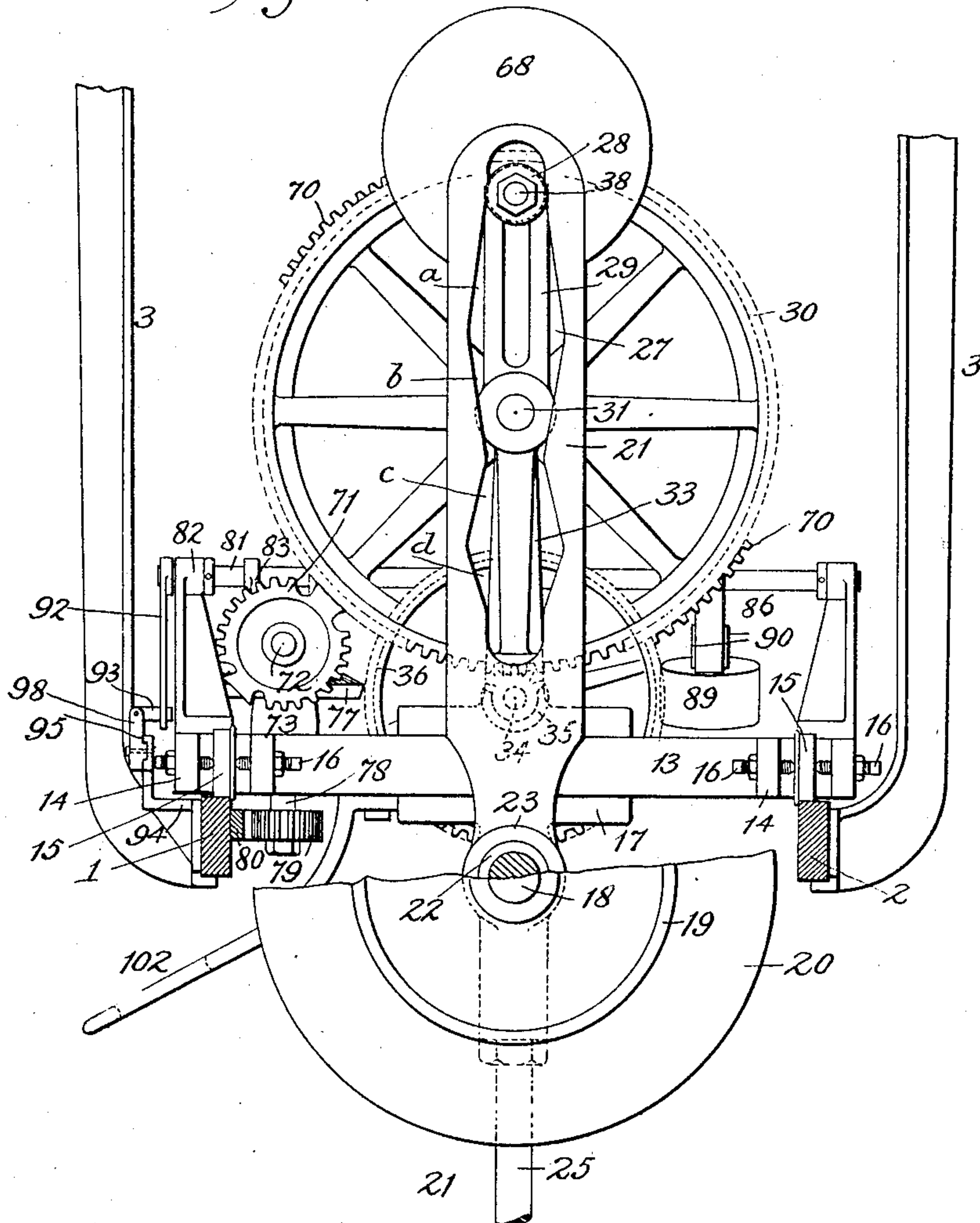
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4 SHEETS—SHEET 3.

Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

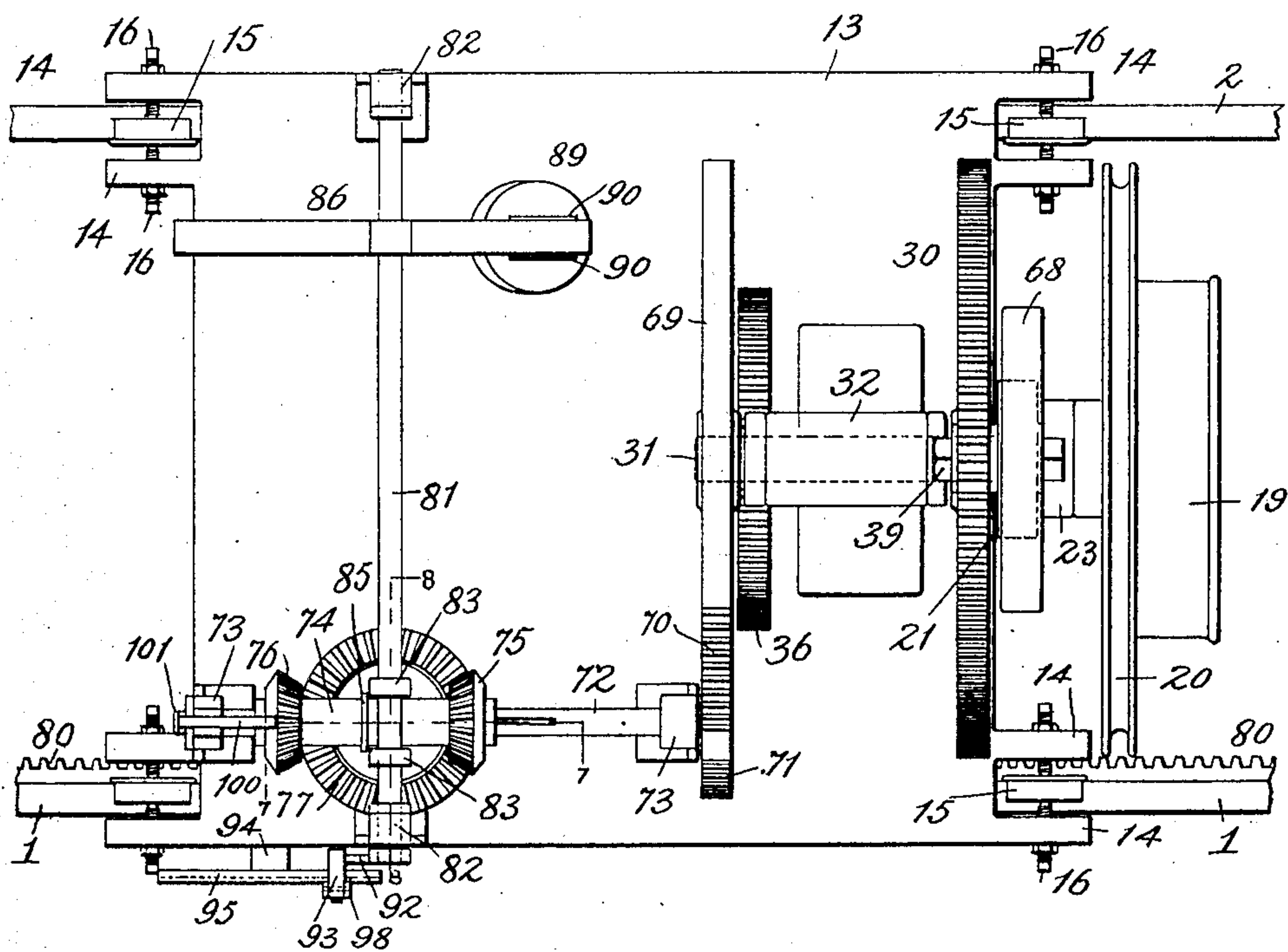


Fig. 6.

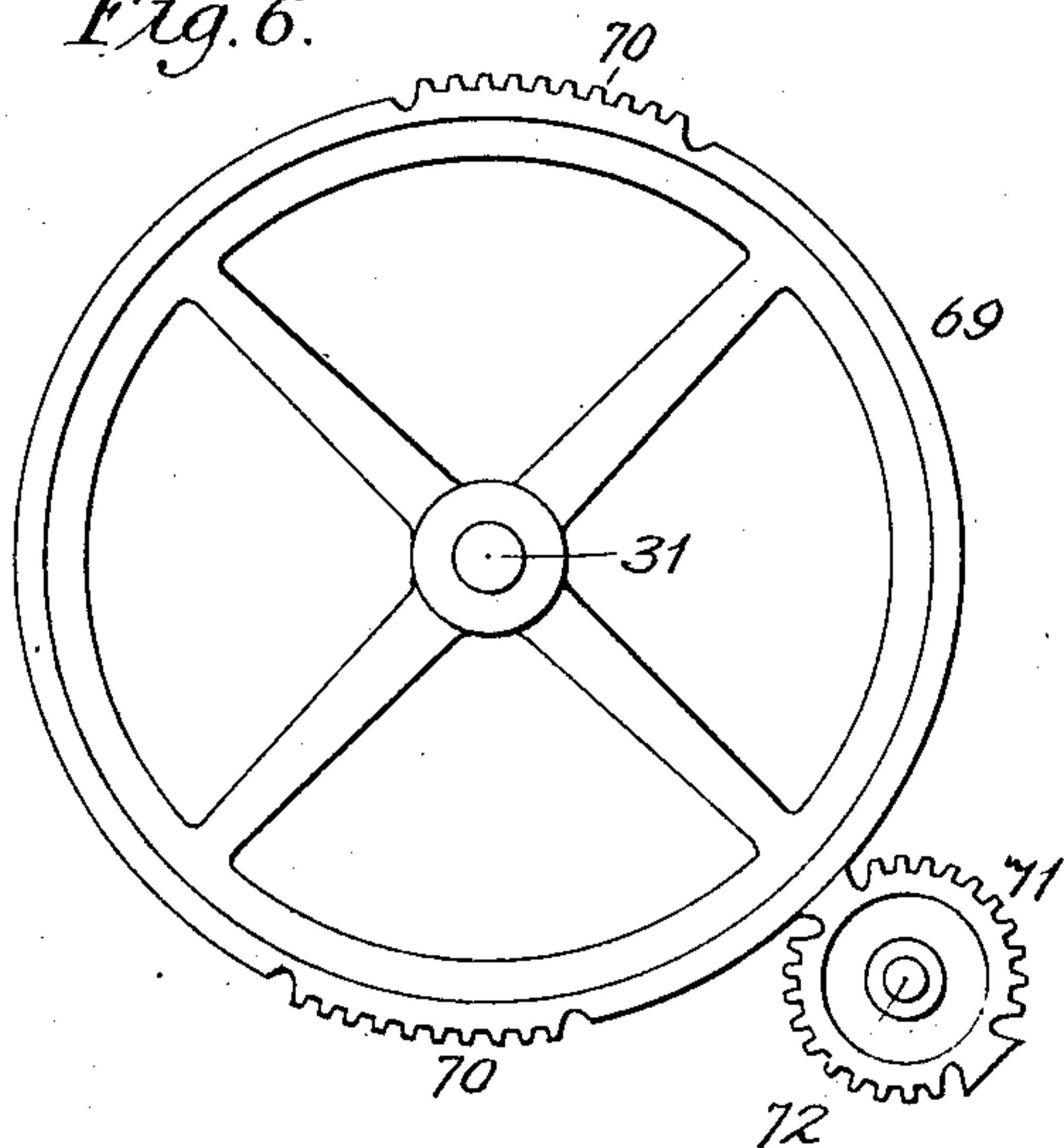
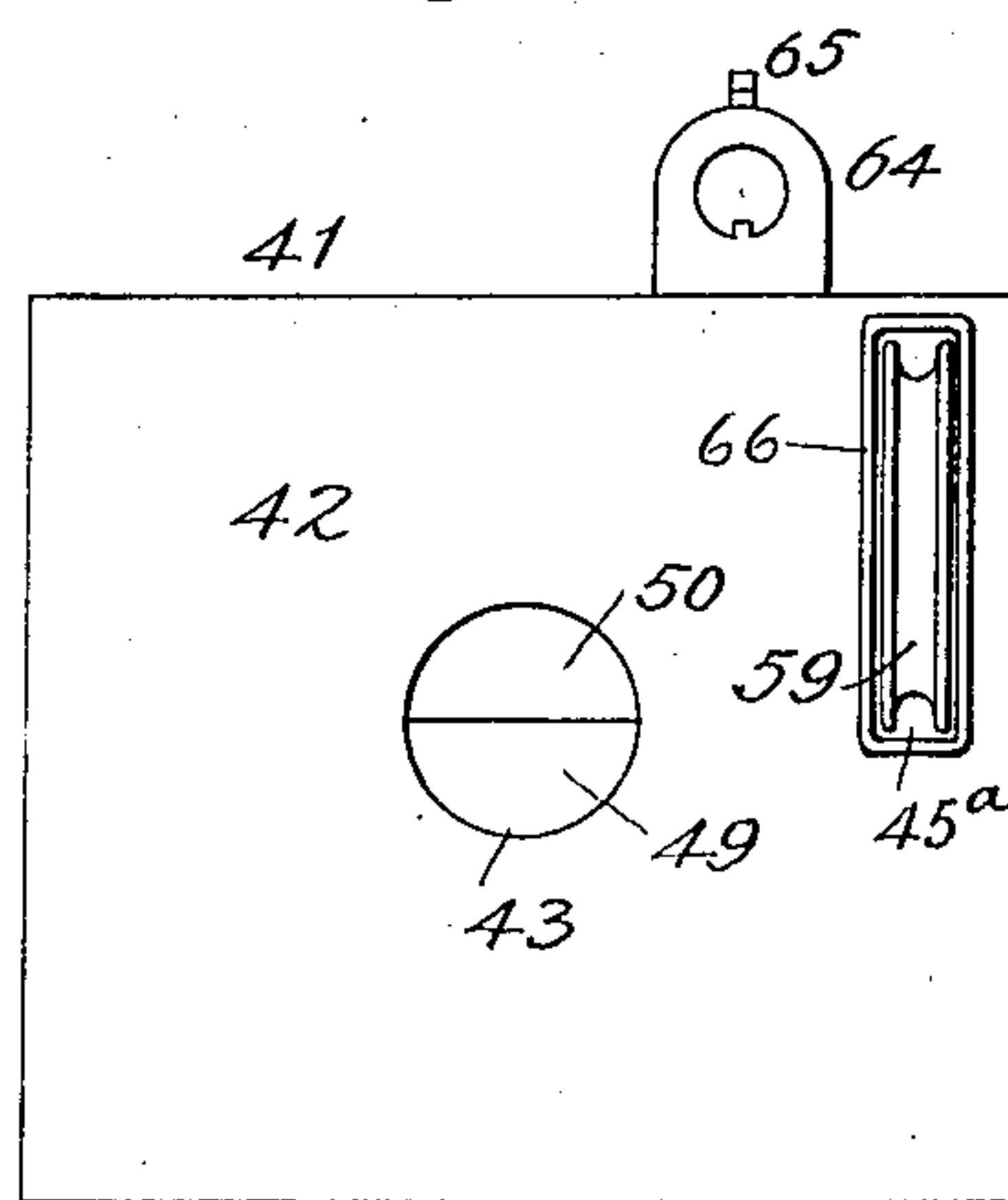


Fig. 9.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR AUTOMATICALLY FOLDING OR PLAITING GOODS IN VATS OR KEIRS.

No. 892,828.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed March 28, 1908. Serial No. 423,935.

To all whom it may concern:

Be it known that I, JOSEPH GREMMINGER, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented new and useful Improvements in Machines for Automatically Folding or Plaiting Goods in Vats or Keirs, of which the following is a specification.

This invention relates to a machine for laying in plaits or folds, in vats or keirs, cloth or yarn as it is delivered from washing, bleaching or dyeing machines; and has for one of its objects to automatically lay the cloth or yarn, in form resembling a rope, in such vats or keirs by the vibratory movement of a swinging arm which, with the operating mechanism, is moved at the end of each oscillation a distance equal to the width or diameter of the material being plaited or laid down.

Another object of the invention is to provide means for automatically causing the traveling support for the swinging arm to change its direction of movement as soon as it has traversed the vat or keir so that, by the combined movement of the swinging arm and the support therefor, the goods shall be laid in smooth regular plaits in the vat or keir until it is completely filled.

A further object of the invention is to produce an apparatus which will, in a cheaper and more regular and economical manner, perform work now done by hand, principally by boys, and do it more thoroughly and without danger of spoiling the goods by the carelessness incident to present and ordinary conditions. By the use of my improved machine, vats or keirs are filled without allowing the goods to tangle, which on occurring renders necessary the cutting of the material and the formation of short pieces.

With these and other objects in view, the invention consists in the novel construction, combination and arrangement of parts hereinafter described and claimed, reference being had to the accompanying drawings, in which,—

Figure 1 is a side elevation of the improved machine; Fig. 2 an end elevation of the same viewed in the direction of the arrow A in Fig. 1; Fig. 3 a side elevation, on enlarged scale, of the carriage and the mechanisms carried thereby; Fig. 4 an end

elevation of the same on corresponding scale; Fig. 5 a plan view; Fig. 6 a detail view of the intermittent gear wheels through which movement is imparted to the carriage at the proper time for causing the goods to be properly laid in the vats or keirs; Fig. 7 a sectional view, on the line 7—7 of Fig. 5, illustrating the shifting device for changing the direction of movement of the carriage; Fig. 8 a sectional view on the line 8—8 of the same figure; Fig. 9 a plan view of the casing carried by the lower end of the swinging arm; and Figs. 10 and 11 are detail views of the casing for the belt driving the rolls on the end of the swinging arm.

Similar numerals of reference indicate similar parts in the respective figures.

Referring more particularly to Figs. 1 and 2, the numerals 1 and 2 indicate two horizontal track rails suitably spaced from each other, and supported at the proper distance above the floor by vertical brackets 3 bolted thereto and to an overhead support, such for instance as the ceiling of a room. The rails 1 and 2 are of indefinite length and may be extended the full length of the room in which the machine is operated. Bolted to the same support are brackets 4 serving as bearings for a horizontal shaft 5 situated midway between the legs of each bracket, and carrying a drum 6 which may be as long as the track, if desired, or of such other length as necessity or convenience demands. At one end of the drum 6 beyond the brackets 3 is a second overhead shaft 7 supporting a preferably slatted cylinder or reel 8 and a driving pulley 9, a belt 10 passing over the latter from some convenient prime mover. A belt 11 extends between pulleys on the shafts 5 and 7 for driving the drum 6, and by means of a belt 12 reaching from the drum the mechanism on the carriage 13 is operated.

The carriage 13 is flat and rectangular in form; and from each corner project two arms 14 parallel to the rails 1 and 2, in each pair of which arms a flanged supporting wheel 15 is journaled on pivot bolts 16, as shown in Figs. 4 and 5. These flanged wheels rest on the rails 1 and 2, and are adapted to carry the carriage 13 from one end thereof to the other. Fastened to the under side of the carriage 13, and in the transverse center thereof, is a bearing 17 in which a short shaft 18 is journaled, said shaft extending longitudinally of the carriage and projecting from

each end of said bearing. The outer end of the shaft 18 extends beyond the end of the carriage 13, and has fixed thereto a flat pulley 19 around which the belt 12 passes, and a grooved pulley 20, the use of which will be described later.

A swinging or pendulum arm 21 is mounted to oscillate on a sleeve 22 projecting from the outer end of the bracket 17 bolted on the under side of the carriage 13, and extends above and below its axis. The sleeve 22 is concentric with the shaft 18 and forms a part of the bearing therefor. The swinging arm 21 comprises a hub 23 fitting over the sleeve 22, and a downwardly projecting threaded socket 24 into which is screwed a rod 25, preferably round in cross section and locked against turning by a nut 26. Above the hub 23, the arm 21 is broad, in the direction of its oscillation, having flat parallel sides and an irregular closed slot 27 therethrough reaching from the top of the arm 21 downwardly nearly to the hub. Within the slot is a roller 28 radially adjustable in a slotted spoke 29 of a gear wheel 30 placed in close proximity to the inner side of the swinging arm 21. The gear wheel 30 is keyed on one end of a horizontal shaft 31 turning in a bearing 32, Fig. 3, on the upper end of a bracket 33 bolted on top of the carriage 13 vertically above the bearing 17. Near the bottom of the bracket 33 another shaft 34 extends therethrough parallel to the shaft 31, and carries on its outer end a pinion 35 in gear with the toothed wheel 30. The opposite end of the shaft 34 has fixed to it a gear wheel 36 in engagement with a pinion 37 on the inner end of the shaft 18 carrying the belt wheel 19.

From the above it is apparent that when the wheel 19 is driven by the belt 12 the gear wheel 30 will be rotated and, through the medium of the roller 28, oscillate the swinging arm 21. The amplitude of the swinging arm is varied by changing the radial position of the roller in the slotted spoke of the gear wheel 30. The roller 28 is mounted on a pin 38 having a threaded stem passing through the slotted spoke and fixed in adjusted position by a nut 39.

The lower end of the rod 25 of the swinging arm is offset at 40 towards the rear of the machine so that a casing 41, removably secured thereto, will be centered in the longitudinal axis of the arm. The casing 41 is substantially square and its top 42 is closed except that it is provided with a circular central opening 43, through which the cloth or other goods enter, and an elongated hole 43^a for a purpose described later; while its bottom 44 has a larger rectangular opening 45 through which the goods pass out. The interior of the casing 41 is divided into three chambers or compartments by vertically disposed partitions 46 and 47 extending across

the casing in the direction of oscillation of the swinging arm 21. The central compartment 48 is the largest of the three, and contains two rollers 49 and 50 fixed on shafts 51 and 52, respectively, rotating in boxes 53 slidably supported in horizontal slots 54 in the partitions. The boxes 53 for the shaft 52 abut against the end walls of the slots, but the boxes for the shaft 51 are adapted to slide in the slots so that the rollers 49 and 50 may separate while the material to be laid is passing between them. The rollers are held in contact by springs 55 bearing against the sliding boxes and against plates 56 on the ends of the bolts 57 by means of which the tension of the springs is regulated. Between the ends of the rollers 49 and 50 and the adjacent bearing boxes 53 are placed guard plates 58 parallel to the partitions, and which closely embrace the shafts thus preventing oil from passing from the journals onto the rollers and soiling the material.

Fixed on one end of the roller shaft 52, in one of the side compartments of the casing 41, is a grooved roller 59 driven by a crossed belt 60 passing through the elongated hole 43^a from the grooved roller 20 on the shaft 18. In the opposite side compartment of the casing the ends of the shafts 51 and 52 are provided with engaging gear wheels 61 and 62, by means of which the movable roller 49 is driven. Two inclined plates or guards 63, parallel to the shafts 51 and 52, extend upwardly at an angle from the bottom of the casing to the rollers to prevent the goods from adhering to the rollers and being carried around therewith. Fastened to the rear outer side of the casing 41 is a vertical socket 64 into which the lower end of the offset 40 on the swinging arm 21 enters, it being secured therein by bolts 65. These bolts are loosened and the box raised or lowered when the tension of the crossed belt 60 is to be adjusted. The elongated hole 43^a in the top of the casing is surrounded by an upwardly extending flange 66 over which the lower end of a belt guard 67 telescopes. The height of the flange is sufficient to preserve the connection with the belt guard when the casing is moved to adjust the tension of the crossed belt. To counterbalance the weight of the casing 41 a weight 68 is fastened to the upper end of the swinging arm 21, as shown particularly in Figs. 3 and 4.

Returning to the means for oscillating the swinging arm 21, attention is directed to Fig. 4 from which it will be seen that the slot 27 in which the operating roller travels extends, broadly speaking, in a radial line from the axis of the swinging arm, but that the walls of said slot are of irregular form for the purpose of giving a steady even motion to the swinging arm. The slot 29 comprises four component parts, *a*, *b*, *c* and *d* which, uniting,

form a single opening. The walls of the uppermost part *a* are as wide apart as the diameter of the roller 28; they then diverge, in the direction of the axis of oscillation, for a certain calculated distance and at a predetermined angle. The walls then converge to form the part *b* of less length than that *a*; then diverge again to form the part *c* which is shorter than the part *b*, and finally converge to form the part *d* which is shorter than that *c*. These differences in the length of the several component parts of the slot are required by the fact that as the roller approaches the axis of oscillation of the arm 21 the leverage decreases, and that the angle which the slot assumes with relation to the direction of movement of the roller is different above and below the axis of rotation of said roller.

When the swinging arm 21 reaches the end of its oscillation in either direction, it is necessary for the carriage to move a short distance so that the next lap of the cloth shall lie beside the one just laid down, this being accomplished by means now to be described. On the opposite end of the shaft 31 on which the gear wheel 30 is keyed is a wheel 69 of the same diameter having on its periphery, at diametrically opposite points, a number of gear teeth 70 which mesh with teeth in a smaller gear wheel 71 fixed to the end of a horizontal shaft 72 extending towards the end of the carriage 13 opposite the oscillating arm 21. Each group of the teeth 70 equals one half as many as are contained in the smaller wheel 71, so that the latter gear wheel receives a half revolution every time a group of teeth on the larger wheel engages with it. The wheels 69 and 71 may be of any type of lock or intermittent gearing properly proportioned to turn the driven wheel a half revolution while the driving wheel is traveling through a short arc. The shaft 71 is mounted in brackets 73 at each end and has feathered thereon a sliding sleeve 74, with a bevel gear 75 on one end and a second similar gear 76 on the opposite end. These bevel gears face each other and are adapted to engage alternately a larger bevel gear 77 placed below and between them when the sleeve 74 is moved endwise. The bevel gear 77 is fixed on the upper end of a vertical shaft 78 which extends through the carriage 13, and has on its lower end a pinion 79 in engagement with a rack 80 fastened on the inner side of the track rail 1. Above the shaft 72 and extending across the carriage 13, at a right angle to said shaft and in a plane passing through the axis of the vertical shaft 78, is a shaft 81 supported in bearings 82 bolted to the front and rear edges of the carriage. Mounted on the shaft 82 are two parallel arms 83, or if preferred a yoke may be substituted therefor, extending downwardly on opposite sides of the sleeve 74 and

provided on their ends with pins or rollers 84 between two collars 85 on said sleeve. When the shaft 81 is rocked the arms 83 move the sleeve and cause one or the other of the bevel gears thereon to engage the bevel gear 77. The shaft 81 is caused to rock automatically at the proper times by means of a gravity-operated attachment thereon and an arm arranged to strike against fixed stops when the carriage reaches the limit of movement in either direction.

An open tilting frame 86, having straight parallel upper and lower bars 87 and 88, is secured at the center of the upper bar on the rock shaft 81 and extends laterally on each side of said shaft. A weight 89 is suspended from said lower bar by ears 90, between which are journaled small rollers 91 adapted to run on said lower bar from one end to the other as its inclination is changed. The tilting frame 86 is secured on the rock shaft 81 in such relation to the shifting arms 83 that, when the latter are perpendicular and the two bevel gears 75 and 76 disengaged from the bevel gear 77, the frame 86 will be in a horizontal position. As soon, however, as the position of the tilting frame 86 is changed by the movement of the rock shaft, the weight will run to the lower end of said bar further tipping the frame and causing the shifting arms 83 to move the sleeve 74 endwise and bring one of the bevel gears thereon into engagement with the bevel gear 77.

Pinned or otherwise fastened on the front end of the rock shaft 81 outside the bearing 82 is an arm 92 parallel to the shifting arms 83 and extending downwardly as low as the track rail 1. When the carriage 13 has traveled in one direction about as far as desired, the arm 92 encounters a stop 93 which arrests it; and, as the carriage continues its movement, said arm rocks the shaft 81 which shifts the sleeve 74 and brings the tilting frame 86 to a horizontal position and then slightly inclines it in the opposite direction. The weight immediately gravitates to the opposite end of the frame, thus causing the bevel gear 75 or 76, heretofore running idly, to be shifted into engagement with the gear wheel 77, imparting thereto a rotation opposite to that it previously had and, through the pinion 79 and rack 80, causing the movement of the carriage to be reversed.

Bolted at suitable intervals throughout the length of the track rail 1 on its outer side are T-shaped brackets 94 extending upwardly to near the plane of the top of the carriage, the upright stems of the brackets being offset as shown to permit the carriage passing them. The horizontal top of each bracket has a slot 96 in its outer side extending from one end to the other, in which slot a projection 97 on the inner side

of a movable upright block 98 is seated for steadying said block. A fastening bolt passes through the block and through a horizontal slot 99 in the bracket, thus permitting horizontal adjustment of said block. Pivoted in a notch in the upper end of the block is the stop 91 which causes the rock shaft 81 to operate. When it is desired to change the direction of the carriage the stop is moved on its pivot so as to project outwardly, but when its use is not required it is swung inwardly on its pivot out of the way of the arm 92.

It is desirable at times to fully shift the carriage on the rails from one place to another without operating the gearing. To do this the sleeve 74 is moved endwise until both bevel gear wheels 75 and 76 are disengaged from the bevel gear 77 and held in this position by a pawl 100 pivoted on the bearing 73 near the bevel gear 76, which pawl engages the back of said bevel gear wheel and holds the sleeve from moving. A spring 101 is fastened on the bracket 73 and bears at its free end on the outer end of the pawl 100, which end is provided with two flattened faces by means of which the pawl is held in operative position or raised when out of use, as indicated in Fig. 3.

The mechanism on the carriage 13 is protected from dust and injury by a casing indicated by the dotted line 103, Fig. 3. Below the carriage and suspended therefrom is a drip pan 104, represented by a dotted line in the same figure, into which grease from the lubricated parts of the machine falls and is thus prevented from soiling the goods.

In operating the invention, a vat or keir is supported below the swinging arm 21, and close to the casing 41 when said arm is at the lowest point of its oscillation, *i. e.* in vertical position. The keir is as long as the distance through which the arm swings and as wide as necessary or convenient, the carriage moving to and fro on its track transversely of the keir.

The cloth is led to the machine over the slatted cylinder or roll 8 and thence downwardly through an eye 102 on the carriage to the central opening 43 in the top of the casing, and between the rollers 49 and 50 to the keir. By means of the belts 10, 11 and 12 and intermediate pulleys, the drive pulley 19 and its shaft 18 are rotated, and, through the gearing shown, turn the gear wheel 30 and the roller 28 carried thereby. This roller operates the swinging arm and causes the laying of the goods in the keir in a longitudinal direction from end to end, the material being fed at the proper speed by the rolls 49 and 50 in the casing, said rolls being driven by the belt 60 from the grooved pulley 20 on the shaft 18. At the end of each swing of the arm 21, the larger wheel 69 of the lock or intermittent gearing which, it will be remem-

bered, is on the same shaft as the gear wheel 30, engages the smaller gear wheel 71 and gives it a half revolution, causing the bevel gears 75 and 76, which are on the same shaft, to also turn. From one of these bevel gears motion is imparted to the bevel gear 77, and thence to the pinion 79 which, engaging the rack 80, causes the carriage 13 to be moved sufficiently far to lay the succeeding fold of the material beside the one previously laid. This operation continues until the cloth reaches the side of the keir, when the trip arm 92 strikes a stop 93, which has been adjusted to the proper position, and reverses the direction of movement of the carriage, as previously explained.

I do not restrict myself to the exact details of construction, combination and arrangement herein set forth, it being obvious that minor variations thereof, not involving the exercise of invention, may be made by the skilled mechanic; and such departures from what is herein described and claimed, not involving invention, I consider as within the scope and terms of my claims.

Having thus described my invention, I claim:—

1. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage, and means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, substantially as described.

2. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage, feed rolls at the lower end of said arm, and means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, substantially as described.

3. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage, feed rolls at the lower end of said arm, means for continuously rotating said rolls, and means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, substantially as described.

4. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, means for automatically changing the direction of movement of said carriage, an arm mounted on said carriage, feed rolls at the lower end of said arm, and means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, substantially as described.

5. The combination, in a machine of the

class described, of a carriage, a track for the same, automatically operated mechanism for intermittently moving the carriage on said track, means for automatically changing the direction of movement of said carriage, an arm mounted on said carriage, means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, a vat or keir placed in such relation to said arm that the latter shall oscillate longitudinally thereof, and means on the lower end of said arm for delivering goods to said vat or keir, substantially as described.

6. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage, feed rolls at the lower end of said arm, means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, a vat or keir placed in such relation to said arm that the latter shall oscillate longitudinally thereof, and means for regulating the tension of the hold of said feed rolls upon the goods, substantially as described.

7. The combination, in a machine of the class described, of a carriage, a track on which said carriage is adapted to move, automatically operated mechanism for intermittently moving the carriage, an arm mounted on said carriage, feed rolls at the lower end of said arm, means for rotating said feed rolls, means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, and means for automatically changing the direction of movement of said carriage, substantially as described.

8. The combination, in a machine of the class described, of a carriage, a track on which said carriage is adapted to move, automatically operated mechanism for intermittently moving the carriage, an arm mounted on said carriage, feed rolls at the lower end of said arm, means for rotating said feed rolls, means for oscillating the arm in a vertical plane transversely of the line of movement of the carriage, means for automatically changing the direction of movement of said carriage, and a vat or keir placed in such relation to said arm that the latter shall oscillate longitudinally thereof, substantially as described.

9. The combination, in a machine of the class described, of a wheeled carriage, a track for the same, automatically operated mechanism for intermittently moving and changing the direction of movement of said carriage, an arm mounted on said carriage and provided with a lower casing, rollers within said casing for receiving and distributing the goods, means for giving rotation to said rollers, one of the same being movable from the other and under spring tension, and

plates or guards also within said casing and in engagement with said rollers for preventing the goods from adhering thereto, substantially as described.

10. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage, means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, a vat or keir situated in the line of movement of said arm, and automatic means whereby the direction of the movement of the carriage and of the arm supported thereon is changed as soon as it has traversed the vat or keir, substantially as described.

11. The combination, in a machine of the class described, of a wheeled carriage, a track upon which said carriage is mounted and is adapted to move, automatically operated mechanism for intermittently moving said carriage, means for automatically changing the direction of movement of said carriage, an arm mounted on said carriage, means for oscillating the arm in a vertical direction transversely of the line of movement of said carriage, a vat or keir placed in such relation to said arm that the latter shall oscillate longitudinally thereof, and means for conveying the goods to said arm and for guiding and delivering the same therefrom in plaits or folds to said vat or keir, substantially as described.

12. The combination, in a machine of the class described, of a wheeled carriage, a track upon which said carriage is mounted and adapted to move, automatically operated mechanism for intermittently moving said carriage, an arm mounted on said carriage, means for oscillating the arm in a vertical direction transversely of the line of movement of said carriage, means whereby the goods are delivered to said arm, a casing at the lower end of the arm provided with internal separable rollers between which the material is passed, and a vat or keir placed in such relation to said arm that the latter shall oscillate longitudinally thereof, substantially as described.

13. The combination, in a machine of the class described, of a wheeled carriage, a track upon which said carriage is mounted and adapted to move, automatically operated mechanism for intermittently moving and changing the direction of movement of said carriage, an arm mounted on said carriage, means for delivering the goods thereto, means for oscillating the arm in a vertical direction transversely of the line of movement of said carriage, and means upon said arm comprising a casing and internal rollers, one of which is movable and has spring tensional and adjusting devices between which

rollers the material is passed and by which it is delivered to the vat or keir, substantially as described.

14. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage and provided with a lower slotted casing, rollers within said casing for receiving and distributing the goods, said rollers having bearings mounted in the slots of the casing and one of said rollers being movable and under adjustable spring tension, and plates or guards also within said casing and in engagement with said rollers for preventing the goods from adhering thereto, substantially as described.

15. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, means for automatically changing the direction of movement of the same, an arm mounted on said carriage and provided with a lower slotted casing, said arm being provided with a weight above its axis to counterbalance the weight of said casing, rollers within said casing for receiving and distributing the goods, means for rotating said rollers, said rollers being mounted in the slots of the casing and one being movable and under adjustable spring tension, and plates or guards also within said casing and in engagement with said rollers for preventing the goods from adhering thereto, substantially as described.

16. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, a casing for said carriage, an arm mounted on the carriage, and means for

oscillating the arm in a vertical plane transversely of the line of movement of said carriage, substantially as described.

17. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, a casing for said carriage, an arm mounted on the carriage, means for oscillating the arm in a vertical plane transversely of the line of movement of said carriage, and a drip pan suspended from said carriage, substantially as described.

18. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, an arm mounted on said carriage and provided with a lower casing, rollers within said casing for receiving and distributing the goods, and plates or guards also within said casing and in engagement with said rollers for preventing the goods from adhering thereto, substantially as described.

19. The combination, in a machine of the class described, of a carriage, automatically operated mechanism for intermittently moving the same, a slotted arm mounted on said carriage, and means operating in connection with the slot 29 of said arm comprising a gear wheel 30 and an operating roller 28, whereby, as the roller approaches the axis of oscillation of said arm, the leverage is decreased and a steady and even motion is given to said arm, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH GREMMINGER.

Witnesses:

W. J. RHOADS,

WM. M. GOODLEY.