No. 862,847. PATENTED AUG. 6, 1907.

O. PRANGE.

PHOTOGRAPHIC MULTIPLEX COPYING MACHINE.

APPLICATION FILED AUG. 26, 1904.

2 SHEETS—SHEET 1.

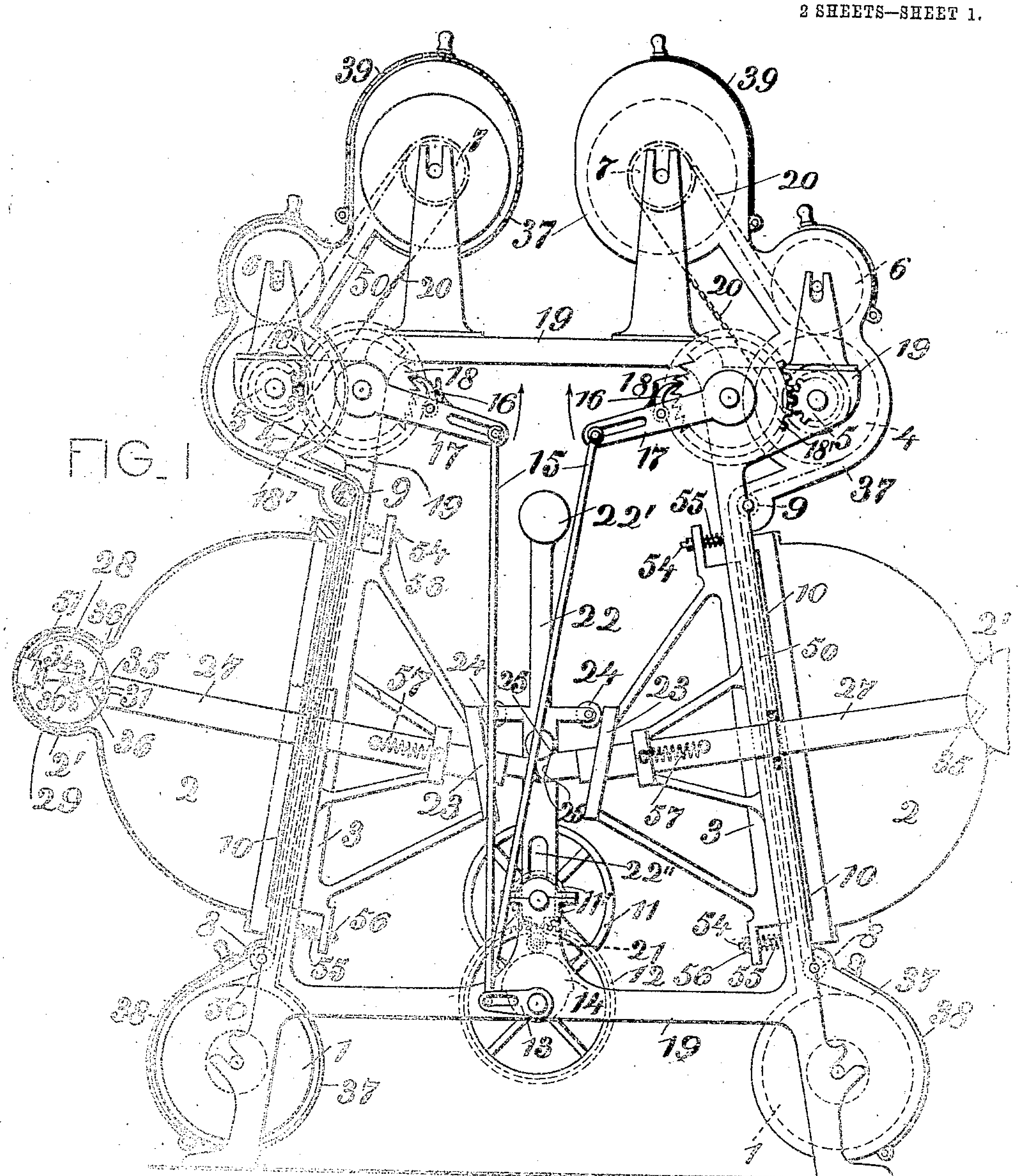
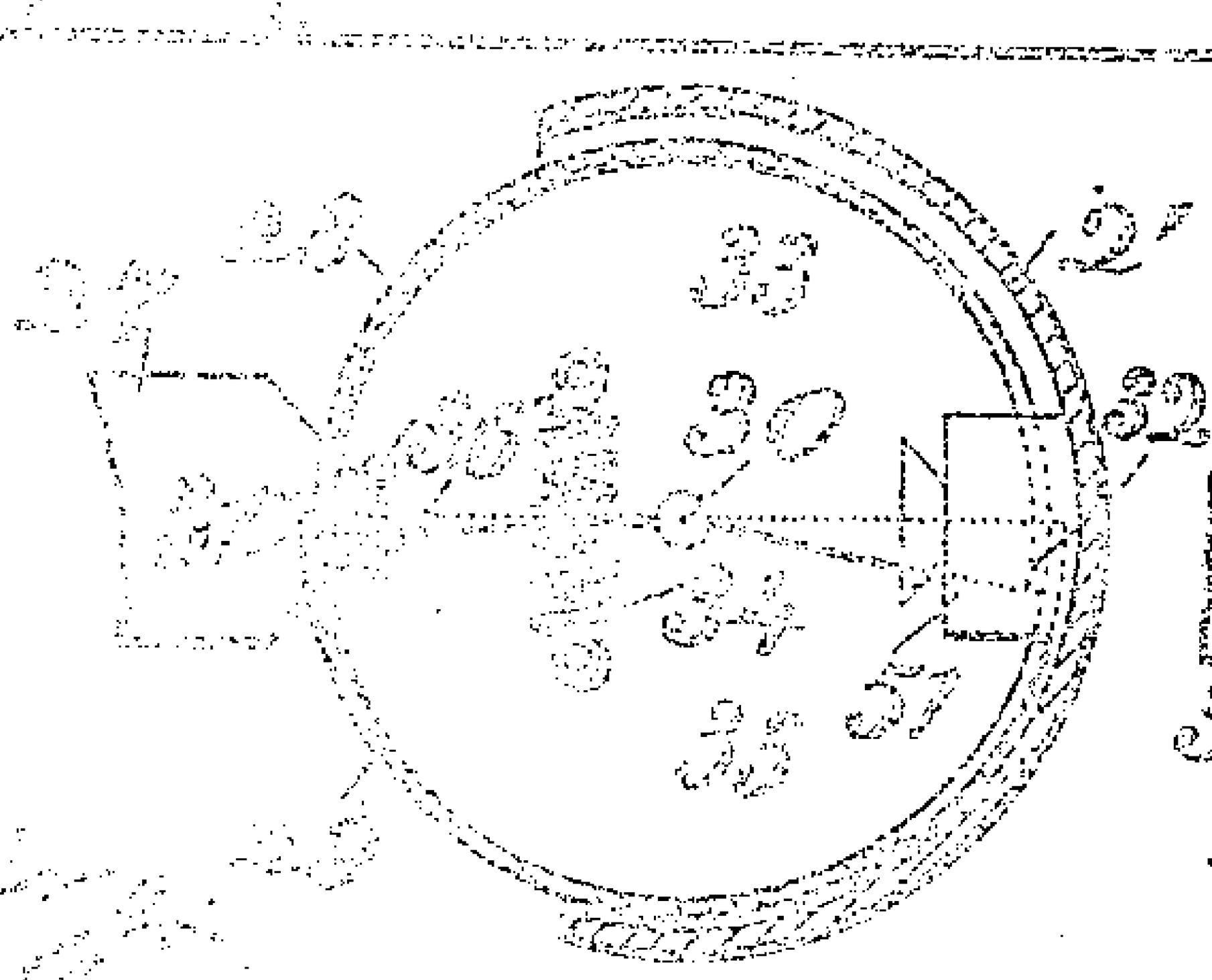
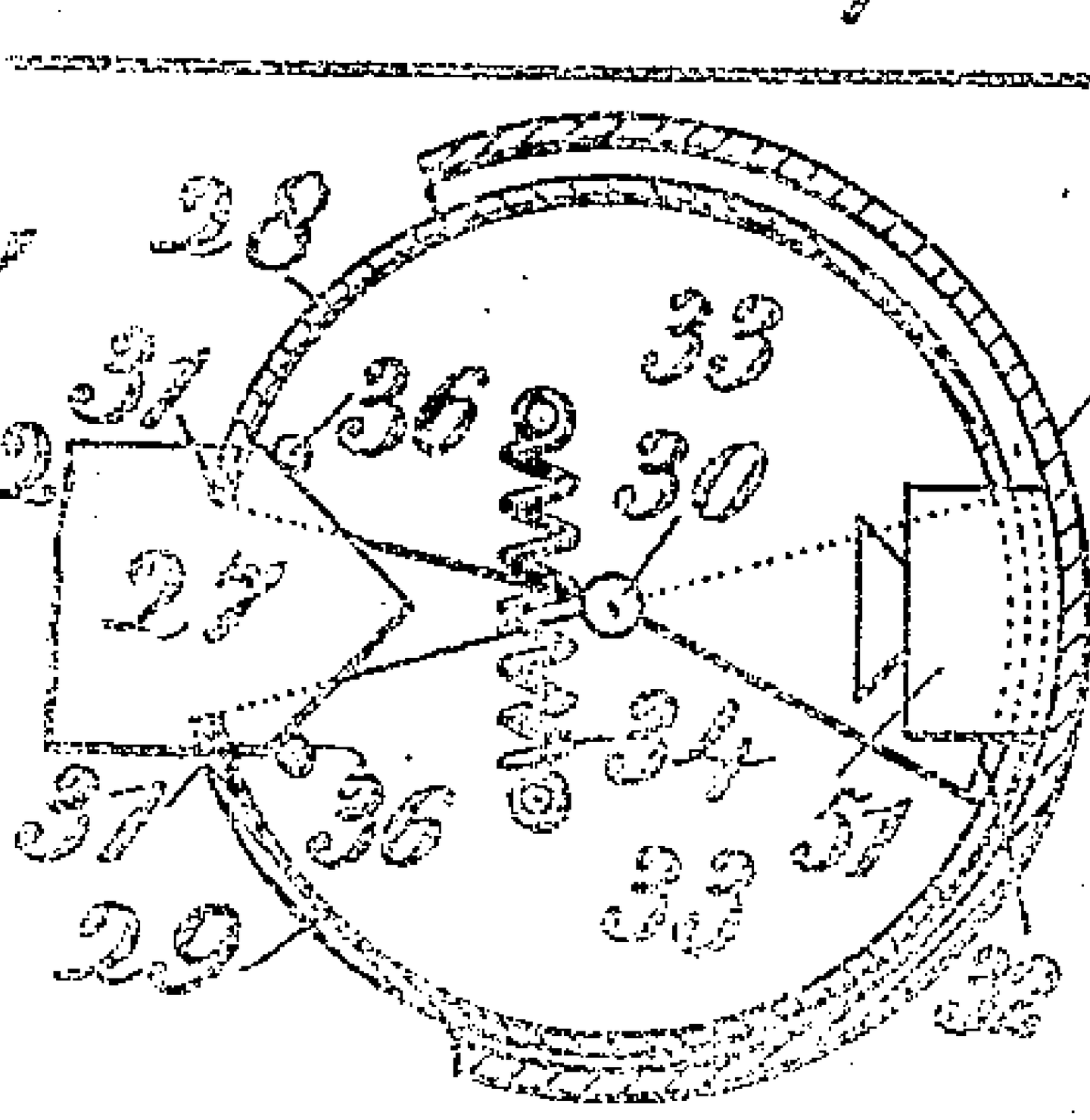


FIG_1





Witnesses:

FIG_3

FIG_4

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Oscar Prange

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2 SHEETS—SHEET 2.

FIG. 2

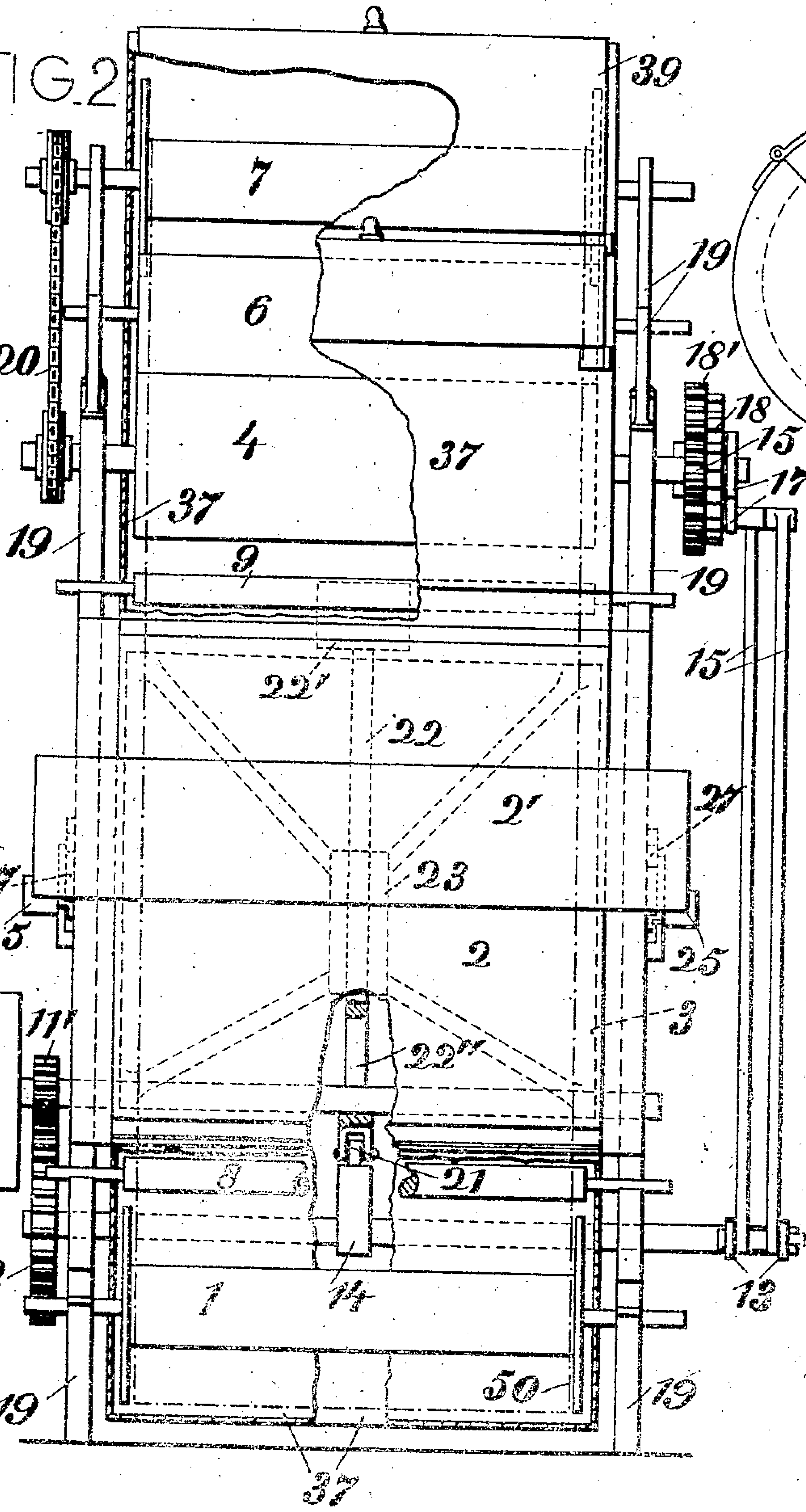


FIG. 6

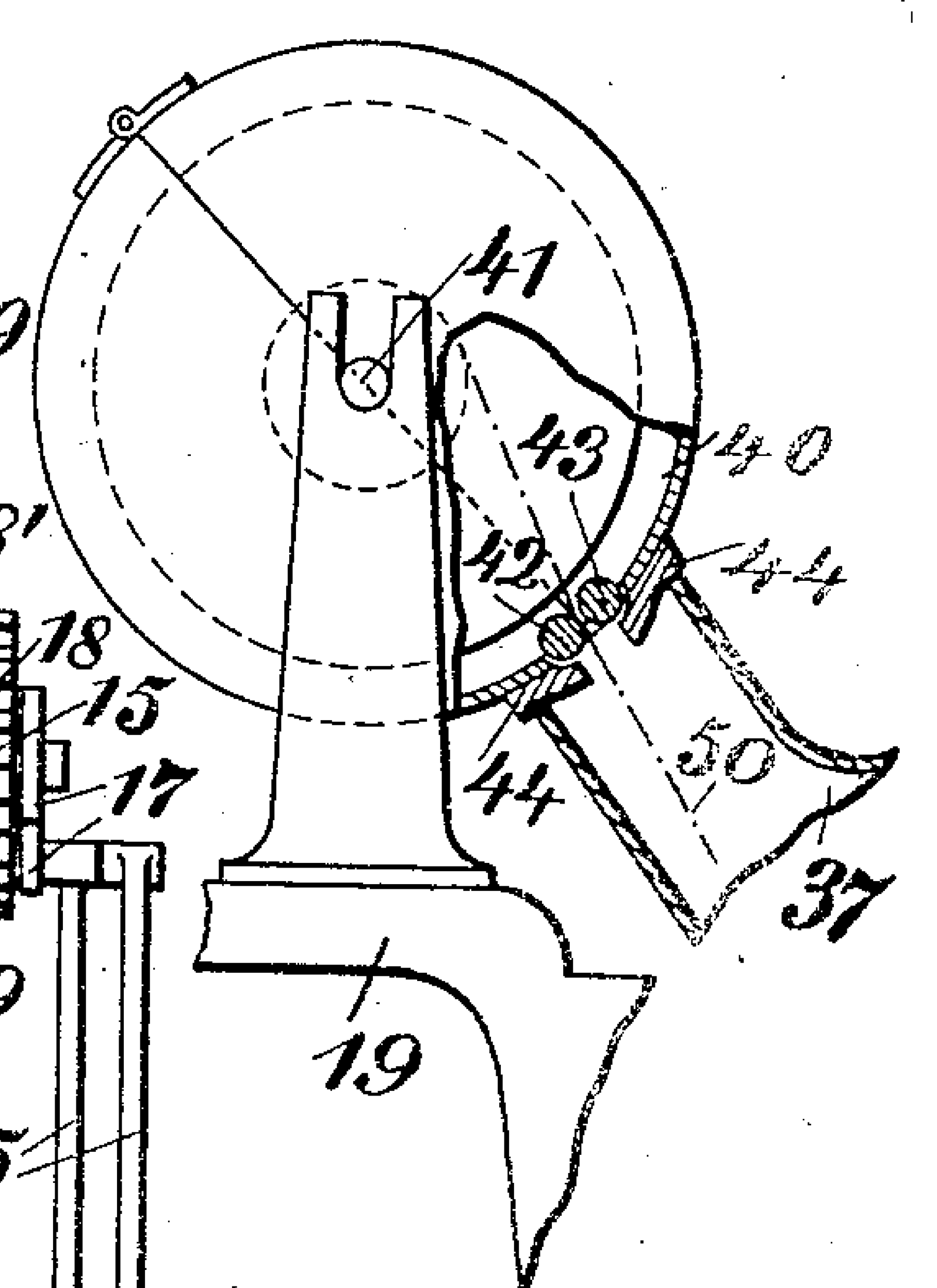
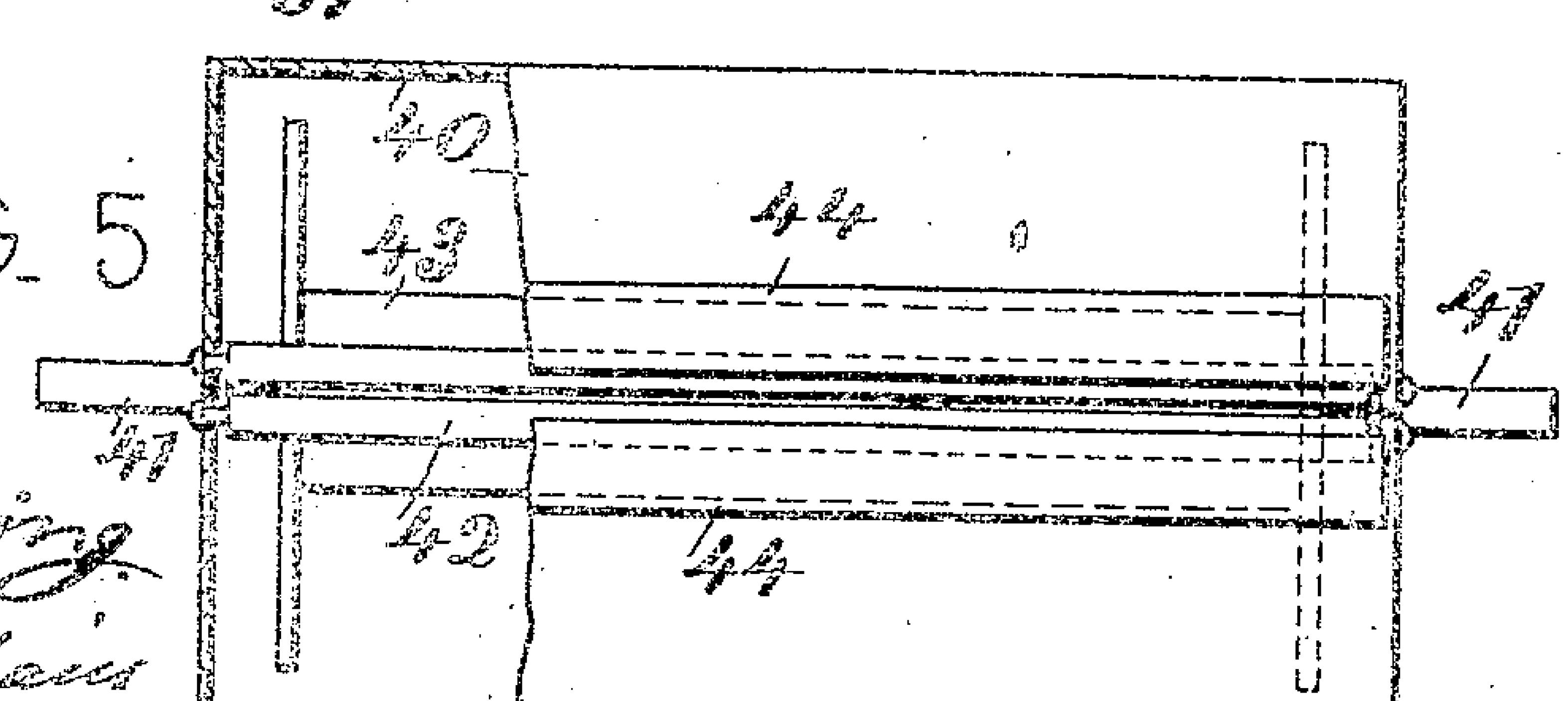


FIG. 5



Witnesses:

Inventor:

Oscar Prange

UNITED STATES PATENT OFFICE.

OSCAR PRANGE, OF SCHÖNEBERG, NEAR BERLIN, GERMANY.

PHOTOGRAPHIC MULTIPLEX COPYING-MACHINE.

No. 862,347. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed August 26, 1904. Serial No. 222,332.

To all whom it may concern:

Be it known that I, OSCAR PRANGE, merchant, a subject of the German Emperor, and a resident of Herbersstrasse 1, in Schöneberg, by Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Photographic Multiplex Copying-Machines, of which the following is a specification.

This invention relates to photographic copying machines, and it consists in certain features of novelty which will appear from the following description and be clearly defined in the appended claims, reference being had to the accompanying drawings in which

Figure 1 is a front elevation, partly in section, of a duplex copying machine constructed according to this invention, Fig. 2 an end view partly in section, Figs. 3 and 4 are enlarged sectional details illustrating an exposing device fully referred to hereafter, Fig. 5 is a side elevation, partly in section, of a supply-and receiving drum described hereafter, and Fig. 6 is an end elevation, partly in section, of the latter as inserted in place.

The construction of the machine in the case represented is as follows. In a frame 19 are arranged two copying devices, consisting each of rollers 1, 8, 9, 4, 6, and 7, an illuminating chamber 2, and a platen 3. The rollers are mounted in the frame 19 and are contained in a casing 37 which forms a light-tight conduit for the web of sensitized or photographic paper 50. The illuminating chamber 2, which at one end receives the negative 10, has at the other end a cylindrical compartment 2′ communicating therewith and containing the exposing device. Each exposing device consists in substance of two flaps 28, 29 of about semi-cylindrical shape (see also Figs. 3 and 4) arranged to turn on pivots 30 and inclosing a suitable source of light 51. The edges 31 of such flaps lying towards the negative 10 overlap each other when the flaps are closed by the action of spiral springs 34. The other edge 32 of the upper flap 28 enters the lower flap 29. Each flap has a pin 36 projecting from each of its ends 33, the arrangement being such that whenever these pins are forced asunder the flaps turning on their pivots 30 are opened by their edges 31 being brought out of mutual engagement (Fig. 4). This is done by slide pieces 27 guided in the frame 19 and having wedge-shaped ends 35 which enter between the pins 36, as will be more fully described hereafter. The slide pieces are retained in their normal position, that is, the position in which the flaps 28, 29 are closed, by springs 57. The platens 3, which serve to press the webs against the negatives, are guided in their motion by studs 54 and subjected to the action of springs 55 that tend to press them against heads or nuts 56 fitted on the studs. The rollers 1, 8, 9, 4, 6, 7, platens 3, and slide pieces 27, are operated by one common driving gear, that in the case represented is constructed as follows. A belt pulley 11 has a pinion 11′ on its shaft, this pinion meshing with a toothed wheel 12, whose shaft carries at one end a crank 13, and at the center a cam or eccentric 14. Attached to the crank are rods 15, which have their other ends fitted to arms 17, provided with pawls 16, operating ratchet wheels 18 which are formed integral or fixedly connected with gears 18′ meshing with wheels 5 keyed to the axes of the rollers 4. The rollers 4 and 7 of each copying device are connected with each other by a chain gear 20. On the cam 14 there rests a friction roller 21 of a rod 22, held down by a weight 22′ and carrying rollers 24 arranged to run on inclined planes 23, carried by the platens 3, as shown. The rod 22 may be guided in its motion by the shaft of the belt pulley 11, this shaft passing through a slot 22″ of the rod, as will best appear from the section made in Fig. 2. The opposing ends 26 of the slide pieces are beveled, and the rod 22 has laterally-projecting arms 25 designed to act on such bevelings, in a manner fully described hereafter.

The operation of the machine is as follows. The roller 1 with the unexposed photographic paper is inserted in place in the manner usual for film rollers. The casing 37 has a door 38 to such end. The driving gear described is then set in motion so as to turn the arms 17 in the direction indicated by the arrows and feed the web 50 forward through the required distance. This is done by the action of the rollers 4, 6, 7. After the web has been fed forward the cam 14 allows the rod 22 to descend, so as to press the platens 3 against the negatives 10 by the rollers 24 running on the inclined planes 23; and after this has been done the arms 25 act upon the beveled ends 26 of the slide pieces 27 so as to move these outward. The consequence of this is that the wedge-shaped ends 35 thereof force the pins 36 asunder, against the action of the springs 34, so as to turn the flaps 28, 29 into the position shown in Fig. 4. In this way the source of light 51 is permitted to act on the negatives and the portion of web covered thereby. Hereupon the rod 22 is again raised by the cam 14, with the result that first the light is cut off by the flaps closing again, when the platens 3 are released from the action of the rod 22 so as to return into their normal positions. On further operation of the driving gear the web will be fed forward through an additional distance, when the procedure described will recur.

The exposed paper may be removed from the roller 7 through a door 39 of the casing 37.

Drums with a separate, removable light-tight casing as shown in Figs. 5 and 6 may be employed in place of the drums 1 and 7 shown in Fig. 1. 40 is a light-tight casing mounted loosely on the drum shaft 41, and after

the drum has been placed in the frame 19 the casing is prevented from turning in suitable manner. The casing may advantageously be formed, as shown, in two semi-cylindrical parts hinged together, a slot being provided for the web to pass through. This slot may have a light-tight cover 44 and be furnished with rollers 42, 43 to guide the web. The casing 37 in such case is open at its upper edge, as shown in Fig. 6, the light-tight cover 44 of the drum casing as put in place resting thereon so as to prevent the entrance of light.

What I claim is:

1. In a photographic printing machine, the combination of a light-tight conduit adapted to receive a web of sensitized paper, an illuminating chamber to receive the negative, such chamber having an exposing device consisting of two pivotally turning spring-actuated and mutually engaging flaps forming portions of a cylinder, a movable platen; a source of light inclosed by these flaps, means for intermittently feeding the web between the said illuminating chamber and the said platen, and means for simultaneously actuating the said exposing device and the platen relatively to each other so as to press the web and negative together, and for simultaneously opening the exposing device, substantially as described.

2. In a photographic printing machine, the combination of a light-tight conduit adapted to receive a web of sensitized paper, an illuminating chamber to receive the negative, such chamber having an exposing device consisting of two pivotally turning spring-actuated and mutally engaging flaps forming portions of a cylinder, a source of light inclosed by these flaps, and actuating means consisting of a shaft, means for driving the latter, a cam mounted on the same, a vertically reciprocating rod arranged to be lifted by the said cam, and a spring-actuated slide operated by the said rod, the outer end of such slide being adapted to force the flaps apart, web-carrying rollers located in the said light-tight condult, and means driven by the said shaft for intermittently rotating such rollers, substantially as described.

In witness whereof I have hereunto signed my name this 14th day of July 1904, in the presence of two subscribing witnesses.

OSCAR PRANGE.

Witnesses:

HENRY HASPER,

WILLIAM MAYNER.