No. 685,942. Patented Nov. 5, 1901.

J. PIERCE.

ROTARY SEPARATOR AND STOP FOR LACING STUD SETTING MACHINES.

(Application filed May 6, 1901.)

(No Model.) 2 Sheets—Sheet 1.

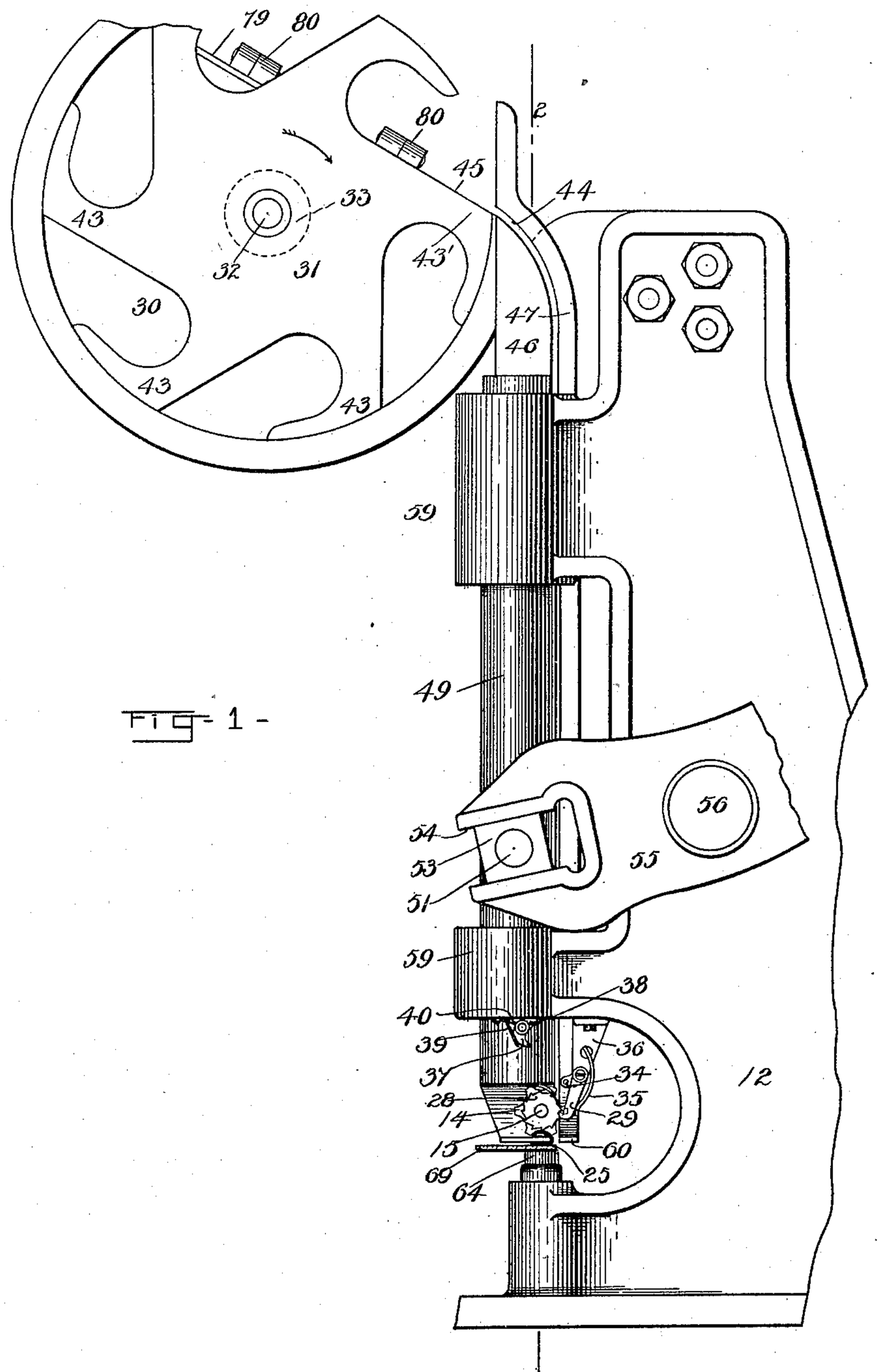

Fig. 1.

WITNESSES-

Sydney E. Taft

Louis A. Jones.

INVENTOR

John Pierce

by his Attorney.

Charles V. Gooding.

No. 685,942. Patented Nov. 5, 1901.

J. PIERCE.

ROTARY SEPARATOR AND STOP FOR LACING STUD SETTING MACHINES.

(Application filed May 6, 1901.)

(No Model.) 2 Sheets—Sheet 2.

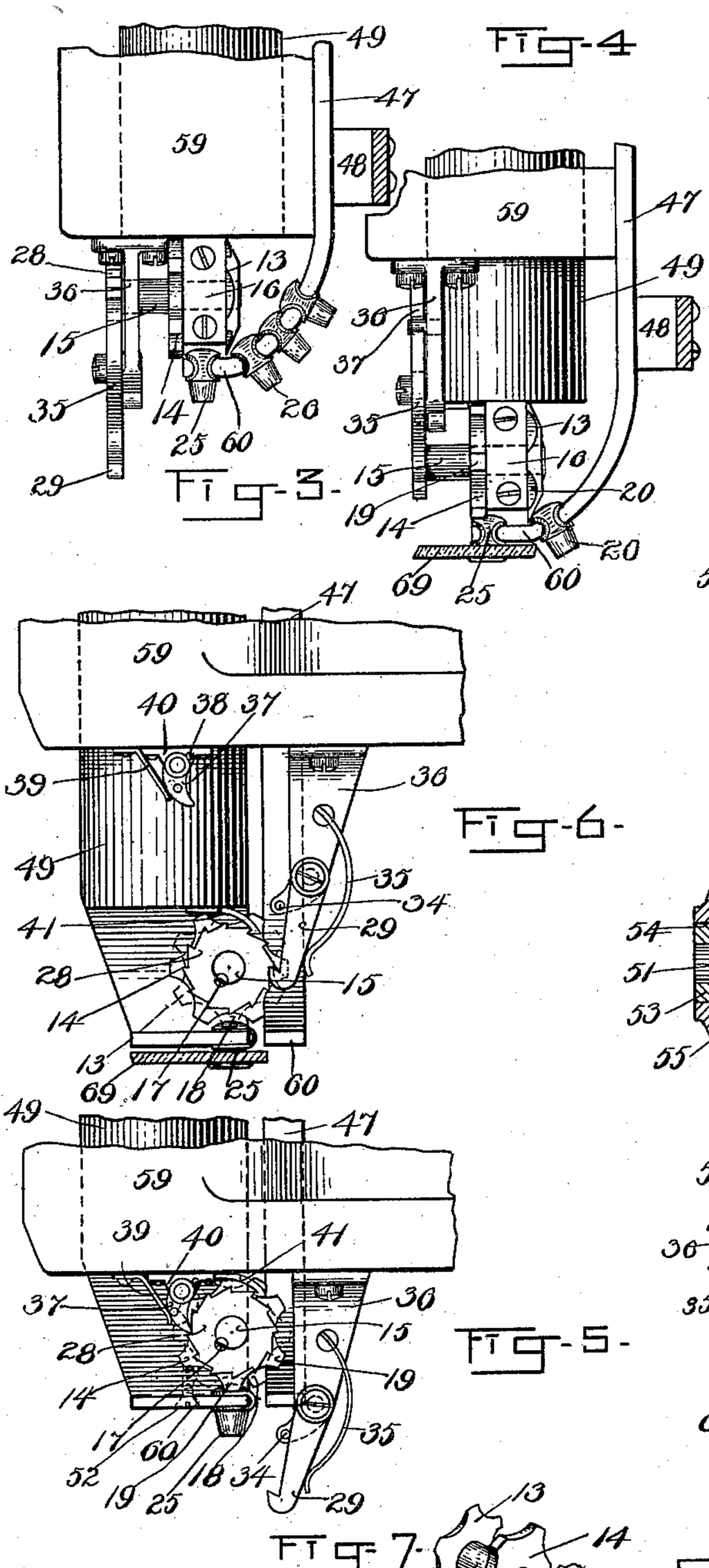

FIG-3-

FIG-4

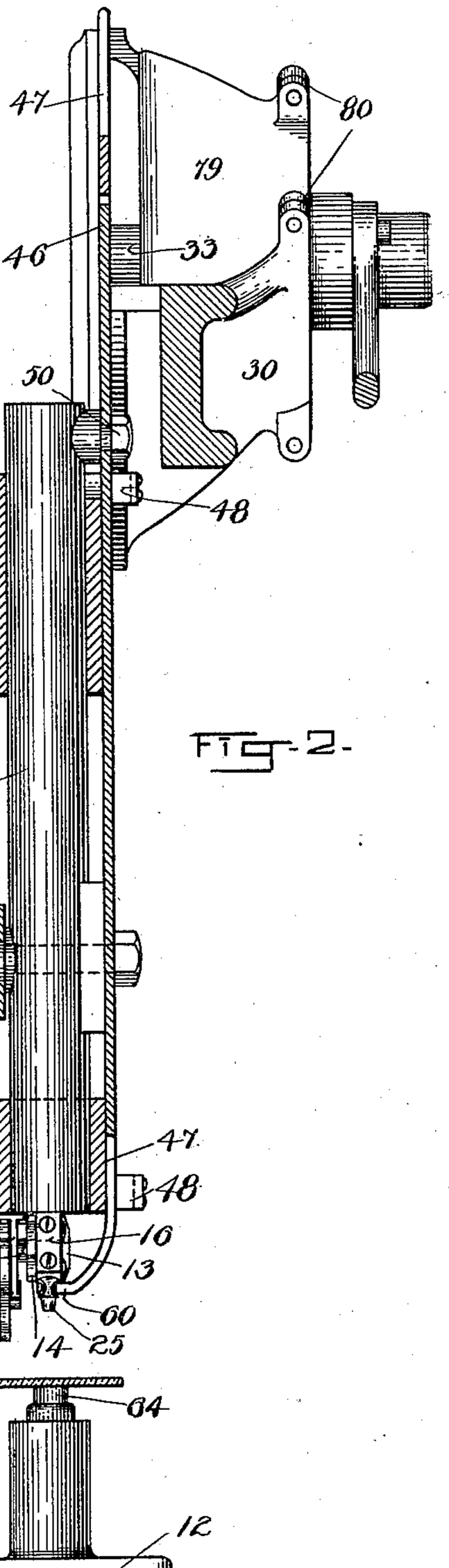

FIG-2-

FIG-6-

FIG-5-

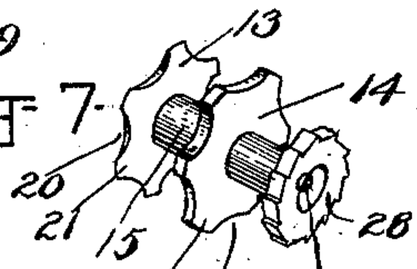

FIG-7-

WITNESSES-

Sydney E. Taft.

Louis A. Jones.

INVENTOR:

John Pierce,

By his Attorney, Charles V. Gooding.

UNITED STATES PATENT OFFICE.

JOHN PIERCE, OF MILTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO JOSEPH H. CHADBOURNE, OF WATERTOWN, MASSACHUSETTS, AND WALTER B. MOORE, OF SWAMPSCOTT, MASSACHUSETTS.

ROTARY SEPARATOR AND STOP FOR LACING-STUD-SETTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 685,942, dated November 5, 1901.

Application filed May 6, 1901. Serial No. 58,849. (No model.)

To all whom it may concern:

Be it known that I, JOHN PIERCE, a citizen of the United States, residing at Milton, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Rotary Separators and Stops for Lacing-Hook-Setting Machines, of which the following is a specification.

This invention relates to that class of machines in which articles—such as lacing-hooks, buttons, rivets, and the like—are fed from a hopper to a raceway and are taken from the raceway one by one after being set or attached to a piece of material. I have illustrated and described my invention as adapted to a machine for setting lacing-hooks, and particularly as adapted to a machine for setting lacing-hooks for which I have obtained Letters Patent of the United States, dated September 11, 1900, No. 657,673. In machines of this class it is essential that the lacing-hooks shall, first, not leave the raceway until after they have been set in the upper of the boot or shoe; second, that the lowermost lacing-hook shall be correctly centered and held in position above the anvil upon which it is to be set, and, third, that after said lacing-hook is set in the shoe-upper the end of the raceway shall be free for the removal of said lacing-hook therefrom as soon as the lacing-hook which has been set clears the anvil upon the upward movement of the raceway, and, further, that the next lacing-hook on the raceway shall descend to the proper position upon the raceway above the anvil, while the other lacing-hooks in said raceway are held back. It is very essential in machines of this class that the lacing-hooks shall not be manipulated or handled more than is absolutely necessary from the time they leave the hopper until they are set in the shoe-upper. It is also essential in a machine of this class that as much time as possible should be allowed for the operator to remove the lacing-hook which has been set in the upper of the shoe from the raceway, and in the machine of this invention the device is so constructed and operated that the lacing-hook which has been previously set in the shoe-upper is free to be removed as soon as said lacing-hook clears the top of the said anvil, and the parts are left in such a position that the operator may remove the said hook from the raceway at any time during the upward movement of the raceway and plunger from the time the lacing-hook leaves the anvil until just before the plunger and raceway arrive at their uppermost position. It is further essential in a machine of this class that the lowermost hook upon the raceway should have sufficient time to pass into position before setting in the shoe-upper over the center of the anvil, and in the machine of this invention this is provided for, said lowermost lacing-hook having all the time to feed which is consumed by the raceway and plunger in their downward movement from their uppermost position until just before the lacing-hook is set in the upper of the shoe.

The object of this invention is to provide a combined rotary separator and rotary stop, positively operated, which shall fulfil the requirements hereinbefore recited.

The invention consists in a rotary separator and rotary stop fast to a rotary shaft, said rotary shaft having a bearing in a reciprocating plunger, said plunger having a raceway fast thereto and mechanism for imparting an intermittent rotary motion to said rotary shaft, bringing said stop and separator alternately into and out of line with the lacing-hooks on said raceway, stopping the last lacing-hook in line with the anvil and separating the remainder of the hooks on the raceway from said last hook.

The invention, again, consists in a machine for attaching lacing-hooks to sheet material having a raceway, a rotatory shaft, a separator-disk, and a stop-disk, said disks being fast to said rotatory shaft and having alternate depressions and projections equidistant from each other in the periphery thereof, the depressions in one of said disks being in line with the projections on the other of said disks.

The invention further consists, in machines

of the character described, of an anvil, a raceway, a separator-disk, and a stop-disk, said separator-disk and stop-disk being located on opposite sides of a plane extending through the center of said anvil and intersecting the path of the hooks on the raceway as they approach the anvil and mechanism to impart a rotary motion to said separator-disk and to said stop-disk.

The invention further consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a right-hand side elevation of a portion of a lacing-hook machine similar to that shown and described in my United States Letters Patent No. 657,673, with my improved rotary separator and rotary stop attached thereto. Fig. 2 is a vertical sectional elevation taken on line 2 2, Fig. 1, looking toward the left in said figure, the plunger, separator, and stop being shown in elevation. Fig. 3 is a rear elevation of a portion of the plunger, raceway, separator, and stop with a number of lacing-hooks on said raceway, the same being shown full size and starting to descend. Fig. 4 is a view similar to Fig. 3 with the parts shown in the relative positions assumed when the plunger is in its lowermost position and the lacing-hook, having been set in the material, is being removed by the operator from the raceway. Fig. 5 is an enlarged right-hand side elevation of the parts shown in Fig. 3. Fig. 6 is a side elevation of the parts shown in Fig. 4. Fig. 7 is a perspective view of my improved rotary separator and rotary stop.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is the base-plate of a machine for setting lacing-hooks, similar in construction to that shown in my Letters Patent No. 657,673. 12 is the frame of the machine, fast to said base-plate.

The lacing-hooks are placed in a hopper 30, from the bottom of which they are taken by an intermittently-rotated picker-plate 31, which is fast to a shaft 32, having a bearing 33 in the hopper 30. The method of conveying lacing-hooks by a picker-plate such as that shown from a hopper to a raceway is old and well known to those skilled in the art.

The picker-plate 31 has six fingers or arms 43. The lacing-hooks are taken by these arms from the bottom of the hopper, and as the picker-plate rotates in the direction of the arrow, Fig. 1, the lacing-hooks are picked up by said arms and carried from the bottom of the hopper, as shown, sliding around the curved edge of each arm of the picker-plate until each arm in its turn arrives at the position of the arm 43′, with the straight edge 45 of said arm in line with the opening of the raceway 44, whereupon the lacing-hooks will slide down the straight edge 45 of the arm 43′ on the raceway 44. The hopper 30 is cut off on its upper side at an angle of thirty degrees, so that as the lacing-hooks slide off the arm 43 they will not be interfered with by said hopper, but will be perfectly free to slide off of the arm 43 and onto the raceway 44, as hereinbefore described. It will thus be seen that as the picker-plate 31 rotates in the direction of the arrow, Fig. 1, the different blades thereof will emerge from the hopper at the right-hand side thereof and the lacing-hooks thereon will slide off of the back edge 43 of each arm before said arm enters the hopper again, thus leaving the way free for said lacing-hooks to slide off the picker-plate and onto the reciprocatory raceway without danger of being stopped by the walls of the hopper. In order to prevent dirt from falling into the hopper, I provide a cover 79, hinged at 80 to the hopper 30.

The raceway 44 is made of two pieces of flat steel 46 47, the part 47 being fastened to the part 46 by blocks 48. The plate 46 is fastened rigidly to the vertically-reciprocating plunger 49 by a screw 50, stud 51, and screw 52. The stud passes through the plunger 49 and receives a sliding block 53, said sliding block entering a slot 54 in a lever 55. Said lever 55 is pivoted to a stud 56, fast to the frame 12, and is rocked upon said stud by a cam fast to the main shaft of the machine. The plunger 49 slides in bearings 59 59 in the frame 12, motion being imparted thereto by the lever 55. The raceway 44 passes downwardly outside the bearings 59 59 from the hopper 30 to the lower end of the plunger 49, where it curves under said plunger 49, ending in a short horizontal portion 60.

My improved rotary separator and rotary stop consists of two cylindrical disks 13 and 14, respectively. Said disks are fastened to a rotary shaft 15, arranged to rotate in a bearing 16, formed in the lower end of the plunger 49. The rotary shaft 15 is shouldered at each end to receive said disks, and each of said disks is attached to said rotary shaft by a screw 17. The stop-disk 14 has a number of depressions or spaces 18 in the periphery thereof equidistant from each other, each of which as it is brought in line with the lacing-hooks upon the raceway 44 allows the head of the lowermost hook 25 upon said raceway to pass by said stop after said lacing-hook has been set and the plunger is raised sufficiently to clear the shank of the lacing-hook from the anvil, the parts being in the relative position shown in Figs. 4 and 6. The stop 14 has a series of projections or teeth 19, equidistant from each other, each of which is moved in turn across the path of the lacing-hook upon the raceway 44 when the said raceway and the plunger to which it is attached are raised to the position shown in Figs. 3 and 5. It will be noted that the shaft 15 is parallel to the path in which the lacing-hooks feed as they pass along the horizontal portion 60 of the raceway 44 and that the disks 13 and 14

stand across the path of said lacing-hooks. The separator-disk 13 has a series of depressions 20 and of projections 21 upon the periphery thereof and is fastened to the shaft 15 in such relation to the stop-disk 14 that each of the depressions 20 come in line with one of the projections 19 on the stop-disk 14 and the projections 21 upon said separator-disk come in line with the depressions 18 on said stop-disk, the number of projections upon the stop-disk and separator-disk being equal. Each of the depressions 20 when in line with the lacing-hooks upon the raceway 44 allows the lowermost hook of the column of hooks upon the raceway to pass along the raceway to a point thereon directly over the anvil 64, where said lowermost hook will come to rest against one of the projections 19 upon the stop-disk 14. The said separator-disk 13 has a thin V-shaped edge or periphery, so that it can be readily passed between two of the lacing-hooks upon the raceway and separate the lowermost hook thereon from the hook next to it.

It will be understood that the separator-disk 13 and stop-disk 14 are fastened to the rotary shaft 15 in such relation to each other and to the raceway 44 that when one of the depressions 18 in the periphery of the stop-disk 14 is in position so that the lowermost hook may be removed from the raceway 44 the projection 21 upon the separator-disk 13 stands across the raceway 44 and holds back the hooks on said raceway, and when one of the projections 19 upon the stop-disk 14 stands across the raceway 44 and prevents the lowermost hook from being removed therefrom or from accidentally sliding off of said raceway one of the depressions 20 upon the separator-disk 13 will at that time be in such a position with relation to the raceway 44 and to the path of feed of the lacing-hooks upon said raceway that the lowermost hook of the column of hooks upon said raceway can pass down said raceway and between the separator-disk and stop-disk directly over the anvil, as shown in Fig. 2. This result is attained by fastening the separator-disk and stop-disk to the rotary shaft 15, as hereinbefore described, with the projection upon the periphery of one of said disks in line with the depression upon the periphery of the other disk, and vice versa. It will therefore be seen and understood that when the projection upon one of the disks stands across the path of the hooks upon the raceway and prevents the lowermost hook from traveling along said raceway the depression upon the other disk stands in line with the path of the hooks upon said raceway and allows said lowermost hook to travel or be moved along the raceway.

The separator-disk and stop-disk are intermittently rotated from the position shown in Fig. 5 to that shown in Fig. 6 and from the position shown in Fig. 6 to that shown in Fig. 5, as follows: The shaft 15 has a ratchet 28 fast thereto, which engages a spring-pawl 29 when the plunger 49 and raceway 44 have nearly arrived at their lowermost position, turning the ratchet 28, shaft 15, separator 13, and stop 14 from the position shown in Fig. 5 to that shown in Fig. 6. The pawl 29 is held normally against a pin 34 by a spring 35 and is supported upon a bracket 36, fast to the frame 12. When the plunger 49 and raceway 44 ascend, together with the separator-disk and stop-disk, shaft 15, and ratchet 28, a pawl 37 engages the ratchet 28 when said parts have nearly arrived at their uppermost position, and said ratchet, together with said disks, is rotated from the position shown in Fig. 6 to that shown in Fig. 5. The pawl 37 is normally held against a pin 38 by a spring 39, said pawl being supported upon an ear 40 upon the frame 12. A stop-pawl 41, fast to the under side of the plunger 49, prevents the rotary shaft and disks and ratchet from being turned backward accidentally.

The operation of my improved rotary separator and rotary stop, in conjunction with the vertically-reciprocating plunger and raceway, is as follows: The lacing-hooks are delivered to the raceway 44 from the picker-plate 31 and slide down said raceway to the position shown in Fig. 3. The lowermost hook 25, resting upon the short horizontal portion 60 of the raceway 44, with the left side of the head of said hook touching the right side of one of the projections 19 on the stop-disk 14, the weight of the hook 26 and the column of hooks on the raceway pushes the hook 25 into the position shown in Figs. 2 and 3 and brings said hook into a vertical position directly above the center of the anvil 64. The plunger 49 is shown raised in Figs. 2 and 3 and just beginning to descend. The operator next places the upper of the shoe in the proper position over the anvil 64, Fig. 2, and the plunger descends. As the plunger descends the rotary shaft 15, with the stop-disk and separator-disk fast thereto, remains stationary with relation to the plunger and raceway until just before the shank of the lacing-hook 25 abuts against the leather of the shoe-upper held upon the shoe-anvil 64, at which point one of the teeth of the ratchet 28 engages the pawl 29 and rotates said ratchet one tooth, together with the separator-disk and stop-disk 13 and 14, respectively, and the shaft 15, from the position shown in Fig. 5 to that shown in Fig. 6. During the last part of the downward motion of the plunger 49 the shank of the lacing-hook 25 is driven through the shoe-upper 69 and clenched upon the anvil 64.

It will be seen that when the plunger and raceway, together with the separator-disk and stop-disk and rotary shaft, start to ascend the lowermost lacing-hook can be removed from the raceway at any time after said lacing-hook has cleared the top of the anvil 64 and until one of the teeth of the ratchet 28

engages the pawl 37 upon the last part of the upward motion of the plunger, whereupon said ratchet, together with said separator-disk and stop-disk, will be rotated one tooth and one of the depressions 20 in the separator-disk will come in line with the lacing-hooks upon the raceway 44 and allow the lowermost hook in the column of hooks to pass down said raceway and against one of the projections 19 on the stop-disk 14, which by that time will have been rotated into position in line with the lacing-hooks upon said raceway. It will also be seen that the lowermost hook of the column of hooks upon the raceway has all of the time occupied by the plunger in descending from its uppermost position to the point at which the ratchet encounters the pawl 29 in which to travel along said raceway to a position immediately above the anvil and between the separator-disk and stop-disk. It will further be seen and understood that the partial rotation of the shaft 15 and of the stop-disk and separator-disk fast thereto takes place just as the lacing-hook enters the upper of the shoe 69, so that the head of said lacing-hook is held between two projections 19 and 21 as the shank of said lacing-hook first enters the upper and while it is passing through it, and thus said lacing-hook is held firmly in position during the setting operation.

It will be seen that the mechanism or means by which an intermittent rotary motion is imparted to the rotary shaft and to the separator-disk and stop-disk 13 and 14, respectively, may be varied without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for attaching lacing-hooks and the like to sheet material, a raceway, a rotatory shaft, a separator-disk and a stop-disk fast to said rotatory shaft, said separator-disk and said stop-disk each having alternate depressions and projections equidistant from each other in the periphery thereof.

2. In a machine for attaching lacing-hooks and the like to sheet material, a raceway, a rotatory shaft, a separator-disk and a stop-disk fast to said rotatory shaft, said separator-disk and said stop-disk each having alternate depressions and projections equidistant from each other in the periphery thereof, the depressions on one of said disks in line with the projections on the other of said disks.

3. In a machine for attaching lacing-hooks and the like to sheet material, a raceway, a rotatory shaft, a separator-disk and a stop-disk fast to said rotatory shaft, said separator-disk and said stop-disk each having alternate depressions and projections equidistant from each other in the periphery thereof, said disks being so arranged with relation to each other that when one of the depressions upon said separator-disk is in line with the lacing-hooks on said raceway, one of the projections on the stop-disk will be in line with said lacing-hooks and vice versa, and mechanism to impart an intermittent rotary motion to said rotatory shaft.

4. In a machine for attaching lacing-hooks and the like to sheet material, an anvil, a raceway, a separator-disk and a stop-disk, said separator-disk and said stop-disk being located on opposite sides of a plane extending through the center of the anvil and intersecting the path of the hooks on the raceway as they approach the anvil, and mechanism to impart a rotary motion to said separator-disk and to said stop-disk.

5. In a machine for attaching lacing-hooks and the like to sheet material, an anvil, a plunger, mechanism for imparting a reciprocatory motion to said plunger, a raceway bearing a fixed relation thereto, a separator-disk and a stop-disk, said separator-disk and said stop-disk carried by said plunger and located upon opposite sides of a plane extending through the center of the anvil and intersecting the path of the hooks on the raceway as they approach the anvil, and mechanism for imparting a rotary motion to said separator-disk and to said stop-disk.

6. In a machine for attaching lacing-hooks and the like to sheet material, an anvil, a plunger, mechanism for imparting a reciprocating motion to said plunger, a raceway bearing a fixed relation thereto, a rotatory shaft carried by said plunger, a stop-disk and a separator-disk fast to said rotatory shaft and projecting radially therefrom on opposite sides of and equidistant from a plane extending through the center of the anvil and intersecting the path of the hooks on the raceway as they approach the anvil, and mechanism to impart a rotary motion to said rotatory shaft.

7. In a machine for attaching lacing-hooks and the like to sheet material, an anvil, a plunger, mechanism for imparting a reciprocating motion to said plunger, a raceway bearing a fixed relation thereto, a rotatory shaft carried by said plunger, a stop-disk and a separator-disk fast to said rotatory shaft and located on opposite sides of a plane extending through the center of the anvil and intersecting the path of the hooks on the raceway as they approach the anvil, and a ratchet fast to said rotatory shaft arranged to engage a stationary pawl and imparting an intermittent rotary motion to said rotatory shaft.

8. In a machine for attaching lacing-hooks and the like to sheet material, an anvil, a plunger, mechanism for imparting a reciprocating motion to said plunger, a raceway bearing a fixed relation thereto, a rotatory shaft carried by said plunger, a separator-disk and a stop-disk fast to said rotatory shaft located upon opposite sides of a plane extending through the center of the anvil and intersecting the path of the hooks on the raceway as

they approach the anvil, a depression in the periphery of each of said disks, said depressions so arranged that when one of them is in line with the lacing-hooks on said raceway the other is out of line with said lacing-hooks, and mechanism to impart an intermittent rotary motion to said rotatory shaft.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN PIERCE.

Witnesses:
CHARLES S. GOODING,
LOUIS A. JONES.