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Patented Sept. 25, 1900.

F. A. SEIBERLING.

VULCANIZER.

(Application filed Mar. 14, 1900.)

2 Sheets—Sheet 1.

(No Model.)

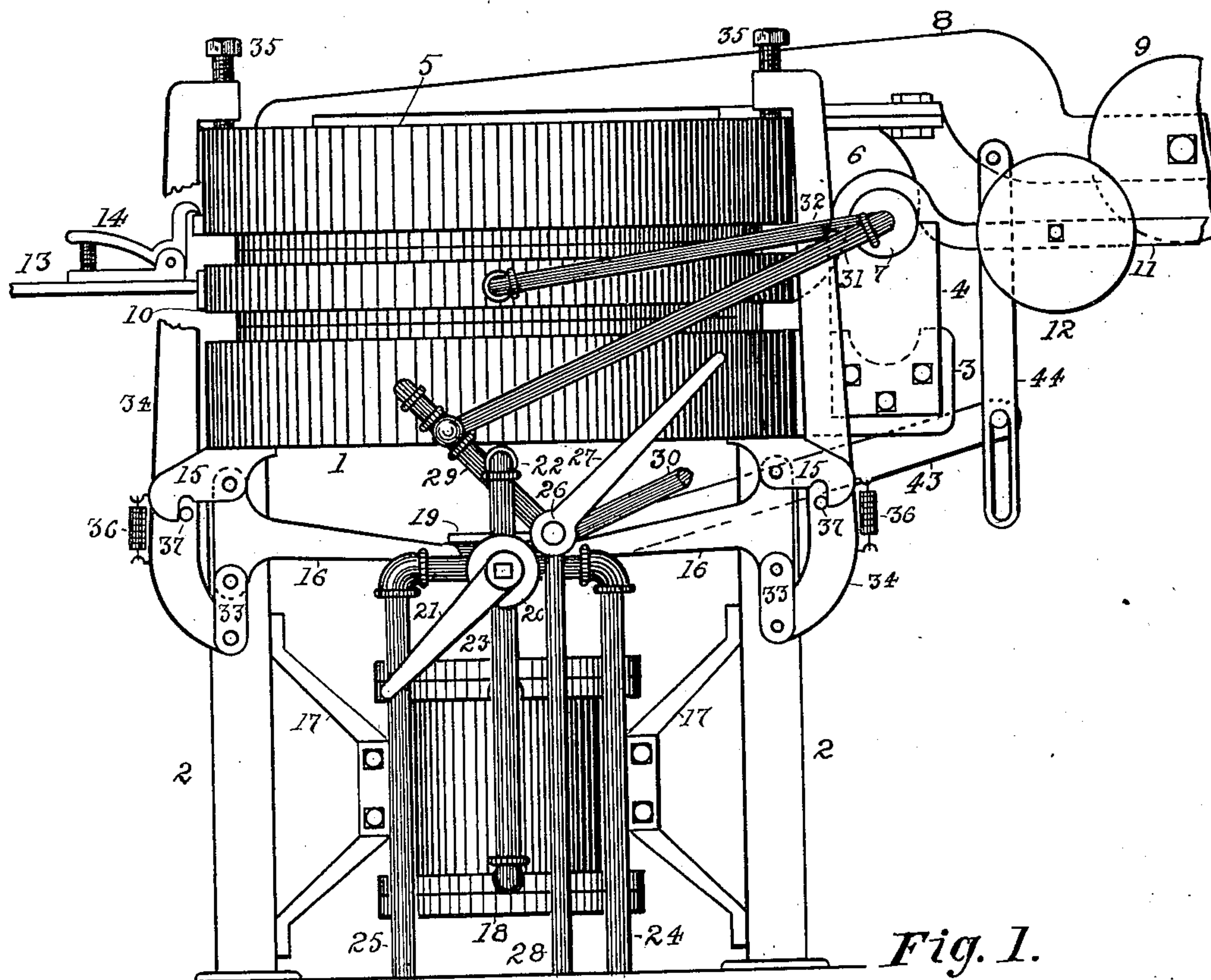


Fig. 1.

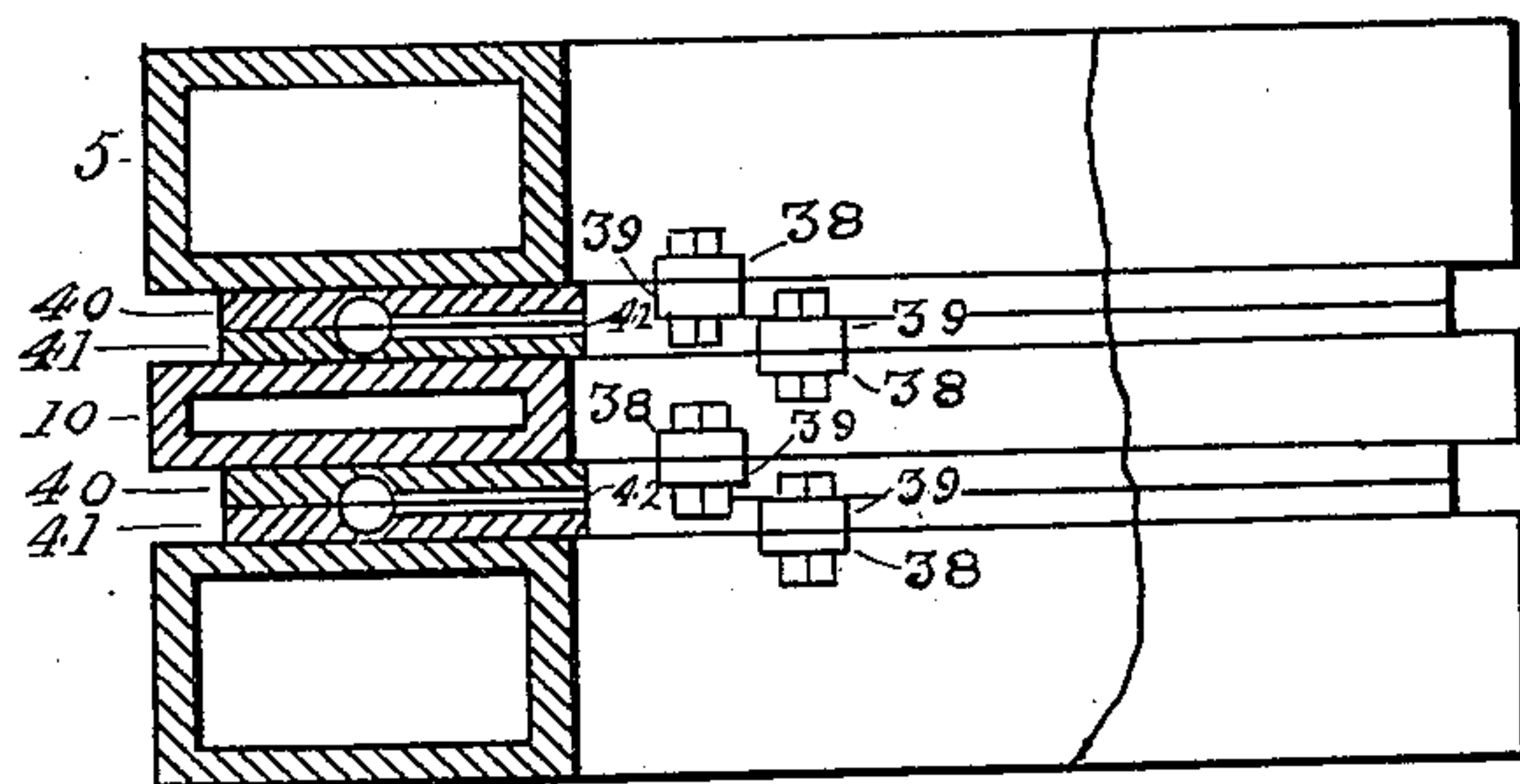


Fig. 2.

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2 Sheets—Sheet 2.

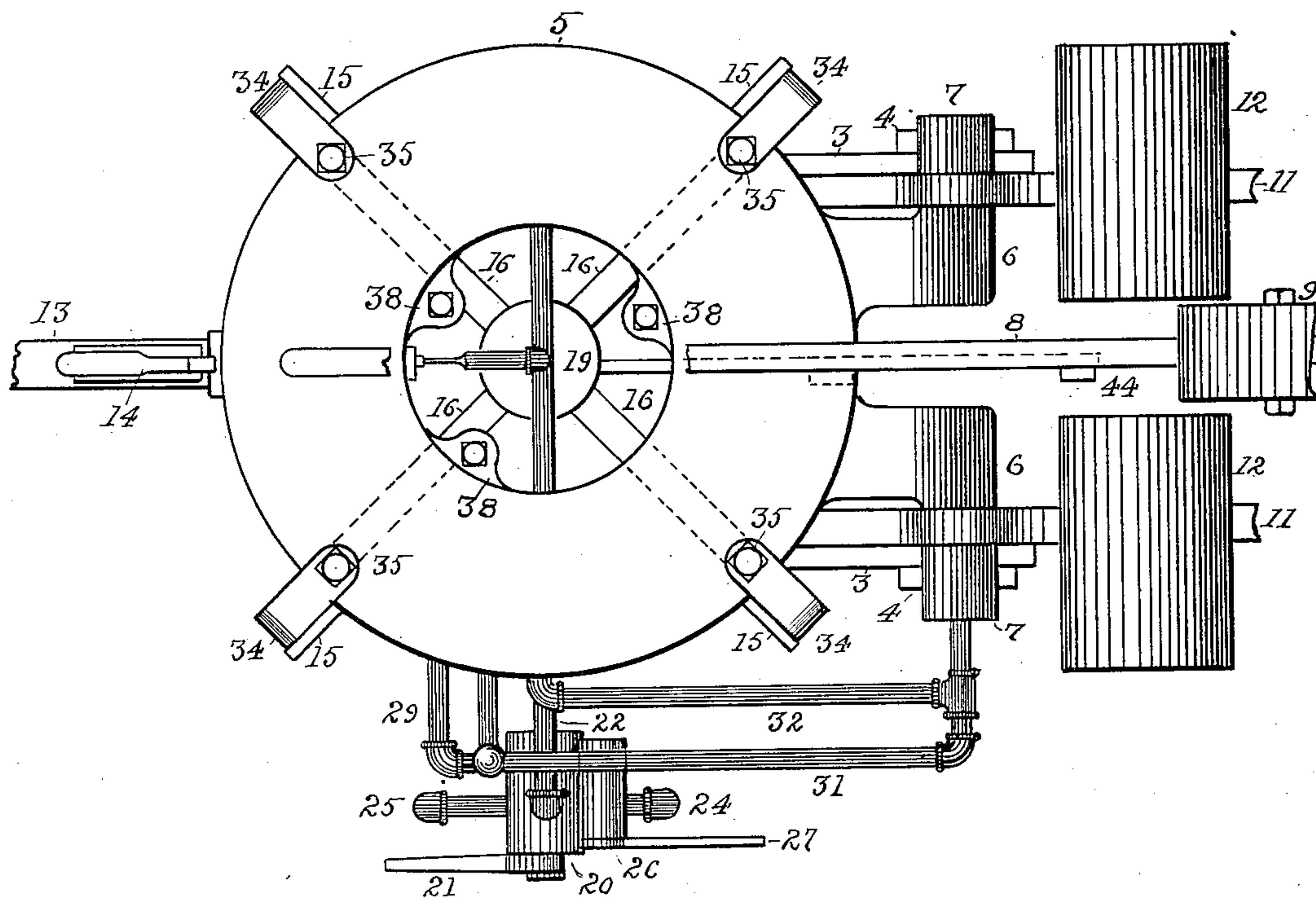


Fig. 3.

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# UNITED STATES PATENT OFFICE.

FRANK A. SEIBERLING, OF AKRON, OHIO.

## VULCANIZER.

SPECIFICATION forming part of Letters Patent No. 658,472, dated September 25, 1900.

Application filed March 14, 1900. Serial No. 8,591. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK A. SEIBERLING, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Vulcanizers, of which the following is a specification.

My invention has relation to improvements in vulcanizers for articles of rubber, and has especial relation to that class of vulcanizers used for curing pneumatic tires.

One object of my invention is to produce a new vulcanizer in which the same heat may be used to vulcanize two or more tires simultaneously and which, by means of power-actuated mechanism, may be closed to lock the tires in the molds and to open them when the process is completed.

A further object is to control the entrance and exit of steam to and from the vulcanizers at will, and a final object is to provide machinery to accomplish these different effects.

To the aforesaid objects my invention consists in the peculiar and novel construction, arrangement, and combination of parts hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawings, forming a part of this specification.

In the accompanying drawings, in which similar reference-numerals indicate like parts in the different views, Figure 1 is a side elevation of my improved vulcanizer; Fig. 2, a view of the cases detached, with the nearer portion broken and showing the cases in section; and Fig. 3, a plan of the same.

Referring to the drawings, 1 is an annular hollow case supported on legs 2, from one side of which case extend two parallel arms 3 3, to each of which is bolted a plate 4, having a semicircular notch in its upper end to form a bearing for a journal of the upper case 5. The upper case 5 is similar in construction and size to the case 1 and has parallel arms 6, with outwardly-turned cylindrical ends 7 to form journals to rest in the notches of the plates 4, these arms and cylindrical ends being hollow and internally connected with the case 5. Extending from the back of the case 5 is a bar 8, provided with a counterweight 9, to balance the case as it is rocked upward.

Between the cases 1 and 5 is a hollow ring

10, of the same internal and external diameter as those cases, having parallel bars 11, extending from one side, arranged to lie adjacent to and between the arms 3, curved to fit the upper half of each cylinder end 7, projecting beyond these ends, and each provided with a counterweight 12. This ring 10 is provided at its front with a handle 13, by which it may be raised and lowered, and has a spring-pressed latch 14, arranged to engage a lug on the case 5 and hold the case and ring together.

About the under face of the case 1 at regular intervals are fastened brackets 15, each provided with a bolt-hole and with its outer end formed into an inverted hook, with one longer internal straight face. Pivoted in these brackets are levers 16, in T shape, with their longer arms projecting toward the center line of the cases 1 and 5 and rounded for a purpose to be stated. The shorter arms of these levers are provided at each end with bolt-holes and each is pivotally secured at one end to one of the brackets 15.

Supported centrally beneath the case 1 by braces 17 is a cylinder 18, provided with a piston and rod, which rod terminates in a circular head 19, having a deep, semicircular groove around it, in which groove the rounded ends of the long arms of the levers 16 rest. At one side of the cylinder 18 and, as shown in Fig. 1, slightly above it is a four-way valve 20, provided with a lever 21, by which it may be rocked. This valve is connected by pipes 22 and 23 with the upper and lower ends of the cylinder 18, respectively, and by pipes 24 and 25 with a source of fluid under pressure and an outlet or waste. As this is a common form of four-way valve, no detail of its construction has been deemed necessary. Adjacent to the valve 20 is a three-way valve 26, provided with a lever 27, by which it may be rocked. The valve is connected by the pipe 28 with a source of live steam, and by a pipe 29 with the interior of the lower case 1 and with the exhaust-pipe 30. From a branch in the pipe 29 a pipe 31 connects with one of the cylindrical ends 7 and by a branch 32 with the hollow ring 10, by which arrangement all may be charged with live steam when desired for heating them.

Pivotally connected with the free ends of



the shorter arms of the levers 16 are link-bars 33, which are similarly connected with one end of the clamp-bars 34, which stand about the cases 1 and 5 and have offset upper ends provided with screw-threaded bolts 35, arranged when the clamp-bars 34 are vertical to overhang the case 5 and press on it when the bars are drawn vertically downward. The bars 34 are connected with the brackets 15 by coiled springs 36, fastened between hooks on the clamp-bars 34 and the brackets 15, that constantly draw them upward, and each has a projecting pin 37, arranged when the bar is raised to enter the hooked end of a bracket 15 and serve as a pivot for the bar to rock on.

To the adjacent faces of the cases 1 and 5 and the ring 10 are secured, by means of bolts in projecting perforated lugs 38 39, annular half-molds 40 and 41, arranged to register with each other and to receive and hold a tire to be vulcanized. In the inner side of each pair of molds is a lug in which are semi-circular grooves 42 for the reception of the inspirating-tube by which the tire is inflated during the process of vulcanization. As this tube is a common device shown in other applications, it has not been exhibited in the drawings.

Pivotaly mounted on a lug projecting from the bottom of the case 1, which is indicated by dotted lines in Fig. 3, is a lever 43, having at one end a pin that runs in a slot-bar 44, which bar is pivoted at its upper end to the bar 8 on the case 5. The opposite end of the lever 43 rests in the groove in the piston-rod head 19, and rocks with its rise and fall, and by its operation swings the case 5 up to open the press and releases it to permit it to descend by gravitation.

The operation will be understood by assuming the vulcanizer closed, as shown in Fig. 1, and the molds empty. The operator first swings the lever 21 to introduce the fluid under pressure to the bottom of the cylinder 18, which causes the piston to commence to rise. This raises the longer arms of the levers 16 and flexes the joint between their shorter ends and the links 33, which permits the clamp-bars 34 first to rise, drawn up by the springs 36, until their bolts 35 are free from the case 5, and as the piston continues to rise they will be rocked outward. At this time the lever 43 has rocked down so that the pin at its outer end has reached the lower end of the slot in the bar 44 and continuing its motion draws down the bar 8, thus rocking the case 5 and ring 10, which is held to it by the latch 14, upward until the completion of the stroke of the piston. This has opened the mold between the case 1 and ring 10 and a green unvulcanized tire is placed therein. The operator then releases the latch 14 and swings the ring 10 down on the case 1, thus opening the upper set of molds, and a green unvulcanized tire is placed in the half-mold in the ring 10. To enable the fresh tires to

bed properly in each lower mold, it is customary to introduce live steam through the inspirating-tube, hereinbefore referred to, by opening the valve 26 sufficiently to inflate them. When the tires are in place, as just described, the operator changes the valve 20, so as to introduce fluid under pressure to force the piston down and lowering the piston-rod head 19, rocking down the levers 16. The first effect of this motion is to rock the clamp-bars 34 to a vertical position, so that their bolts overhang the case 5, and then by straightening the toggle-joint, of which the links 33 form a part, to draw them vertically down with great force on the case, thus binding the cases 1 and 5 and the ring 10 together. During the last movement the lever 43 has also rocked to raise its outer end to release the bar 44 to permit the case 5 to descend. Steam is then introduced to the molds and tires by the valve 26 and maintained during the requisite time for vulcanization, when the steam is turned off, the cases and molds opened in the manner before stated, the cured tires removed, and green ones substituted.

I claim as my invention—

1. In a vulcanizer the combination of a fixed hollow case, a movable hollow case hinged thereto and an intermediate hollow ring hinged between said cases and molds in said cases and ring, with means for connecting said movable case and ring, clamps to bind said cases and ring together and means for introducing and controlling the entrance and escape of live steam to and from said cases and ring, substantially as shown and described.

2. In a vulcanizer the combination of a fixed hollow case and a movable hollow case hinged thereto and a hollow ring hinged between said cases and molds in said cases and ring, of a cylinder connected with said fixed case having a piston and rod adapted by intermediate mechanism to close and lock said cases and ring and to release and open them and means for controlling a fluid under pressure to operate said piston, substantially as shown and described.

3. In a vulcanizer the combination with a fixed hollow case and a movable hollow case hinged thereto and a hollow ring hinged between said cases molds held therein, and means for causing said movable case to rock on its hinges, of a latch to connect said ring and movable case to cause them to move in unison, substantially as shown and described.

4. In a vulcanizer the combination with a fixed hollow case and a movable hollow case hinged thereto and a hollow ring hinged between said cases and molds in said cases and ring, a latch to detachably connect said ring and movable case, of a cylinder having a piston and rod adapted to be moved by a fluid under pressure, means for controlling the entrance and escape of said fluid to operate said piston, of a pivoted lever adapted to be rocked by said piston-rod, and a slotted bar connect-



ing said lever and movable case to open and close said case by the movement of said piston, substantially as shown and described.

5 In a vulcanizer the combination with a fixed hollow case and a movable hollow case and a hollow ring hinged between said cases and molds in said cases and ring, of a cylinder with a piston and rod, a number of levers pivoted about said fixed case, having one end arranged to engage and be rocked by said piston, clamp-bars arranged about said fixed case susceptible of a rocking and a longitudinal movement, adapted to rock to and descend to bind said cases and ring and to rise and release said cases and ring, and rock away from them, and links to connect the opposite ends of said levers and clamp-bars, to cause the latter to operate, substantially as shown and described.

20 6. In a vulcanizer the combination with a fixed hollow case and a movable hollow case, and a hollow ring hinged between said cases and molds in said cases and ring, and molds connected with the adjacent faces of said cases and ring and arranged to register, of a cylinder having a piston and rod adapted to be moved reciprocally by a fluid under pressure, means for controlling the entrance of steam to said cases and ring, locking devices arranged to be operated by said piston to lock together and release said cases and ring,

mechanism adapted to be operated by said piston to open said movable case, and a latch to unite said ring and movable case, substantially as shown and described.

7. Tripartite vulcanizers consisting of a fixed hollow case, a movable hollow case hinged thereto, and a hollow ring hinged between said cases, and molds retained within said cases and ring and between their adjacent faces, and means for severally heating said cases and ring, substantially as shown and described.

8. As an improved article of manufacture a vulcanizer having a plurality of hollow cases hinged together, molds in said cases and means for severally heating said molds, substantially as shown and described.

9. An improved vulcanizer, consisting of a plurality of hollow steam-cases hinged together, molds within said cases, means for heating said cases and molds and mechanism for opening and closing said molds, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

FRANK A. SEIBERLING.

In presence of—

C. E. HUMPHREY,  
C. P. HUMPHREY.