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PATENTED JULY 16, 1907.

H. HEIDORN.

MACHINE FOR FIRING INCANDESCENT GAS MANTLES.

APPLICATION FILED JAN. 29, 1906.

2 SHEETS—SHEET 1.

Fig. 2.

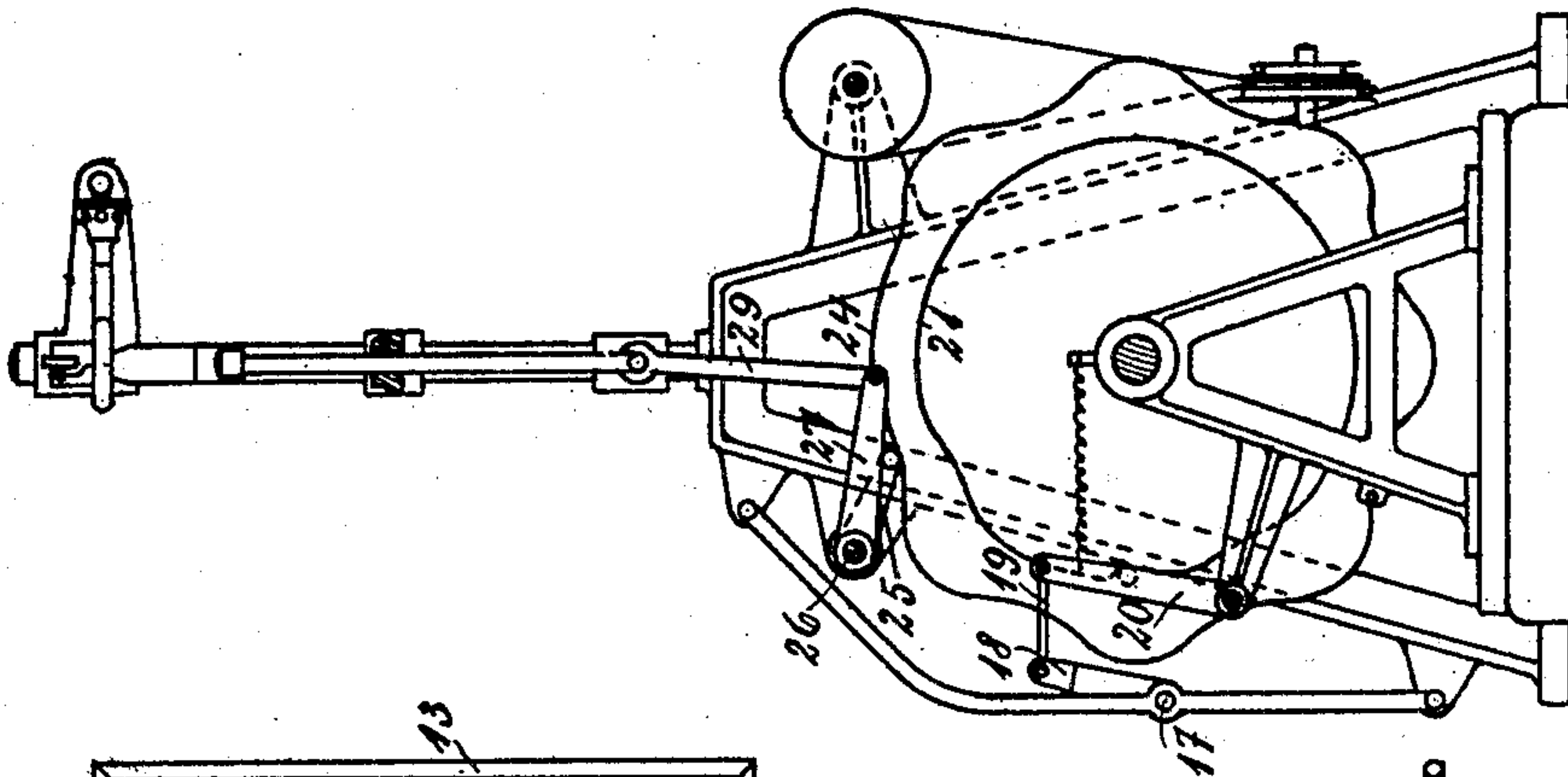
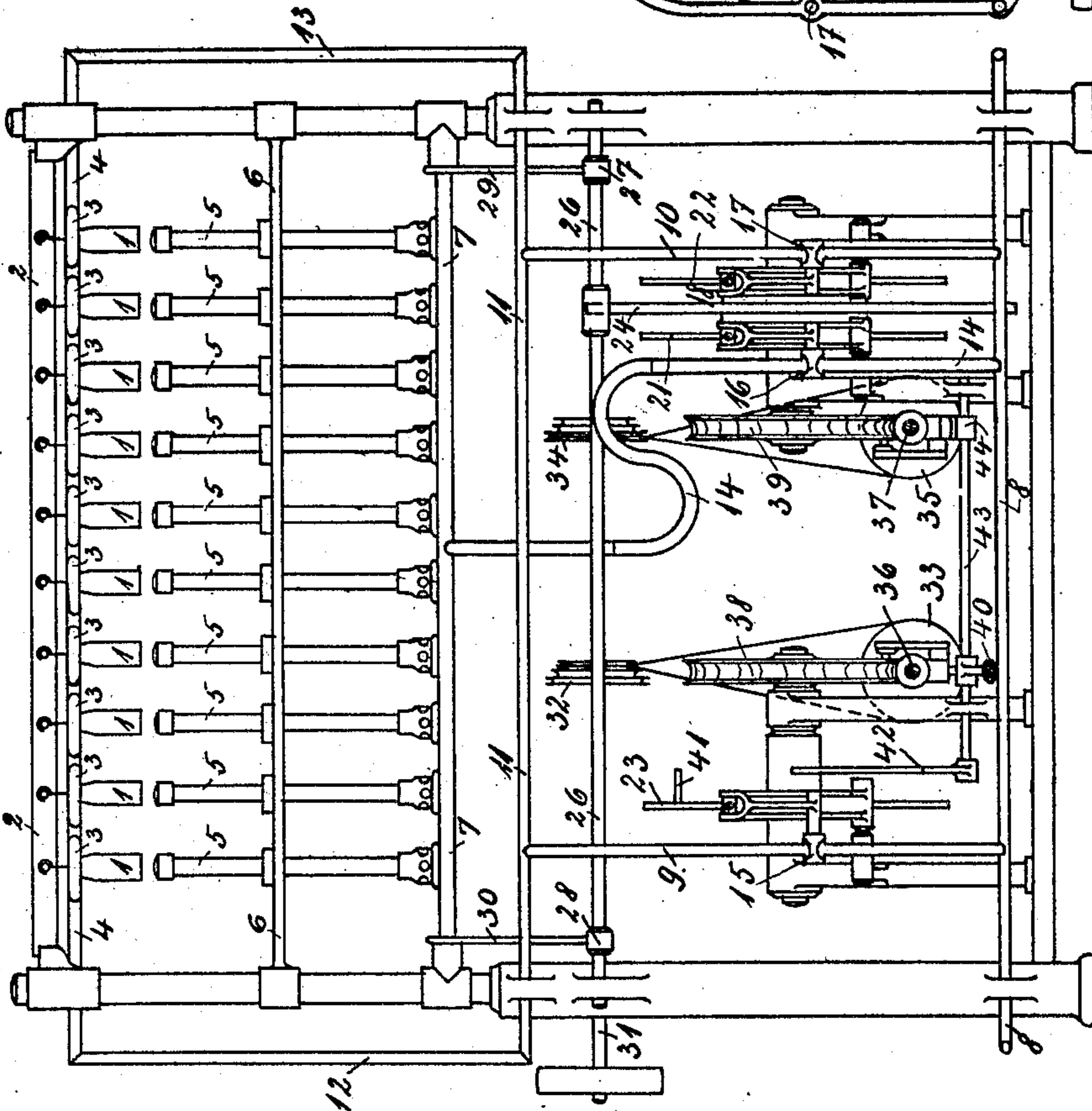


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

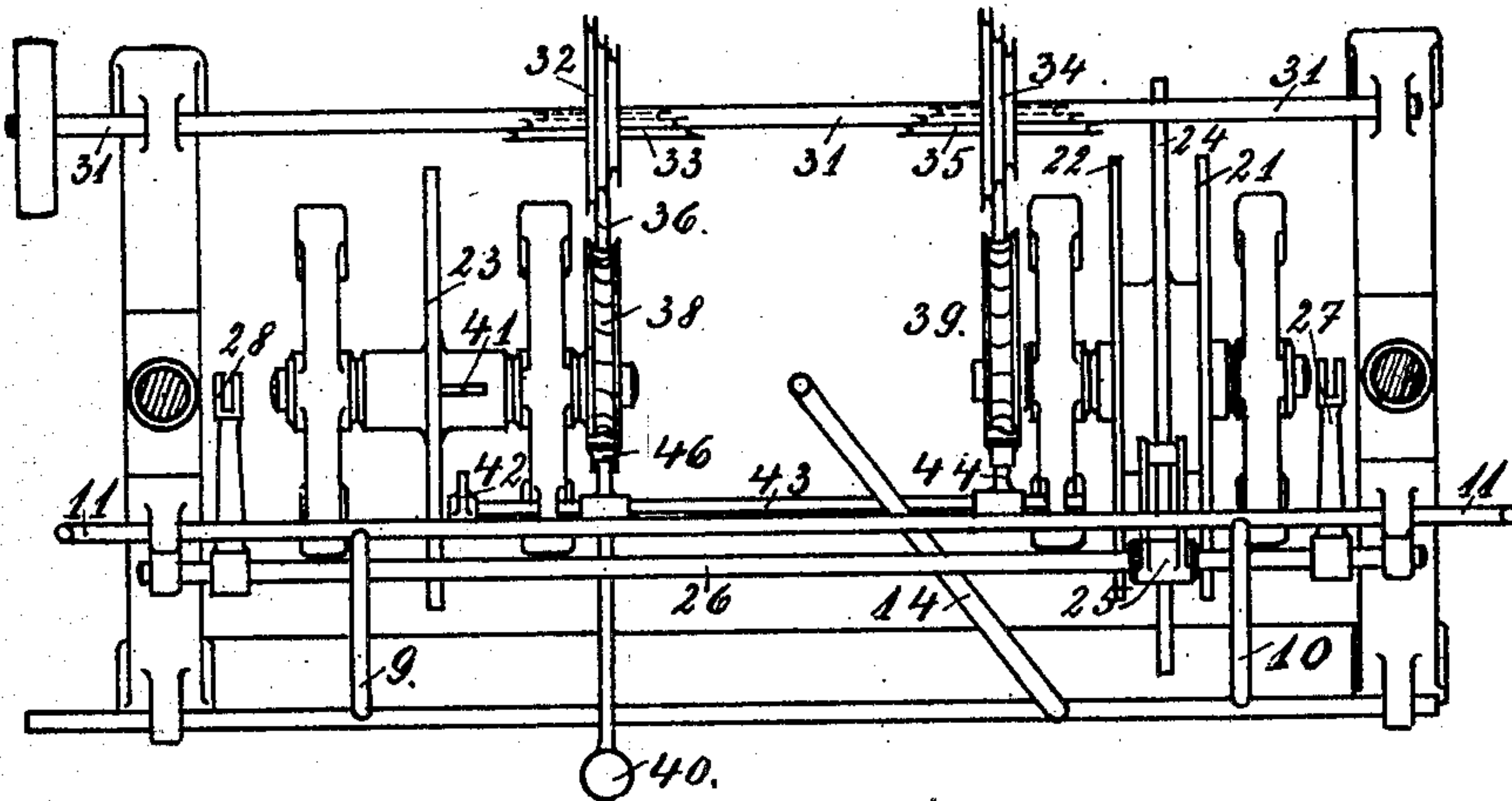


Fig. 4.

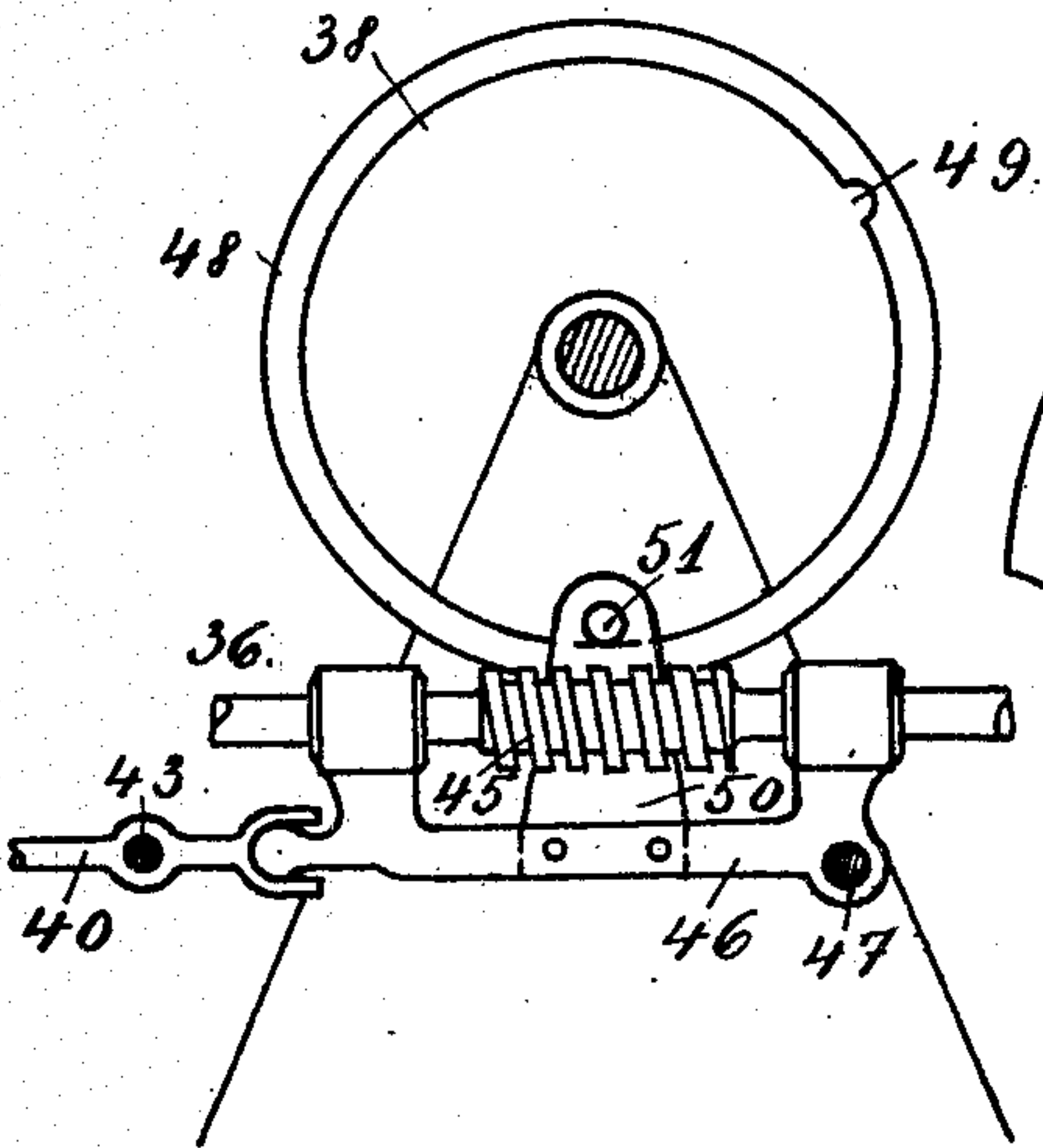


Fig. 5.

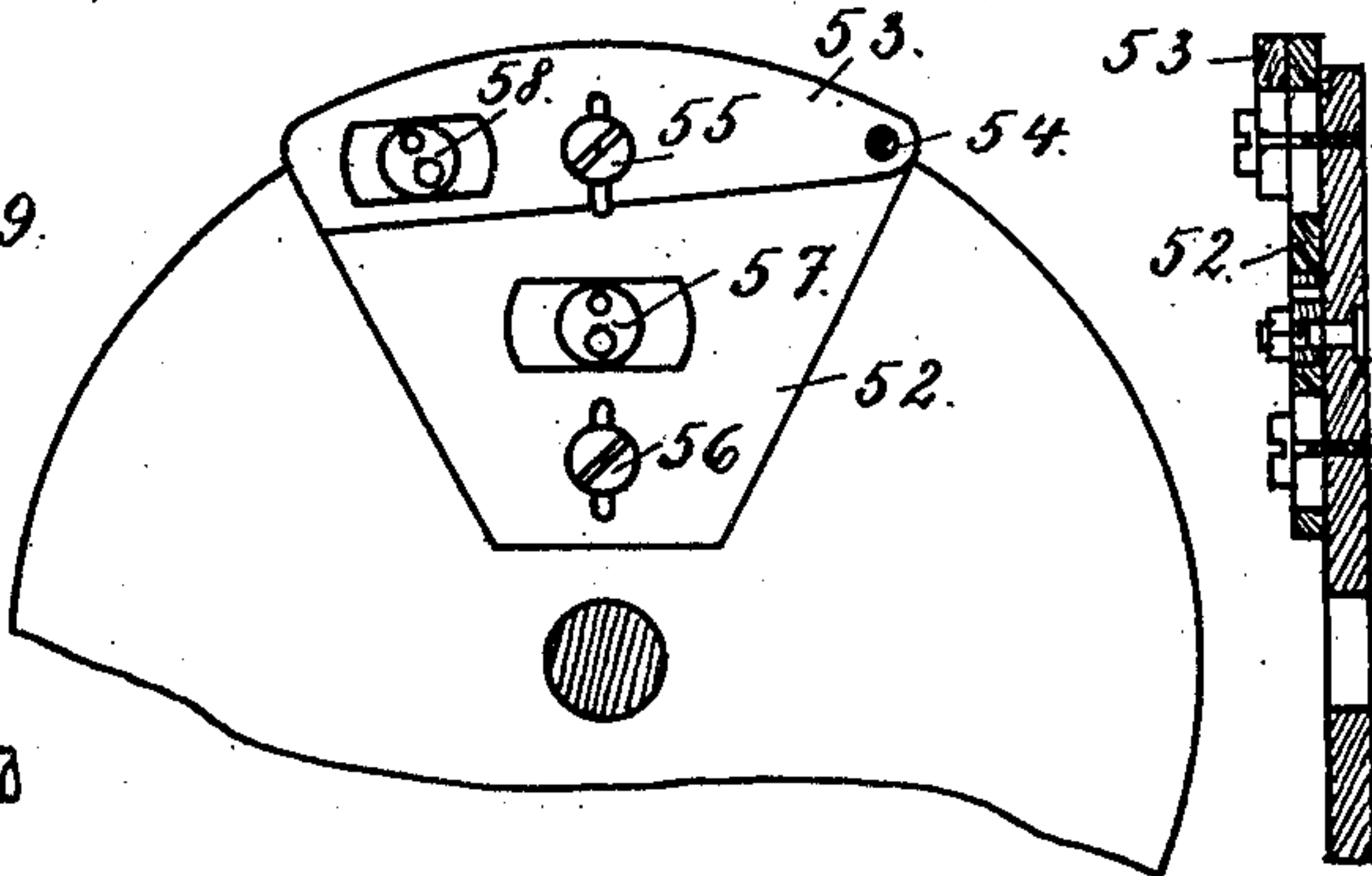


Fig. 6.

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MACHINE FOR FIRING INCANDESCENT GAS-MANTLES.

No. 860,542.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed January 29, 1906. Serial No. 298,434.

To all whom it may concern:

Be it known that I, HUGO HEIDORN, a subject of the Emperor of Germany, residing in Hamburg, Germany, have invented new and useful Improvements in Machines for Firing Incandescent Gas-Mantles, of which the following is a specification.

This invention relates to a machine for firing incandescent gasmantles, which is essentially improved in several respects compared with known machines of the same kind.

The cams by means of which the parts of the machine are actuated, and the cocks for the upper and the lower burners are operated, are adjustably arranged and the periods of rotation of the disks can be varied. The results of this is that the action of the different cams can be altered according to requirements alike with regard to the duration as also the intensity of the flame, which is regulated by the cams. The special adjustment of the cams, the throw, and the outlines of which are arranged in accordance with normal conditions, is effected in respect of the different kinds of incandescent bodies after experiment. The adjustability of the cams is insured by means of adjusting screws, eccentric disks or the like. The cam disk by means of which the burners are actuated may also have adjustable cams, but this is not indispensably necessary.

A further improvement in the machine consists in the arrangements whereby a special cam disk on a special shaft is employed for regulating the incineration of the incandescent bodies and second shaft carries three cam disks, one of which regulates the admission of gas to the lower burner, a second the movement of the lower burners and the third the admission of gas to the upper burners for the purpose of forming and hardening the incandescence bodies. Thus in this form of the invention there are two mechanical devices which are adjustable in all parts independently of each other, one of these devices regulating the incineration and the other the forming and hardening of the incandescent body. These two devices are suitably connected with one another in such a manner that the device employed for regulating the incineration actuates at the proper time the other device employed for the forming and hardening of the incandescent body. This form of the machine is illustrated in the accompanying drawing. By means of the drawing and the following description it will be seen at once how the adjustability of the cams as in the present machine can be utilized in other machines employed for firing incandescent bodies.

In the accompanying drawing Figure 1 is a front elevation of the machine Fig. 2 a side elevation of the same the front side frame support being omitted. Fig.

3 is a plan of the two mechanical devices for the incineration and the forming and hardening of the incandescent body respectively. For the sake of clearness the gas cocks and the mechanism for operating them are not shown. Fig. 4 is a representation of the screw gear Fig. 5 an elevation of an adjustable cam Fig. 6 a section of Fig. 5.

1 are the incandescent mantles, which are shown in the drawing as supposed to be already fired.

2 is the suspension support for the mantles.

3 are the annular upper burners.

4 is the gas supply pipe for the burners 3.

5 are the lower hardening burners.

6 is a fixed support formed with holes through which the burners are carried.

7 is the gas supply pipe on which the burners are fixed.

8 is the inlet pipe for the compressed gas.

9 and 10 are gas supply pipes which open into the pipe 11 and communicate through the pipe 12 and 13 with the pipe 4.

14 is the connecting pipe between the pipe 7 and the pipe 8.

15 is the cock for the pipe 9.

16 is the cock for the pipe 14 and 17 the cock for the pipe 10.

18 is a lever which is fixed to the casing of the cock 17.

19 is a connecting rod, by means of which the movement of the lever 20 is transmitted to the casing of the cock 17. The cocks 15 and 16 are also operated in the same manner by a lever and a connecting rod.

21 is the cam disk for actuating the lever 20 and for regulating the admission of gas through the cock 17.

22 is the cam disk for regulating the admission of gas through the cock 16, and 23 the cam disk for regulating the admission of gas through the cock 15.

24 is the cam disk which raises and lowers the pipe 7 through the medium of the roller lever 25, the shaft 26 the one arm levers 27 and 28 and the connecting rods 29 and 30.

31 is the general driving shaft the motion of which is transmitted to the worm shafts 36 and 37 by means of the step disks 32 and 33 or 34 and 35.

38 is the worm wheel for actuating the cam disks 23; 39 is the worm wheel for actuating the cam disks 21, 22 and 24.

40 is a foot lever for engaging the worm gear 36, 38. The pin 41 on the cam disk 23, together with the lever 42 on the shaft 43 and the lever 44 on the same shaft are employed for engaging the worm gear 37, 39.

45 is the worm on the shaft 36, 46 a bearing block for the shaft 36. The bearing block 46 is pivoted around the bolt 47. The screw wheel 38 is furnished with the projecting edge 48 in which is a notch or catch 49.

50 is a block firmly connected with 46 and provided in the upper part with a pin or a roller 51.

The action of the machine is as follows:—If the foot lever 40 be depressed the worm gear 36, 38 is engaged 5 and hereby the cam disk 23 simultaneously rotated. By actuating the cams on the disk 23 the suspended mantles 1 are subjected to incineration for the desired periods, gas being conveyed to the burners 3 through the pipes 9, 11, 12 and 13 through the cock 15. The gas 10 flowing out is ignited by the igniting flames arranged here but not shown in the drawings. After the incineration has thus been effected, the pin 41 comes on to the lever 42, forces it back and thus throws into gear the worm and worm wheel 37, 39 in precisely the same man- 15 ner as the worm and wheel 36, 38 were put into gear by the foot lever. Directly the worm 37 gears with the worm wheel 39 the catch formed in the edge of the worm wheel 38 comes under the roller or pin 51 and the pin or roller drops into the catch. In consequence of 20 this the block 46 turns around the bolt 47 and the worm 45 is put out of engagement. The worm wheel 36 is then permanently arrested until it is again put in gear through the foot lever 40. The cam disks 21, 22 and 24 are now rotated by the worm gear 37, 39. A cam on the 25 disk 24 first raises the lower burners through the medium of the roller lever 25, the shaft 26, the one arm levers 27 and 28 and the connecting rods 29 and 30. When the burners 5 have reached the highest position a cam on the disk 21 opens the cock 17 and the gas flows 30 through the pipes 10, 11, 12 and 13 to the upper burners 3 and becomes ignited. At the same time a cam on the disk 22 opens the cock 16 and gas flows through the pipe 14 into the pipe 7 and the lower burners 5. The gas flowing out of the burners 5 is ignited by the flames 35 of the upper burners 3. The cock 17 is now closed again and the flames of the upper burners extinguished. As the cam disk 24 is further rotated the burners 5, 6 move downwards and then several times upwards and downwards, while at the same time the cock 16 which 40 regulated the supply of gas to the burners 5 is suitably operated. At the termination of the hardening a cam of the disk 21 is actuated so as once more to convey gas to the burners 3 for the purpose of thoroughly hardening the heads of the mantles. The worm wheel 39 is then 45 disengaged in the same manner as the worm wheel 38 was previously. As the disks 32 and 33 are step disks, the periods of rotation of the cam disk 23 can be regulated that is lengthened or shortened as required. This is also the case with the mechanism for forming and 50 hardening the incandescent bodies, as the disks 34 and 35 are also step disks.

Apart from the device for regulating the period of rotation of the cam disk, a device is also provided for rendering the different cams adjustable. The cam as 55 shown in Fig. 5 can be adjusted radially and tangentially to the cam disk. 52 is the radially adjustable part of the cam and 53 the tangentially adjustable part of the same. In this example of the invention the adjustment is effected through the medium of eccentric 60 disks. Part 52 is radially guided by means of two slots and screws fitting into the same. The tangentially adjustable part 53 is pivoted on the bolt 54. The guide screws 55 and 56 are employed for fixing the cam or parts of the cam, after the cam has been adjusted in the

desired manner by rotating the eccentric disks 57 and 65 58. In order to enable the cams to be lengthened in the periphery, the cams are doubled one or both of them being movable in the direction of the periphery.

It is clear from the foregoing that the new invention enables the cams to be adjusted and altered and the 70 period of rotation of the cam disks to be regulated to the fullest extent. The machine illustrated in the drawing is only intended to represent an example of the invention, the application of which to other firing machine 75 with non-circular disks can be effected without trouble.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination with a series of burners, of means adapted to support a mantle contiguous to each burner, a second series of 80 burners alining with the first series of burners and with the supported mantles and movable in relation thereto, means controlling the admission of a combustible element to one series of burners, and means controlling the admission of a combustible element to the other series of 85 burners, the time of operation of one of the latter two means being controlled by the other.

2. In a machine of the character described, the combination with an upper series of burners, of means adapted to support mantles in close relation thereto, a lower series of burners in alinement with the supported mantles 90 and upper burner, means controlling the admission of gas to the upper burners, and means controlling the admission of gas to the lower burners and adapted to move the latter to and from the supported mantles. 95

3. In a machine of the character described, the combination with an upper series of burners, of means adapted to support mantles in close relation to the burners, lower burners in alinement with the supported mantles and movable to and from the mantles, means for controlling 100 the admission of gas to the lower burners and for reciprocating these burners and means for controlling the admission of gas to the upper burners the latter means controlling also the time of operation of the means controlling the gas supply to the lower burner and actuating the 105 lower burners.

4. In a machine of the character described, the combination with an upper series of burners, of means adapted to support mantles in close relation to these burners lower burners in alinement with the upper burners and with the 110 supported mantles, and adapted to be reciprocated in reference thereto, means for controlling the admission of gas to the upper and the lower burners and for reciprocating the latter, and means for controlling the admission of gas to the upper burners, the latter means controlling the 115 time of operation of the former means.

5. In a machine of the character described, the combination with an upper series of burners of means adapted to support mantles immediately beneath these burners, a lower series of burners in alinement with and adapted to 120 be moved to and from the mantles, gas supply to the upper burners, cam actuated mechanism controlling the gas supply to the upper burners, gas supply to the upper and the lower burners, cams actuating mechanism to control the last recited gas supply and to move the lower burners to 125 and from the supported mantles, the time of operation of the latter mechanism being controlled by the first indicated cam mechanism.

6. The combination with a series of burners, of a gas supply pipe connected thereto and provided with a valve, 130 a cam and coacting mechanism adapted to open and close the valve, worm gearing actuating the cam, means for throwing the worm into engagement with the worm wheel, and means carried by the worm wheel for automatically disengaging the worm therefrom. 135

7. In a machine of the character described, the combination with an upper series of burners, of means adapted to support mantles immediately beneath and in alinement 140 therewith, a lower series of burners in alinement with and movable to and from the mantles, a gas supply for the up-

per and lower burners, comprising a main pipe and valve
branch pipes, leading therefrom, an initially acting cam
and coacting mechanism adapted to operate one of the
valves to control the supply of gas to the upper burners, a
5 series of simultaneously acting cams and their coacting
mechanisms one cam of the series adapted to operate a
valve to admit gas to the upper burners another cam of
the series adapted to operate a valve to admit gas to the
lower burners, and a third cam of the series adapted to
10 move the lower burner to and from the mantles, means

upon the initially acting cam for determining the starting
time of the series of cams, and means for stopping the
movement of the initially acting cam before the series of
cams operate.

In testimony whereof I affix my signature.

HUGO HEIDORN.

In the presence of—

ERNEST H. L. MUMMENHOFF,
OTTO W. HELLMRICH.