

No. 657,362.

Patented Sept. 4, 1900.

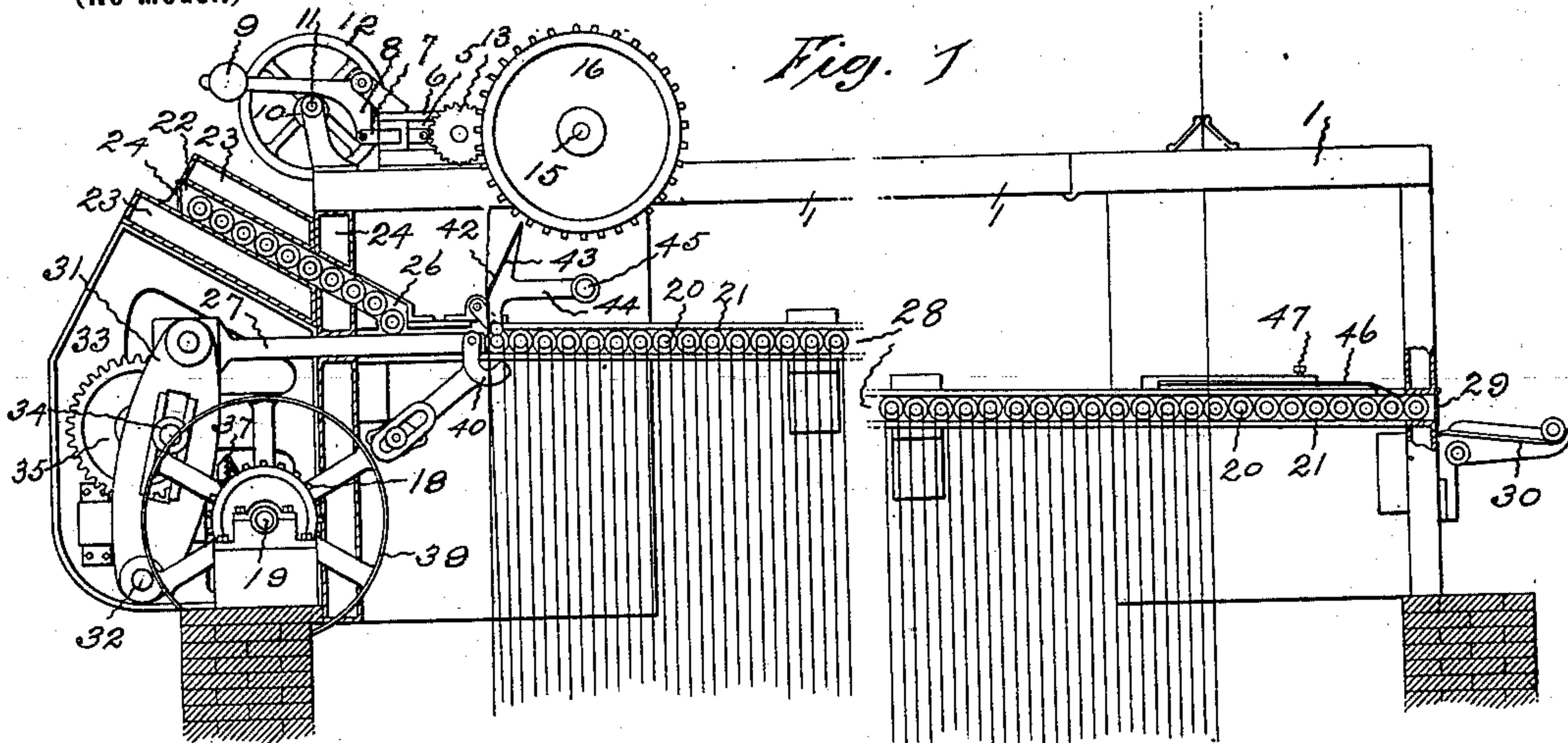
E. A. RUSDEN.

CHAINLESS CONTINUOUS FABRIC STEAMER.

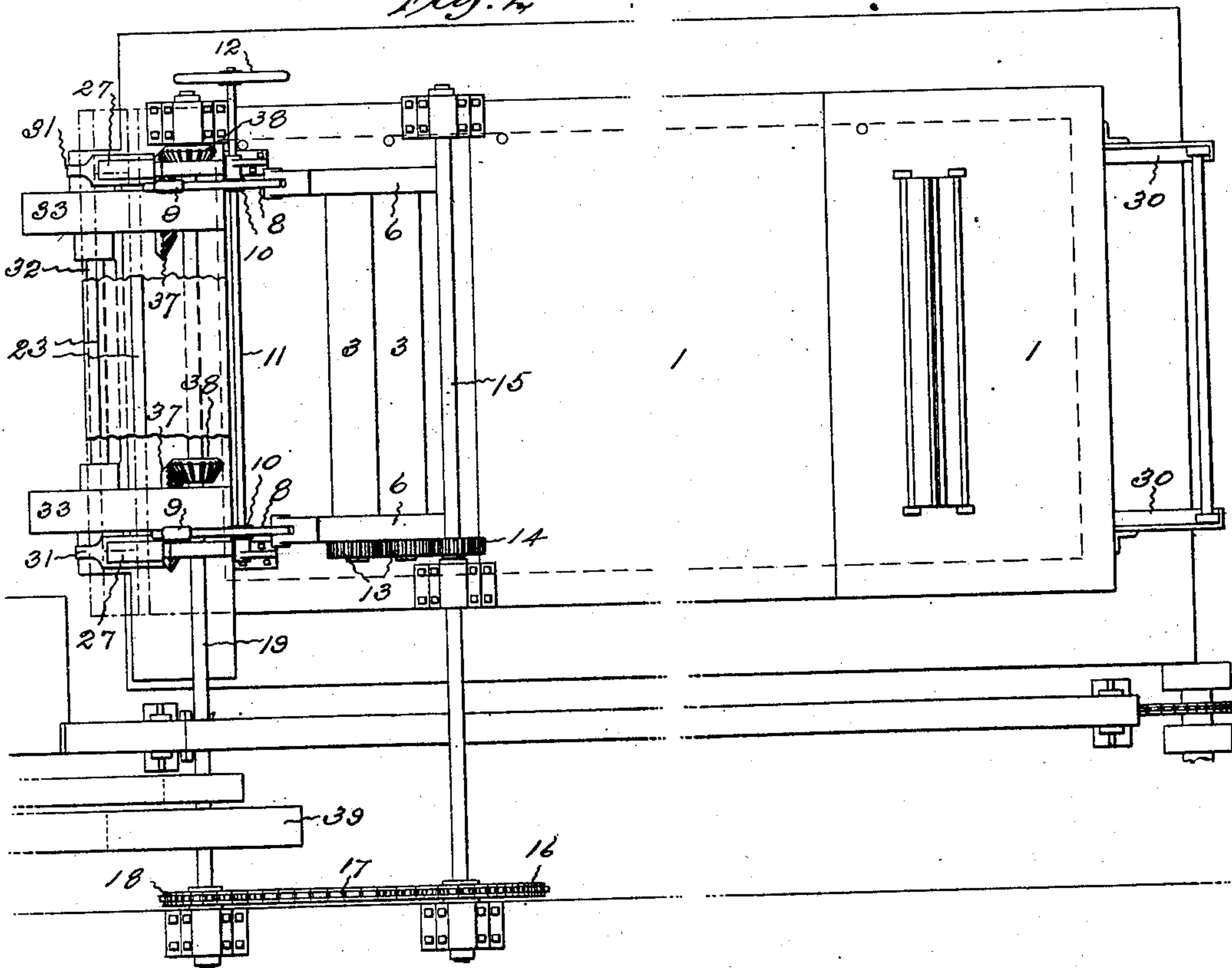
(Application filed Dec. 14, 1899. Renewed July 30, 1900.)

2 Sheets—Sheet 1.

(No Model.)



*Fig. 2*



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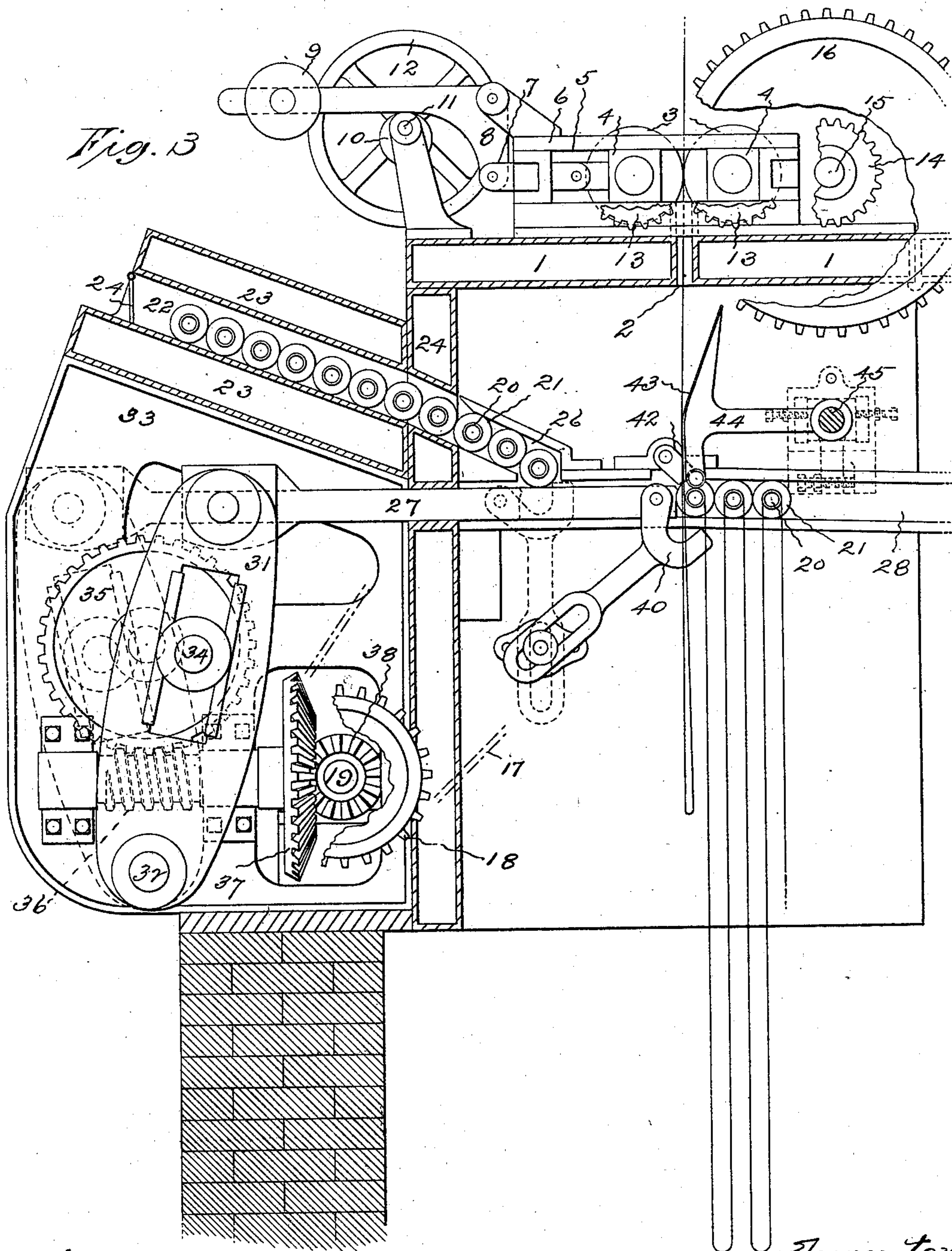
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# UNITED STATES PATENT OFFICE.

ETHELBERT A. RUSDEN, OF WARREN, RHODE ISLAND.

## CHAINLESS CONTINUOUS-FABRIC STEAMER.

SPECIFICATION forming part of Letters Patent No. 657,362, dated September 4, 1900.

Application filed December 14, 1899. Renewed July 30, 1900. Serial No. 25,338. (No model.)

*To all whom it may concern:*

Be it known that I, ETHELBERT A. RUSDEN, a citizen of the United States, residing at Warren, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Chainless Continuous-Fabric Steamers, of which the following is a specification.

This invention relates to an apparatus of the class illustrated and described in the United States Patents to Mather and Smith, No. 504,602, and Gadd, No. 578,008.

The apparatus which embodies the invention may be employed for steaming, aging, fixing, drying, bleaching, and dyeing continuous pieces of flexible fabrics of cotton, woolen, linen, silk, or paper; but it is more particularly adapted for treating printed cloths and similar colored textile fabrics. In the prior apparatus of this nature endless chains and the feed mechanisms for conveying the cloth-supporting rods from one end to the other are arranged entirely within the chambers, where they are exposed to the action of steam and hot gases and are concealed from the observation of the attendants. During the process of steaming large quantities of chlorine and other deleterious gases are freed, and these attack and cause a rapid deterioration of the interior fixtures and are especially destructive of moving parts that are subject to friction. If by wear or from other causes the interior feeding mechanisms become disarranged or the rods get out of pitch or become jammed, it is not known until an accident occurs or the goods being treated, of which there may be many thousands of yards in the chamber, show damage, and then it becomes necessary to stop the apparatus for hours until it is sufficiently cooled down to permit of opening for inspection, readjusting, or repairs.

The object of the present invention is to so construct and arrange the cloth-supports and the feed mechanisms when building the apparatus of this class that the endless chains are dispensed with and all of the feeding mechanisms are located outside of the steaming-chamber, whereby a saving of power for running is effected, a rapid feeding is permitted, a continuous operation insured, the du-

rability increased, the cost of building reduced, and the liability of damaging the goods lessened. In the apparatus illustrated the cloth-supports are tubes; and these are allowed to roll down an inclined opening at the inlet end of the apparatus; from the bottom of which opening they are one by one at the proper time, by the backward movement of plungers, let into the chamber and by the forward movement of the plungers advanced so as to cause the beginning of a loop of fabric that is being fed into the chamber. The plungers extend through the walls of the chamber and are reciprocated by mechanisms located outside, and the tubes after traveling the entire length of the chamber down an inclined way pass out one by one through an opening in the wall as others enter at the opposite end. The mechanisms for driving the fabric-feeding rolls and the mechanisms for reciprocating the plungers are connected so that the operations of feeding the fabric and advancing the tubes will occur synchronously.

Of the illustrations, Figure 1 shows a side view of portions of the upper part of the inlet and outlet ends of the chamber with the front wall removed and sections of the end walls broken away to show the method of feeding the tubes. Fig. 2 shows a plan of the parts shown in Fig. 1 with portions broken away to facilitate comprehension of the mechanisms, and Fig. 3 shows a sectional view, on larger scale, of the upper part of the inlet end of the chamber.

The complete chamber, which is usually built of brick, and the perforated pipes ordinarily placed at the bottom of the chamber for supplying air, steam, or other suitable gas or vapor are not illustrated, for they are of ordinary construction and arrangement and are not necessary to an understanding of the present improvement.

The roof of the chamber is formed of common hollow plates 1, that are heated by steam to prevent moisture from collecting and dripping onto the goods in the chamber. This roof at one end is provided with a suitable opening 2, Fig. 3, for the entrance of the fabric, and located parallel with this transverse opening are the cloth-feeding rolls 3. The journals of these rolls are supported by



boxes 4, loosely placed in ways 5, formed in the frames 6, that are mounted upon the roof of the chamber near the opposite sides of one end. It is preferred that the boxes for one roll be held from movement in one direction by the ends of the frame, while the boxes for the other roll, which boxes are movable along the ways, are connected by links 7 with angle-levers 8. The outer ends of these levers are provided with weights 9, which serve to keep the levers, with the movable roll, pressing against the stationary roll. Beneath these rolls cams 10 are mounted upon a shaft 11, and this shaft may be provided with a hand-wheel 12, which when rotated turns the cams so as to lift the levers and draw the movable roll away from the stationary roll, Fig. 3.

Fastened to the outer end of the feed-roll shafts are intermeshing gears 13, and meshing with one of these is a gear 14 on a shaft 15, that extends transversely above the roof of the chamber and at one end bears a sprocket-wheel 16. A chain 17 passes around the sprocket-wheel 16 and a sprocket-wheel 18, fixed to the shaft 19. By means of these sprocket-wheels, chains, and gears the feed-rolls are rotated together for passing the cloth into the chamber, Fig. 2.

The fabric-supports are preferably brass tubes 20, with collars 21 fastened on their ends. An inclined passage 22 is formed between steam-plates 23 at the inlet end of the apparatus, and the tubes are allowed to roll down this passage through an opening in the steam-plate 24, that forms a part of the end wall of the chamber. A door 25 is arranged to permit the tubes to roll into the passage, but prevent the escape of heated vapor from the chamber. Inside of the chamber, along each side wall in continuation of the passage 23, are guideways 26 for receiving the collars on the ends of the tubes.

Extending through the steam-plate 24, near each side of the chamber and passing below the guideways 26, are plungers 27. When these plungers are forward, the openings from the lower ends of the guideways 26 are obstructed; but when the plungers are back the collars may pass from the guideways 26 into the guideways 28, formed by bars attached to the side walls of the chamber in position to receive the collars on the ends of the tubes. The guideways 28 slope downwardly from the inlet end to the outlet end of the chamber, where there is a door 29, which opens to permit the tubes to pass out onto the brackets 30, attached to the outside of the end wall of the chamber, Fig. 1. The outer ends of the plungers are connected to the upper ends of rocker-arms 31, the lower ends of which arms are mounted on a shaft 32, supported by the frames 33, fastened to the end wall of the chamber. Crank-studs 34, projecting from worm-wheels 35, extend through slots in the rocker-arms. The worm-wheels are mounted

on studs on the outside of each of the frames 33 and mesh with worms 36, the shafts of which bear bevel-gears 37, in mesh with which are bevel-gears 38, that are mounted upon the shaft 19, that extends transversely of the apparatus, Fig. 3. The shaft 19 bears a driving-pulley 39, and it is connected by the sprocket-chain 17 with the shaft 15, and when the shaft 19 is rotated the rocker-arms, through the gears, worms, and worm-wheels, reciprocate the plungers. At the same time, through the sprocket wheels and chain, the fabric-rolls will feed the fabric into the chamber.

Loosely connected with the front end of each plunger is a yoke 40, the shank of which is, by means of a pin and slot, connected with the side wall of the chamber. When the plungers are drawn backward, the yokes stand, as illustrated by the dotted lines in Fig. 3, in front of the ends of the plungers beneath the openings at the bottom of the guideways 26. When the parts are in these positions, one tube may drop down into the yokes in front of the plungers. When the plungers move forwardly, this tube is carried in front of them until the collars on their ends engage the collars on the ends of the tube that has been previously fed forward and advance all of the tubes in the downwardly-sloping guideways 28. This forces the tube at the outlet end of the chamber through the door 29 onto the brackets 30 and moves the tube that has just entered into position to cause the fabric being fed in to form another loop. While the fabric is being fed in and the loops are being formed at one end, the fabric is being drawn out at the other end of the chamber through the doors 41 by the common mechanisms.

Mounted loosely upon a stud projecting inwardly from each side of the chamber is a pawl 42. These pawls are so arranged that a tube may be freely passed under them by the plungers; but they engage with the collars on the ends of the tubes and prevent them from moving backwardly when the plungers are drawn back for permitting the entrance of another tube, Fig. 3.

A fabric-shield 43 is supported by arms 44, mounted upon a shaft 45, that is held by blocks adjustably attached to the side walls of the chambers, and the lower end of this shield is provided with a tube that bears upon the tube last fed in with just sufficient force to prevent the fabric from slipping down the wrong side of the tube when a new loop is being formed, Fig. 3.

A spring-bar 46 may be attached to each side wall near the outlet end of the chamber, so as to press down upon the collars and prevent more than one tube at a time from passing out. The tension of each bar may be adjusted by turning a set-screw 47, Fig. 1. After the tubes have been passed out of the chamber they may be returned to the opposite end by any suitable means.



With this apparatus there are no feeding mechanisms subjected to the action of the steam and hot gases in the interior of the chamber except the ends of the plungers and the yokes connected with the ends of the plungers, should they be used. As the guideways incline downwardly from the inlet to the outlet end, no endless chain is necessary, and but little power is required to feed forward the entire row of tubes filled with many yards of fabric. The tubes, which pass in at the desired time, cannot get out of pitch nor become jammed in the chamber.

I claim as my invention—

1. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, substantially as specified.

2. An apparatus of the within-described class having a chamber provided with a sloping fabric-support inlet-passage at one end and a fabric-support outlet at a lower level at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, substantially as specified.

3. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, and mechanisms for reciprocating the plungers, substantially as specified.

4. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports extending through the walls of the chamber and arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, and mechanisms located without the chamber for reciprocating the plungers, substantially as specified.

5. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end, guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, yokes attached to and movable with the ends of the plungers, and

mechanisms for reciprocating the plungers, substantially as specified.

6. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end, guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, pawls located adjacent to the ends of the guideways to prevent any rearward movement of the supports when the plungers are drawn backwardly, and mechanisms for reciprocating the plungers substantially as specified.

7. An apparatus of the within-described class having a chamber with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, mechanisms for reciprocating the plungers, and a shield with its lower edge adapted to rest upon the tube last advanced by the forward movement of the plungers, substantially as specified.

8. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, plungers for advancing the supports arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, mechanisms for reciprocating the plungers, and springs located adjacent to the guideways at the outlet end of the chamber and arranged to bear down upon the supports, substantially as specified.

9. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports extending from the inlet end to the outlet end of the chamber, plungers extending through a wall of the chamber for advancing the supports and arranged to permit the entrance of a support when drawn outwardly and to obstruct the support-inlet when pushed inwardly, rocker-arms connected with the outer ends of the plungers, crank-pins for oscillating the rocker-arms, and gearing for revolving the crank-pins, substantially as specified.

10. An apparatus of the within-described class having a chamber provided with a fabric-support inlet at one end and a fabric-support outlet at the opposite end with guideways for the supports declining from the inlet end to the outlet end of the chamber, open-



ings through the roof of the chamber near each end for the passage in and out of the fabric, rolls located adjacent to and parallel with the inlet-opening, gears connecting the shafts of  
5. said rolls, movable blocks for supporting said roll-shafts, angle-levers connected with the blocks supporting one of said shafts, weights

mounted upon said levers, cams located beneath said levers, and a hand-wheel for rotating said cams, substantially as specified.

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