

(No Model.)

3 Sheets—Sheet 1.

A. ZUAHLEN.

MACHINE FOR ENGRAVING WATCH OR OTHER CASES.

No. 402,380.

Patented Apr. 30, 1889.

Fig 1

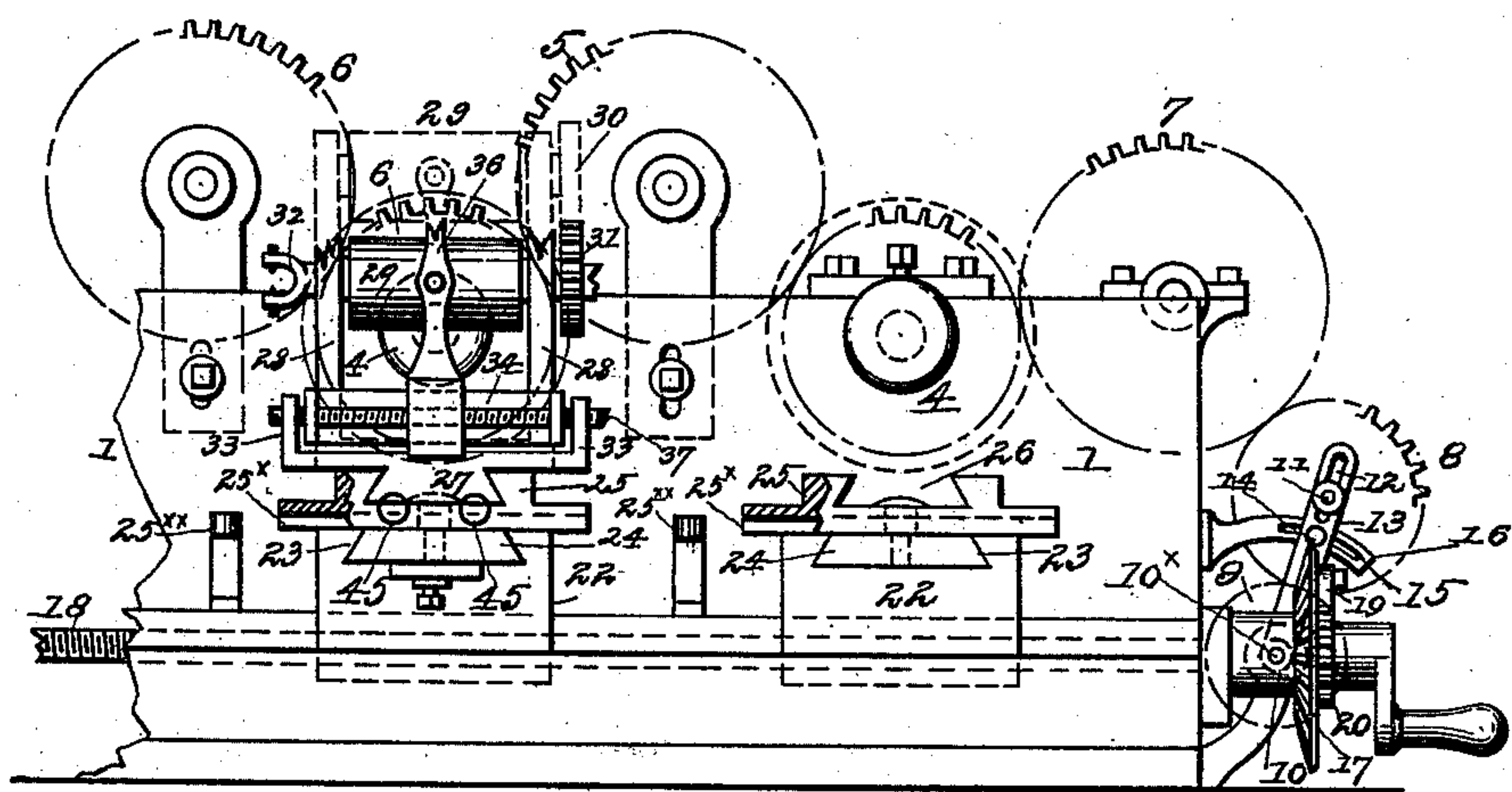


Fig 2

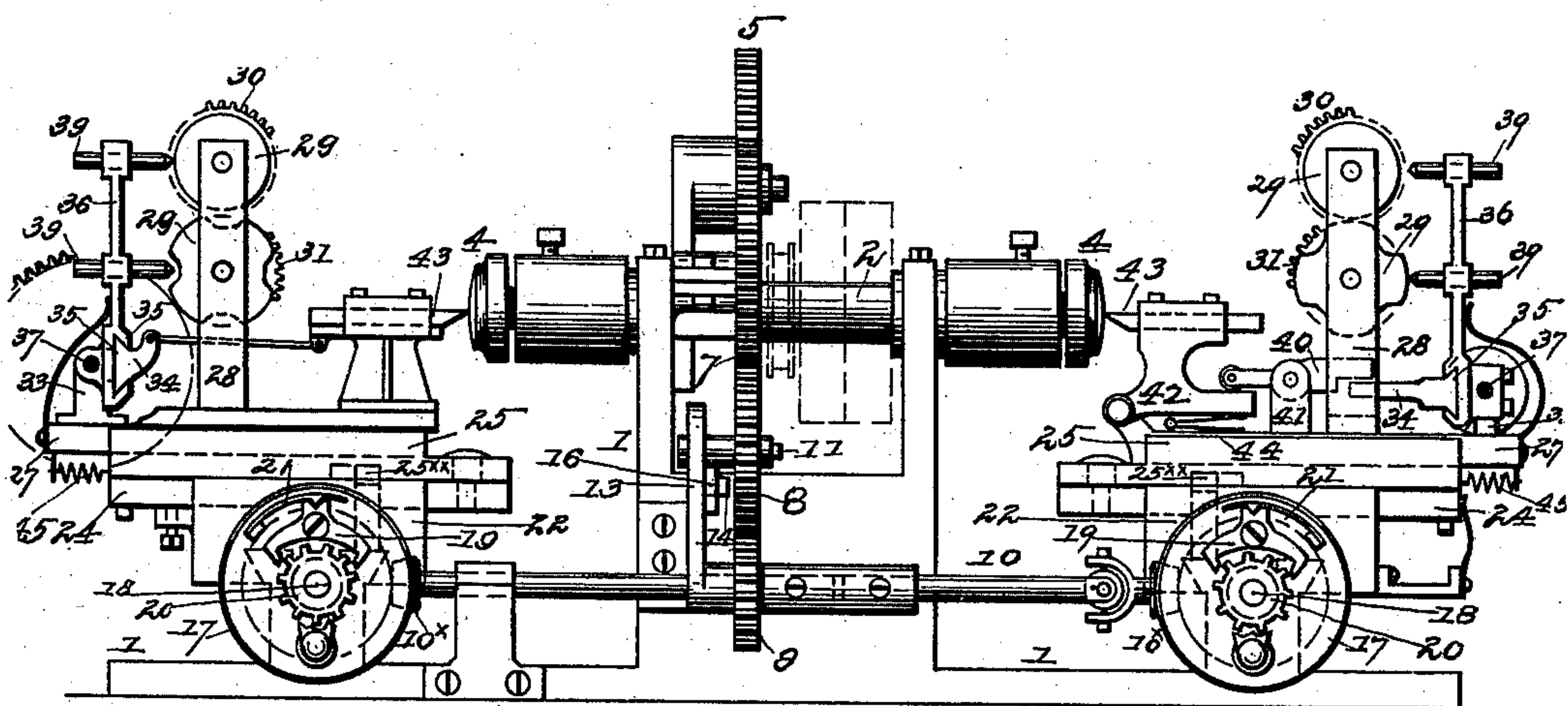
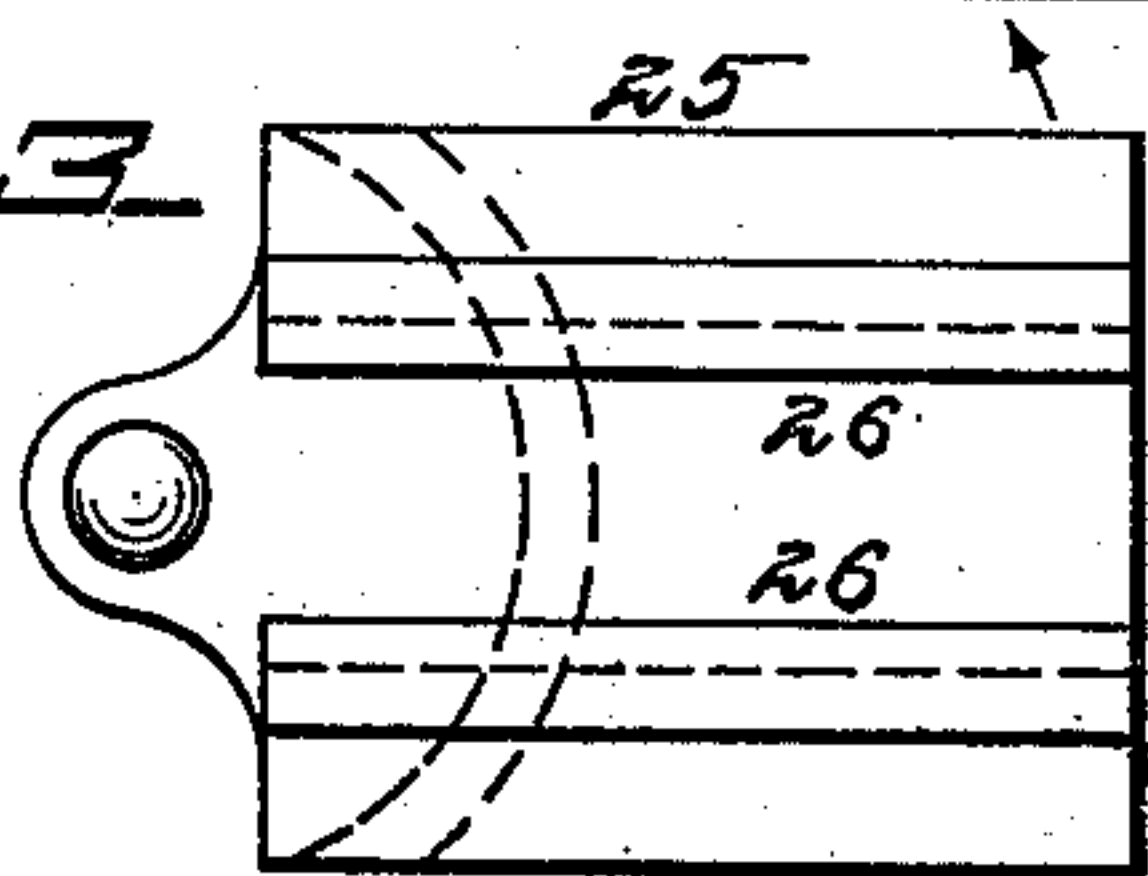


Fig 3

WITNESSES:

L. Nowville
A. P. Jennings.



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Fig 4.

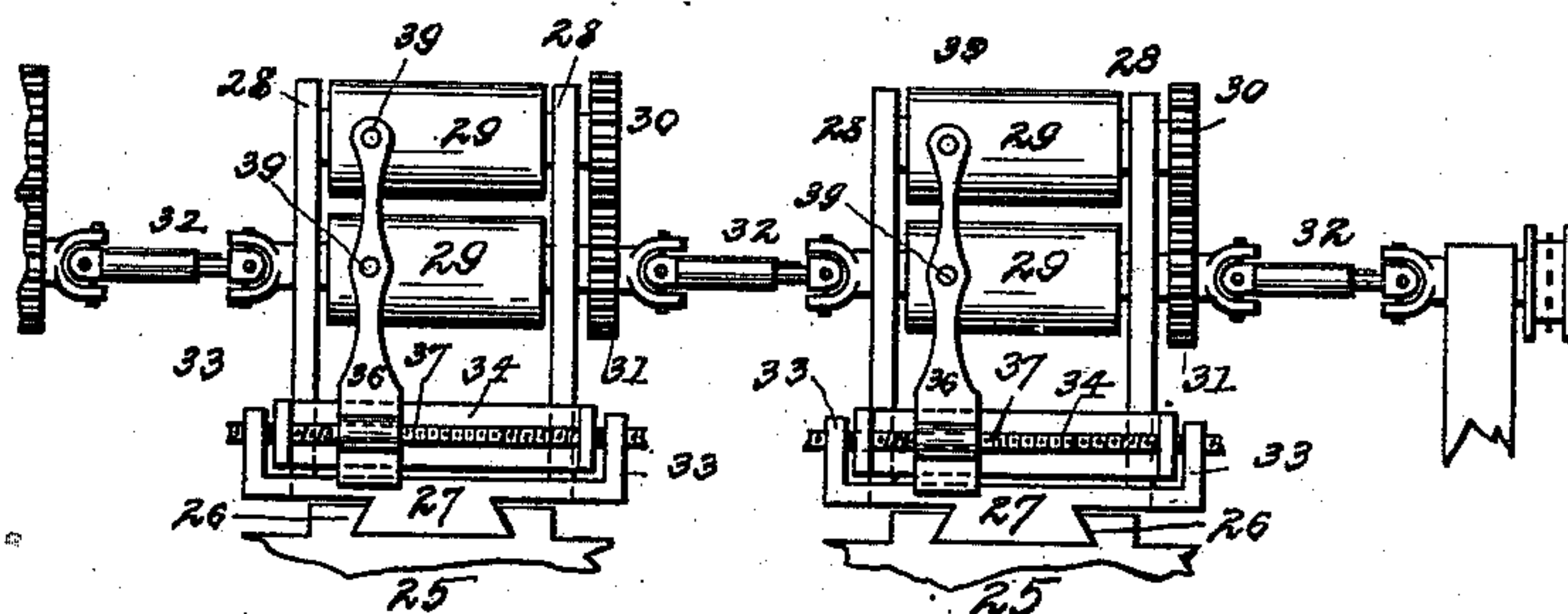


Fig 5.

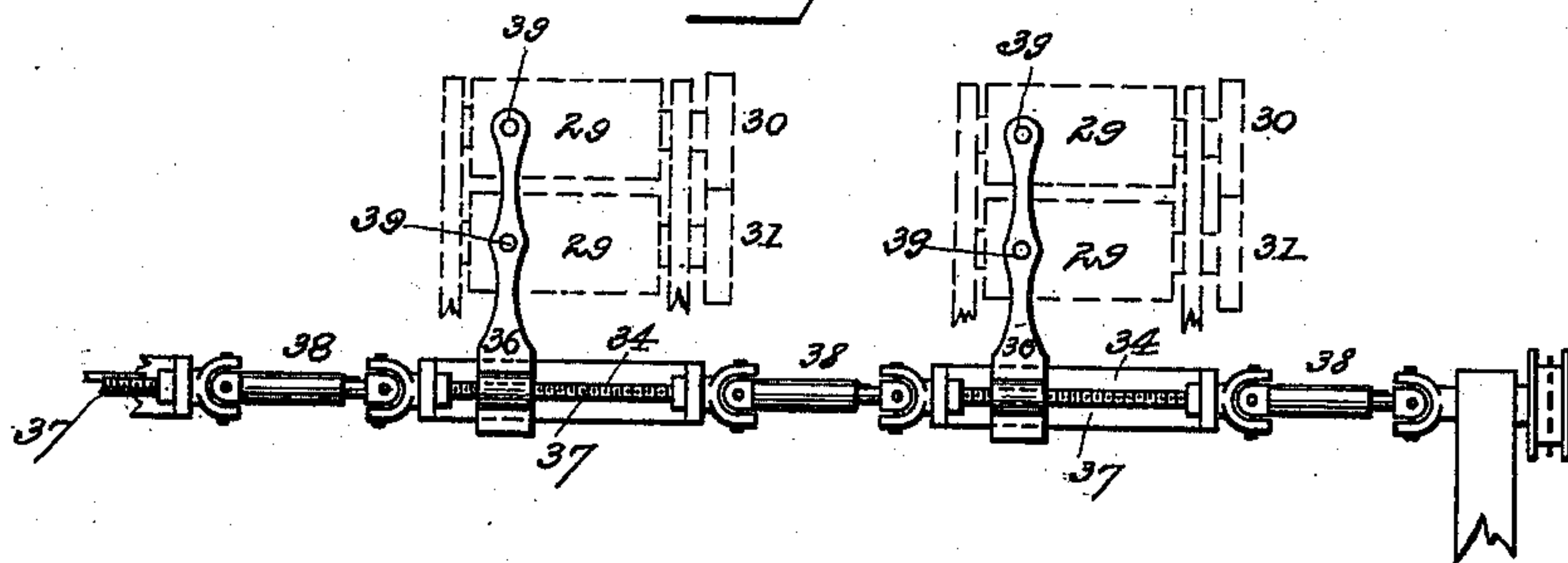
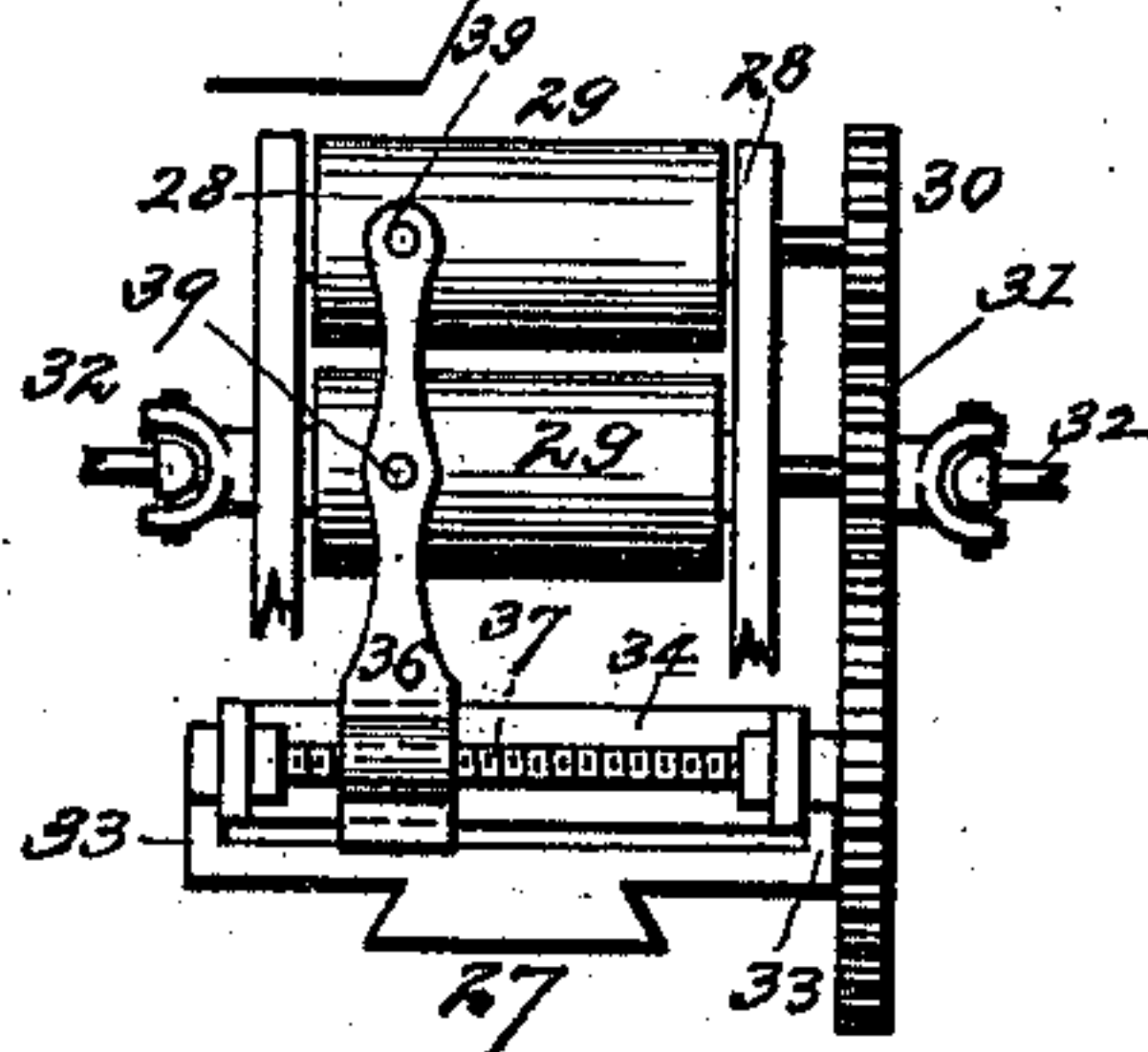


Fig 6.



WITNESSES:

L. Douville
A. P. Jennings.

INVENTOR:

Ami Zuaulen,
BY Giedersheim & Kuntner
ATTORNEYS.

(No Model.)

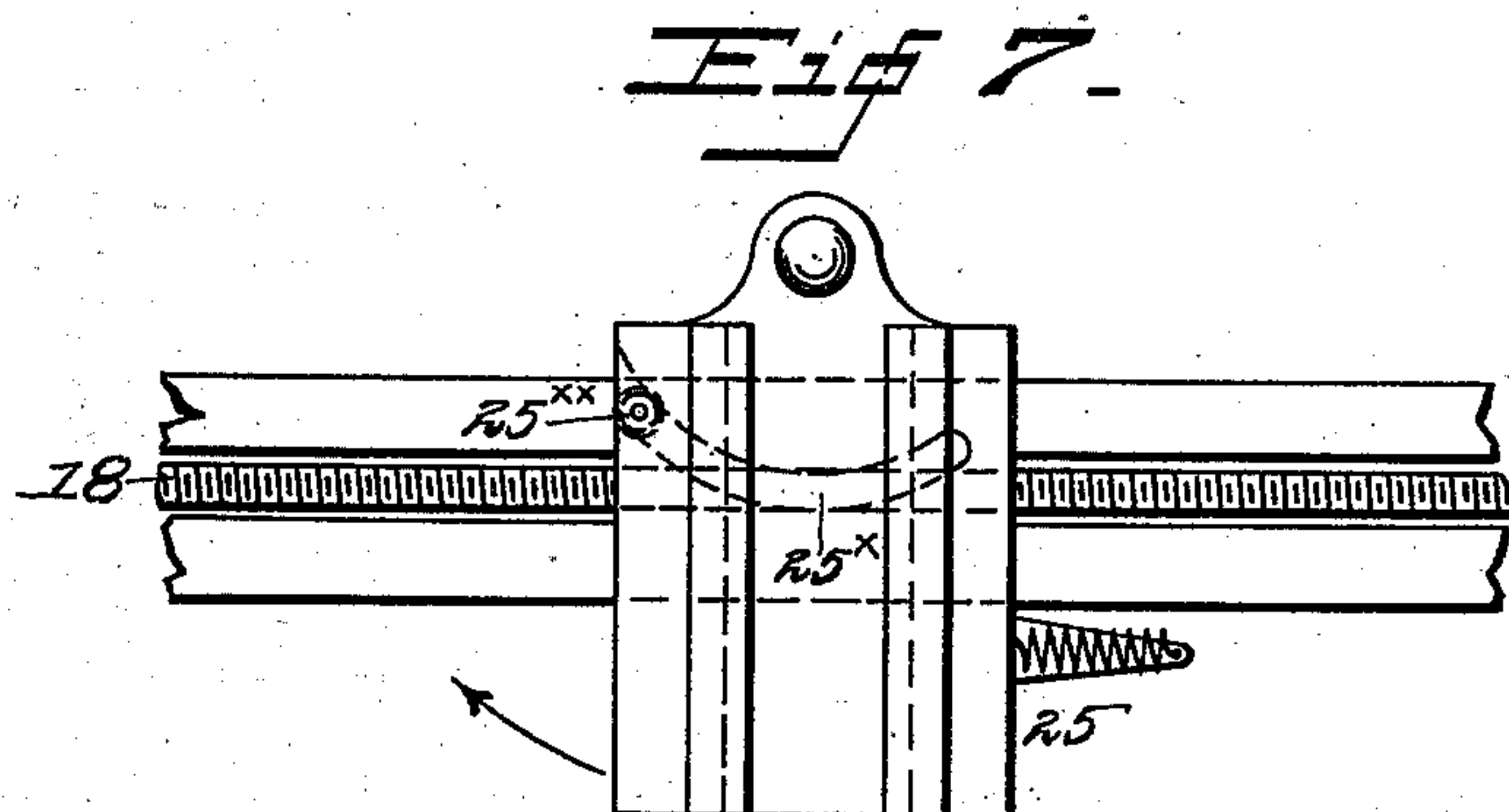
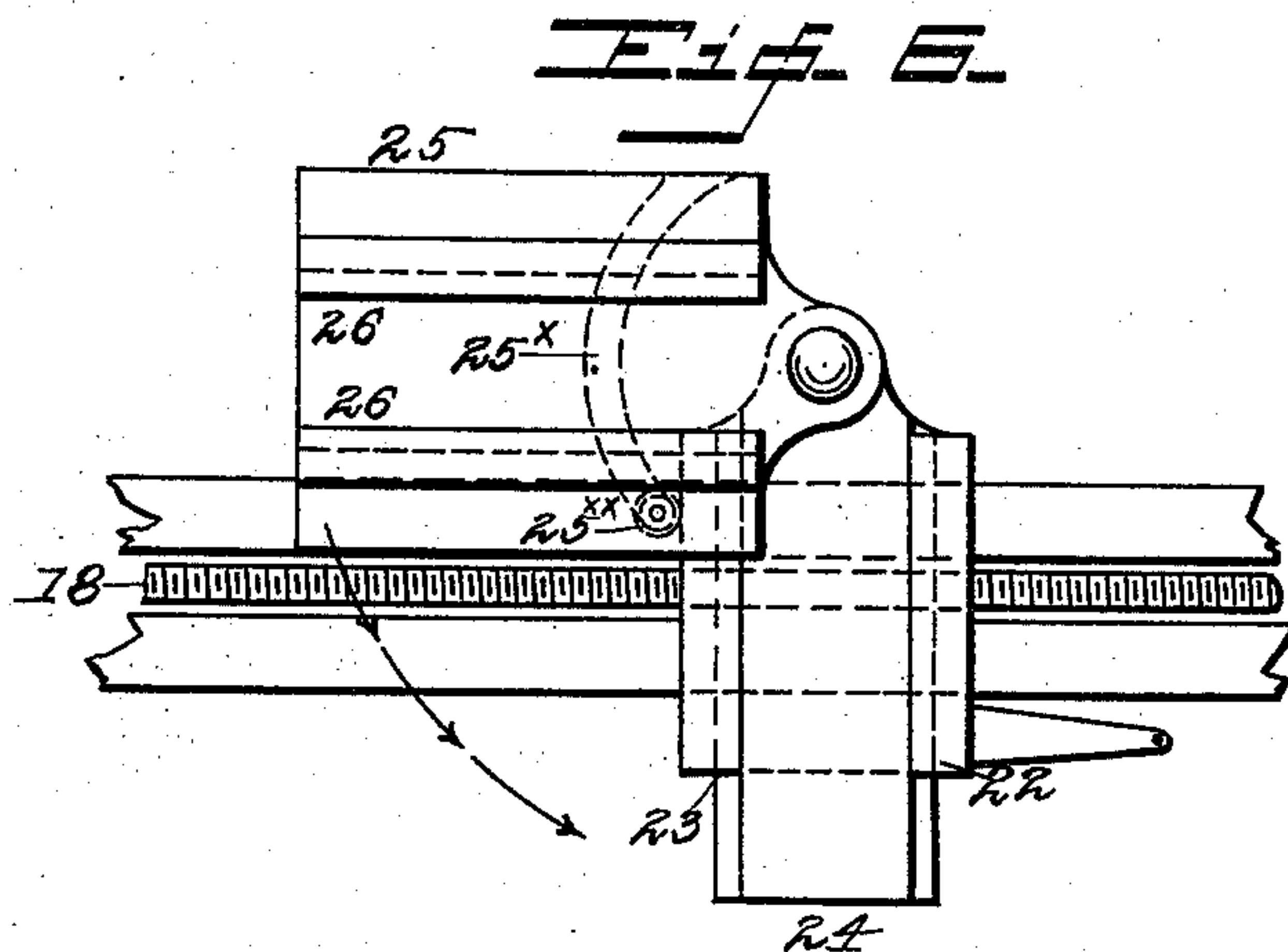
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WITNESSES:

L. Dowville
Wm. J. Moore

INVENTOR:

Ami Zuahlen
BY *Giedersheim & Kuntner*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

AMI ZUAHLEN, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR ENGRAVING WATCH OR OTHER CASES.

SPECIFICATION forming part of Letters Patent No. 402,380, dated April 30, 1889.

Application filed September 17, 1888. Serial No. 285,614. (No model.)

To all whom it may concern:

Be it known that I, AMI ZUAHLEN, a citizen of Switzerland, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Machines for Engraving Watch and other Cases, which improvement is fully set forth in the following specification and accompanying drawings.

10 My invention relates to improvements in machines for engraving watch and other cases; and the object of the invention is to produce a machine which will engrave a number of cases at once, and which will produce any desired design.

15 To attain these objects the invention consists in a driving-shaft constructed to receive the cases, and a series of shafts driven from said driving-shaft, also adapted to receive the cases, and mechanism operating in conjunction with the shafts for engraving the cases.

20 The invention further consists in the combination, with the mechanism carrying the cases, of an engraving mechanism capable of producing any desired design on said cases.

25 The invention further consists in the combination of parts, all as hereinafter shown, described, and specifically claimed.

30 Figure 1 represents a side elevation of a machine constructed in accordance with and embodying my invention. Fig. 2 represents an end elevation thereof. Fig. 3 represents a detail view of one of the pivoted guide-plates. Fig. 4 represents a detail view of one of the design-rollers and the driving mechanism therefor. Fig. 5 represents a detail view of the rock-arms and the driving mechanism therefor. Fig. 6 represents a top plan view of the pivoted guide-plate, and carriage in which it is mounted, the guide-plate being in the position it assumes when the engraving mechanism is operating on the edge of the case. Fig. 7 represents a similar view thereof, the pivoted guide-plate being in the position it assumes when the engraving mechanism is operating on the face of the case. Fig. 8 represents a modification of a driving mechanism for the rock-arms and design-rollers.

40 Similar numerals of reference indicate corresponding parts in the several figures.

Referring to the drawings, the numeral 1 designates the frame-work of the machine.

2 designates the driving-shaft mounted in the frame-work and having thereon the driving gear-wheel 3. To the outer ends of the driving-shaft are secured heads or mandrels 4, on which the cases to be operated upon are sprung or placed.

5 5 designates a gear-wheel meshing with the driving gear-wheel for transmitting motion to a system of gearing, 6, for revolving shafts having cases thereon, the one driving gear-wheel serving to transmit motion of any number of shafts through the system of gearing in order that any number of cases can be engraved, as may be desired. From this construction it is evident that the driving-shaft has thereon the cases to be operated upon, and transmits motion through a system of gearing to any number of shafts carrying cases.

7 designates a gear-wheel mounted in the frame of the machine and meshing with the driving gear-wheel. 8 designates a gear-wheel meshing with the said gear-wheel 7, and 9 designates a gear-wheel meshing with the gear-wheel 8, and which is mounted on a shaft, 10. From this construction it will be seen that power is transmitted through the driving-shaft to the gear-wheels 7, 8, and 9, and that the shaft 10 is revolved thereby. The gear-wheel 8 is mounted on a stud, 11, which is adjustable in an elongated slot, 12, in the upper end of an arm, 13, which arm carries a pin, 14, fitting in a curved slot, 15, of a curved arm, 16, projecting outward from the frame, and the lower end of the arm embraces the shaft 10. The adjustability of the arm carrying the gear-wheel, and the adjustability of the gear-wheel in said arm, allows of the employment of gear-wheels having different diameters to impart different rates of speed to the gear-wheel 9 on shaft 10, and thereby to revolve said shaft 10 at different speeds, the purpose of which will be explained. The shaft 10 has at its ends bevel gear-wheels 10^x, which mesh with bevel gear-wheels 17, which are mounted loosely on screws 18, and which impart motion to said screws by means of the dogs 19 engaging toothed wheels 20 fast on the screws 18, and in order to allow the bevel gear-wheels to revolve without turning the screws springs 21 are provided on the bevel gear-wheels, which

engage the dogs and hold them out of contact with the toothed wheels, as will be readily understood. From this construction it will be understood that motion is imparted through the bevel gear-wheels 10^x, and 17 to the screws 18. The screws 18 pass through carriages 22, on which the engraving mechanism is mounted, and cause said carriages to travel back and forth. In the carriages 22 are formed beveled or dovetailed ways 23, in which are received the beveled plates 24, and to the said plates 24 is pivoted the inner end of the guide-plates 25. The pivoted guide-plates are provided on their under sides with a curved channel, passage, or way 25^x, which receives studs, projections, or rollers 25^{xx}, as clearly shown in Figs. 6 and 7 of the drawings. The purpose of this construction is to cause the guide-plates, and consequently the engraving mechanism mounted thereon, to move from the edge of the case to the center or face thereof as the carriage moves on the screw, and thereby insure a smooth and steady working of the engraving mechanism, as is evident. The guide-plates 25 are also formed with dovetailed ways 26, which receive the dovetailed plates 27.

Rising from the plates 27 are standards or uprights 28, between which are mounted the design-rollers 29. The design-rollers have thereon the design or pattern which is to be produced on the watch-cases. The design-rollers are rotated by means of gear-wheels 30 and 31, meshing together and driven by flexible driving-connections 32, as clearly shown in Fig. 4 of the drawings.

33 designates posts or uprights on the plates 27, between which are pivoted the levers 34, having their outer ends, 35, beveled, as shown in Fig. 2 of the drawings. On the beveled ends of the levers 34 fit the beveled or dovetailed lower ends of the rock-arms 36. The lower ends of the rock-arms are also provided with screw-threaded openings, through which pass the screws 37, rotated by suitable means—such as gear-wheels, sprocket-wheels, pulleys, or the like—through the medium of flexible or accommodating connections 38, as clearly shown in Fig. 5 of the drawings. From this construction it is evident that the rocking arms are caused to travel back and forth, and the rock-arms carry pointers or pins 39, which are adapted to engage the design-wheels, as shown in Fig. 2, the purpose of which will be explained.

40 designates a lever pivoted between uprights or posts 41, having its outer end adapted to be struck by the inner end of the lever 34, and its inner end engaging the outer portion of the pivoted cutter or graver holder 42, carrying the cutter or graver 43, and under the cutter-holder is placed a flat spring, 44, which causes the holder to always present the cutter or graver to the case to be engraved. The construction described is that illustrated in Fig. 2 of the drawings on the right-hand side of the machine, the construction on the left-

hand side of the machine being somewhat different—as, for instance, the lever 34 is an elbow-lever, and is connected by a rod or link to the cutter, giving the cutter a back-and-forth movement in a stationary holder or guide. The result of this portion of the construction is the same as of the construction employed on the right-hand side of the machine.

45 designates springs connected at one end to the pivoted guide-plates, the purpose of which is to retain the plates 27 at the proper place and consequently the cutter or graver. For the purpose of removing the shaft 10, I have shown it in Fig. 2 as constructed in two sections coupled together by means of a collar or sleeve, and the shaft is also provided with a knuckle or ball joint; but it is obvious that such construction is not necessary to the perfect working of the machine. In Fig. 8 I have also shown the design-rollers and traveling screws of the rock-arms as driven by a train of gearing.

From the foregoing description, taken in connection with the drawings, the operation of the machine will be readily understood, and may be briefly stated as follows: The watch-cases are sprung or placed upon the heads on the shafts, to which motion is imparted from the driving-shaft in the manner described, causing the cases to revolve with said shafts. Motion is transmitted from the driving gear-wheels to the shaft 10, causing the bevel gear-wheel 10^x, which revolves the screws which move the carriage carrying the the cutting mechanism longitudinally. The design-wheels are also revolved in the manner described and by the mechanism illustrated in Fig. 4 of the drawings, which design-wheels engage one of the pointers or pins on the rock-arms and cause said arms to impart the proper action to the cutter or graver to the watch-case, and thus cause the cutter or graver to inscribe or engrave on the case the design or pattern on the rollers, the rock-arms being caused to travel by means of the screws and move the pointer over the surface of the roller.

The rock-arm, it will be understood, raises or lowers the lever to which it is connected, giving a corresponding motion to the lever which engages the cutter-holder, as will be readily understood.

The design on the rollers operates the rock-arms to cause the cutter to describe the design on the cases.

The flexible driving-connections between the design and rock-arms allow the pivoted guide-plate to be turned to cause the cutter to engrave from the edge over the curved or rounded surface of the case.

I would have it understood that I reserve the right to make minor changes in the details of construction of parts of the machine without sacrificing any of the advantages thereof or departing from the spirit of the invention.

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

1. In an engraving-machine, the combination of a rotary shaft having journal-bearings between its ends, heads or mandrels secured to said ends and adapted to receive the cases, and engraving mechanism adapted to contact with the cases on both of said ends, substantially as described.

2. In an engraving-machine, the combination of a shaft having cases on each of its ends, gearing operated by said shaft, traveling screws operated by said gearing, and carriages mounted on said screws carrying engraving mechanism for engraving the cases on the ends of the shaft, substantially in the manner described.

3. In an engraving-machine, the combination of a frame having a central upright, a driving-shaft journaled in said upright with cases on its free ends, gearing operated by the driving-shaft, traveling screws mounted in the frame, on each side thereof, and operated by said gearing, and carriages carrying engraving mechanism traveling on said screws, substantially in the manner described.

4. In an engraving-machine, the combination of a driving-shaft having cases on each end thereof, gearing operated by said shaft, a shaft operated by said gearing and having a bevel gear-wheel on each end thereof, bevel gear-wheels meshing with the gears on said shaft, traveling screws operated by said last-named gear-wheels, carriages having engraving mechanism mounted thereon, said carriages being operated by the traveling screws, substantially in the manner and for the purpose described.

5. In an engraving-machine, the combination of a shaft having a bevel gear-wheel at each end, the bevel gear-wheels meshing therewith, the screws on which said gear-wheels are loosely mounted, the toothed wheels on the screws, and devices on the bevel gear-wheels for engaging the toothed wheels to cause the motion of the bevel gear-wheels to be transmitted to the screws, substantially as and for the purpose described.

6. In an engraving-machine, the combination of the arm having a curved slot, the arm having an elongated slot, and a pin or stud arranged in the curved slot of the first-men-

tioned arm, a gear-wheel having a stud or pin arranged in the elongated slot, and the gear-wheel meshing with said gear-wheel, said parts being arranged and adapted to operate substantially in the manner and for the purpose described.

7. In an engraving-machine, the combination of the carriages having the channels in their upper faces, the plates fitting in said channels, the plates pivoted to said plates having curved grooves in their under side and channels in their upper sides, posts, studs, or rollers adapted to enter the curved grooves, the plates fitting in the chambers, and the design-rollers, rock-arms, and grooves mounted on the last-mentioned plate, all arranged and adapted to operate in the manner and for the purpose described.

8. In an engraving-machine, the combination of the carriage having the channel in its upper side, the plate fitting and adapted to slide in said channel, the plate pivoted to said sliding plate and having a channel in its upper side, the plates fitting in said channels, the uprights rising from said plates, the design-rollers mounted in said uprights, the rock-arms and operating-screws therefor, the rods connected at one end to the lower ends of the rock-arms, and the cutter or graver connected with the other ends of said rods, all of said parts being arranged and adapted to operate substantially in the manner and for the purpose described.

9. An engraving-machine having a series of rotary shafts, each having bearings between its ends, heads or mandrels secured to said ends, the said series of shafts having gearing operating from a common driving-shaft, and engraving mechanism adapted to contact with the cases on each of said heads, said parts being combined substantially as and for the purpose set forth.

10. In an engraving-machine, the plate 27, with uprights 33, the pivoted lever 34, having beveled outer ends, the rock-arms 36, with beveled lower end, the pins 39, and design-rollers, said parts being combined substantially as and for the purpose set forth.

AMI ZUAHLEN.

Witnesses:

WM. N. MOORE,

JOHN A. WIEDERSHEIM.