

# PATENT SPECIFICATION



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233,407

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## COMPLETE SPECIFICATION.

### Electric Type Wheel Actions for Typewriting Machine.

I, EDWARD CHARLES ROBERT MARKS, a British subject, of 57 & 58, Lincoln's Inn Fields, London, W.C. 2, do hereby declare the nature of this invention (a communication to me from abroad by the firm Scherbius & Ritter, of 40, Konigstrasse, Berlin-Wannsee, Germany, a firm duly registered under the German law) and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electric type-wheel actions for typewriting machines of the kind having a rotating type wheel mounted so as to be capable of swinging about a shaft which is substantially parallel to the axis of the type wheel and a toothed wheel arranged on the shaft thereof, the type wheel being arrested at predetermined positions by means of a stop device and caused to strike against the platen by its momentum.

According to the present invention the stop point coincides substantially with the swinging point of the type wheel.

In the drawing:—

Fig. 1 illustrates the principal connexion and by way of example the construction of the most important elements of the typewriting machine.

Fig. 2 shows in plan view the top part of the typewriting machine.

Fig. 3 is a sectional view on line III—III of Fig. 1.

Fig. 4 shows another embodiment of the invention.

Fig. 5 shows in plan view certain elements of the machine of modified construction.

Fig. 6 shows in side elevation and partly in section the elements shown in Fig. 5.

Fig. 7 is a vertical section of a detail to an enlarged scale.

Referring to Fig. 1 the typewriting

machine comprises a platen 1 and a type-wheel 2 keyed on a shaft 3. The shaft 3 is driven from a motor 4. A cardan joint 5 is inserted in shaft 3. At one end of the shaft 3, a piece 6, is rigidly mounted in the motor, the remainder of shaft 3 being adapted to rock slightly about the cardan joint 5. This oscillating movement is guided by a link 7 (Figs. 1 and 2), the bearing 8 of which embraces the shaft 3 with a certain amount of play. The link 7 is pivoted at 9. A spring 10 presses the shaft 3 and with the same the typewheel 2 against a fixed stop into the position shown in Figs. 1 and 2. A ratchet wheel 11 is mounted on shaft 3 under the typewheel 2. A nose 12 of a lever 13 is adapted to engage with this ratchet wheel, the lever being adapted to be oscillated by the armature 14 of an electro-magnet 15. The lever 13 is pivotally mounted in a bearing 16. A brush 17, keyed on shaft 3 (Figs. 1 and 3), slides on a ring 18 constructed like an electric commutator. The ring 18 is composed of segments 19 which are, each one separately, connected with one of the switches 20. The second poles of the switches 20 are connected by a common lead 21 with the pole of a battery 22, the other pole of which is connected with the electromagnet 15. This electromagnet is connected with the brush 17 by a lead 23. The switches 20 correspond with the several types of the typewriting machine, and there are as many switches as there are types on the type wheel 2. Every switch 20 corresponds with a segment of the ring 18.

The cardan joint 5 is drawn diagrammatically in Figs. 1 and 4, a suitable construction of joint being shown in Fig. 7 in which 90 is a dished plate fixed to the part 3<sup>a</sup> of the typewheel shaft. A membrane 91 is clamped at its edge to

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the plate 90 and at its centre to a flange fixed to the upper part of the typewheel shaft 3. By this means the upper end of the shaft 3 can be rocked through a small angle  $\alpha$  for instance into the position 3<sup>1</sup> shown in broken lines. Only a very small movement of the typewheel is necessary, since in practice the typewheel is only moved about one millimetre away from the platen. Owing to the shaft 3 fitting in the bearing 8 with a certain amount of play the shaft is free to rock about the cardan joint 5, the inner wall of the bearing being rounded off as shown in Figs. 1 and 4 so as further to ensure freedom of the shaft to rock about the cardan joint.

The operation of the typewriting machine is as follows:

When the motor 4 has been started the shaft 3 revolves and with it the typewheel 2, the ratchet wheel 11 and the brush 17. If for instance switch 24 is closed, as shown in Fig. 1, the segment 25 is electrically connected with the negative pole of the battery 22. When the brush 17 comes in contact with the segment 25 a current flows across the electro-magnet 15 which attracts the armature 14. The nose 12 engages with the ratchet wheel 11 and stops the typewheel in such a position that the sign is printed on the platen, which corresponds to the sign on the switch 20 (keys of a keyboard), the typewheel swinging about an axis passing through 5 and 9. Now in the case of many known typewheel actions, a separate electro-magnet is provided which serves for making the typewheel strike against the platen 1 or the platen against the typewheel.

By the arrangement shown in Figs. 1 to 3 the separate magnet is avoided as at the moment when the nose arrests one of the teeth of the ratchet wheel 11, the typewheel is made to strike, owing to its kinetic energy, against the platen in oscillating around the bearing 9 and is pulled back by the action of spring 10. As soon as the contact 24 is interrupted the electro magnet 15 releases the armature 14, the nose 12 releases the ratchet wheel 11 and the motor 4, which had been braked, begins again to run so that a new type can be written.

In order to avoid the braking of the comparatively great mass of the motor 4 friction clutches 26 may be inserted between the motor 4 and the part 3<sup>a</sup> of the shaft, said friction clutches permitting that the typewheel and ratchet wheel rotate normally with the shaft 3, the motor revolving however without drawing along the shaft 3 for the short moment during which the ratchet wheel

is stopped by the lever 13. The arrangement might however be of such a kind that the motor 4 is coupled by the same contact or by a separate contact at every depression of a key 20.

The spring 10 is fixed on a small wheel 27 which has noses and with which engages the small stop lever 29 fitted with a handle 28. By means of the wheel 27 the tension of the spring 10 can be chosen such that the striking force of the typewheel is regulated. For very high typing speed the arrangement shown in Figs. 1 to 3 may be modified as shown in Fig. 4. Instead of the electro-magnet and the lever 13 a toothed wheel 30 is used which meshes with a toothed wheel 31 keyed on shaft 3. This toothed wheel 30 is mounted on a shaft 32 journaled on two bearings 33 and 34 and running normally idle, driven by the toothed wheel 31. The shaft 32 carries at its lower end an iron plate 35 which is elastically movable in axial direction. With this object in view it is coupled with the shaft by a spring 36 in such a manner that it is prevented from rotating on shaft 32. A braking magnet 37 arranged opposite the plate 35 is adapted to be excited by a coil 38 and has jaws 39. The winding of the brake magnet 37 is inserted at the same point as the magnet 15 in Fig. 1. If current is supplied to the electro magnet 37 it attracts the plate 35 which is thus strongly pressed upon the jaws 39 of the braking magnet. The comparatively small sized rotating plate 35 is thus braked almost instantaneously. The toothed wheel 31 rotating owing to its kinetic energy and by the power of the motor 4 tends now to further rotate the toothed wheel 30. At the same time it supplies the power to make the type wheel, which rotates around said shaft 32, strike against the platen. For this purpose an arm 40 is arranged in which the shaft 3 is journaled and a head 41 of which surrounds the shaft 32, a collar 42 on this shaft preventing the displacement of the same. The arrangement according to Fig. 4 presents, in comparison with that shown in Figs. 1 and 2, the advantage that hammer-like strokes do not occur as the masses are not braked suddenly but partly by the friction coupling and partly by elastic forces. Undesirable striking noises are thus avoided and the material is not worn so rapidly so that the machine can serve for a longer time. The arrangement shown in Fig. 4 can be further constructed for essentially higher typing speed. The cardan joint 5 may be avoided if the shaft 3 is sufficiently thin and

flexible. Fig. 4 shows that the shaft 32 is held by the collar 42 in such a manner that a slight interval exists between the plate 35 and the jaws 39 of the braking magnet. The collar 42 may be omitted and the plate 35 be keyed directly on shaft 32 so that it is constantly in contact with the jaws 39 of the electromagnet 37 sliding upon the same when it rotates.

For this purpose a continuous small power transmission from toothed wheel 31 to the toothed wheel 30 is necessary. This presents however the advantage that the flanks of the teeth of the two toothed wheels remain constantly in contact with one another, a noiseless working being thus ensured and the further advantage that no time is lost for the attraction of the armature 35 by the braking magnet 37. The braking mechanism according to Fig. 4 is given by way of example only. A band brake operated by an electro magnet or any other braking mechanism may also be used. In the form of construction shown in Fig. 4 the drive acts upon shaft 3, it could however act also on shaft 32, in which case the movement of the plate 35 for the purpose of braking would be utilized at the same time for uncoupling the same from the driving point.

Figs. 1—4 show a typewriting machine in which the type wheel has a stopping device with onesided action so that the type wheel strikes against the platen directly after the stop jumps in, the kind of striking of the types on the platen having not been specially considered.

Figs. 5 and 6 show an arrangement in which the type which is actually striking strikes against the paper in exactly or almost exactly perpendicular direction of movement.

According to Figs. 5 and 6 a type wheel 50 is keyed on a shaft 51 on which further a toothed wheel 52 is mounted. The shaft 51 is guided in a bearing 53 fixed to a lever 54. At the other end of the lever a collar 55 is fixed which is mounted upon a stationary pin 56. The shaft 51 is connected by means of a cardan joint 57, preferably of the kind shown in Fig. 7, with the shaft 58 of a motor 59 from which it is driven. A lever 60 having a nose 62 engages with the toothed wheel 52, said lever being pivotally mounted at 61 and adapted to be attracted by an electro magnet 63. The operation of this mechanism is similar to that described with reference to Figs. 1—4, the typewheel being rocked about an axis passing through 55 and 57.

The characteristics of the arrangement shown in Figs. 5 and 6 consist in that the pivot axle, around which the type

wheel executes its striking movement after the nose 62 of lever 60 has come in engagement with the toothed wheel 52, lies in or approximately in the plane of the paper to be typed. If (see Fig. 5) the centre of the pin 56 and nose 62 are situated exactly or almost exactly in the same line the type wheel rotates around the nose 62 after this nose has come in engagement with the space between two teeth of the toothed wheel 52. If this fulcrum is situated in the plane represented by the line A B of Fig. 5, said plane being perpendicular to the plane of the type wheel, the type to be typed strikes perpendicularly on the paper and on the platen 64. The plane through the line A B must touch the platen at the point at which the type wheel comes in contact with the platen when striking.

This idea of the invention may be carried out in various manners. In the embodiment shown in Figs. 5 and 6 the toothed wheel 52 keyed on the same shaft as the type wheel 50 is of much larger diameter than said type wheel. With this object in view it must be arranged below or above the platen 64 and be sufficiently distant from the type-wheel as shown in Fig. 6. By this simple measure it becomes possible to ensure the perpendicular striking of the type on the platen.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Electric typewheel actions for typewriting machines of the kind having a rotating type wheel mounted so as to be capable of swinging about a shaft which is substantially parallel to the axis of the type wheel and a toothed wheel arranged on the shaft thereof, the type wheel being arrested at predetermined positions by means of a stop device and caused to strike against the platen by its momentum, characterised by the feature that the stop point coincides substantially with the swinging point of the type wheel.

2. Electric typewheel action as claimed in Claim 1, characterised in that the stopping mechanism consists of a toothed wheel, gearing with a toothed wheel keyed on the shaft of the type wheel and carrying a stopping or braking element.

3. Electric typewheel action as claimed in Claim 2, characterised in that the second toothed wheel (30) is connected by an elastic member 36 with the stopping or braking mechanism.

4. Electric typewheel action as claimed in any of Claims 1 to 3 characterised in

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that the type wheel shaft is connected with a stationary shaft, continuously revolved from a source of power, by means of a cardan joint or of an elastic intermediate member with interposition of a friction clutch.

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5. Electric typewheel action as claimed in Claim 1 characterised in that the pivot axle, around which the type wheel executes its typing movement after the engagement of the stopping mechanism,

is situated in or approximately in the plane which touches the surface of the platen at the point of contact between type wheel and platen.

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6. Electric type wheel action as claimed in Claim 5, characterised in that the stopping toothed wheel is larger than the type wheel.

Dated this 5th day of February, 1924. 20

MARKS & CLERK.

[This Drawing is a reproduction of the Original on a reduced scale.]

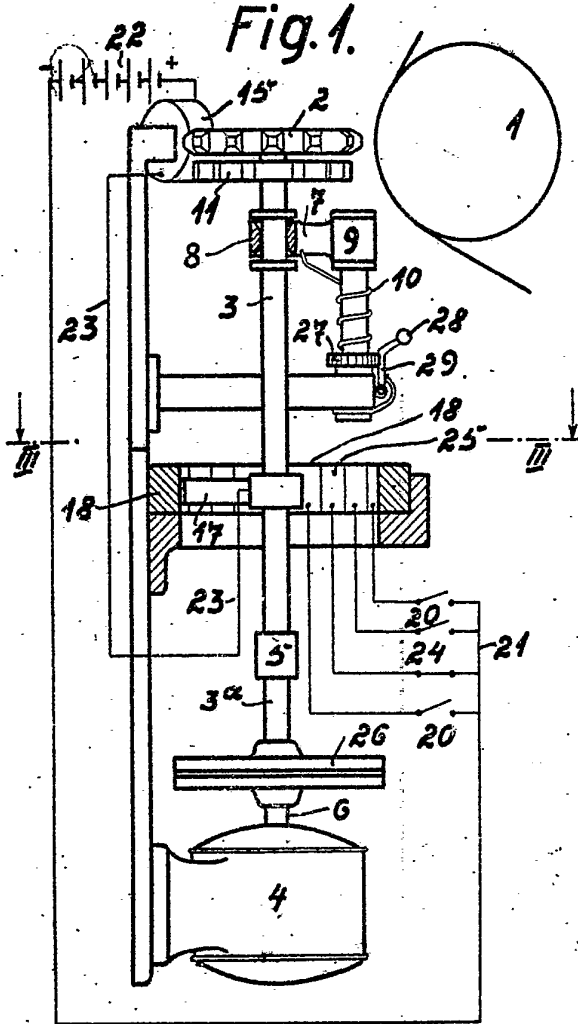


Fig. 2.

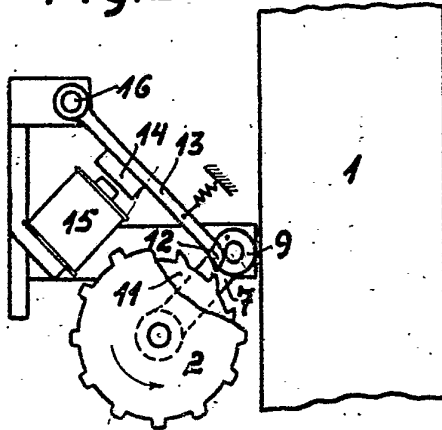


Fig. 3.

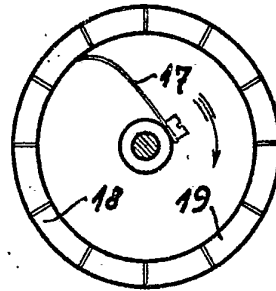
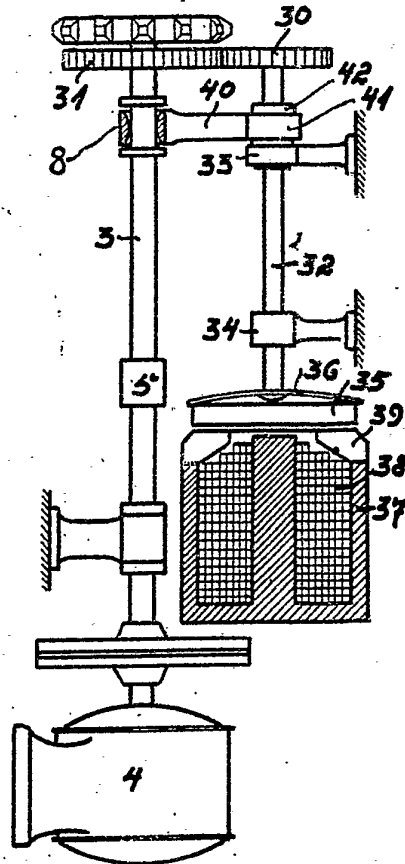


Fig. 4.



Fig

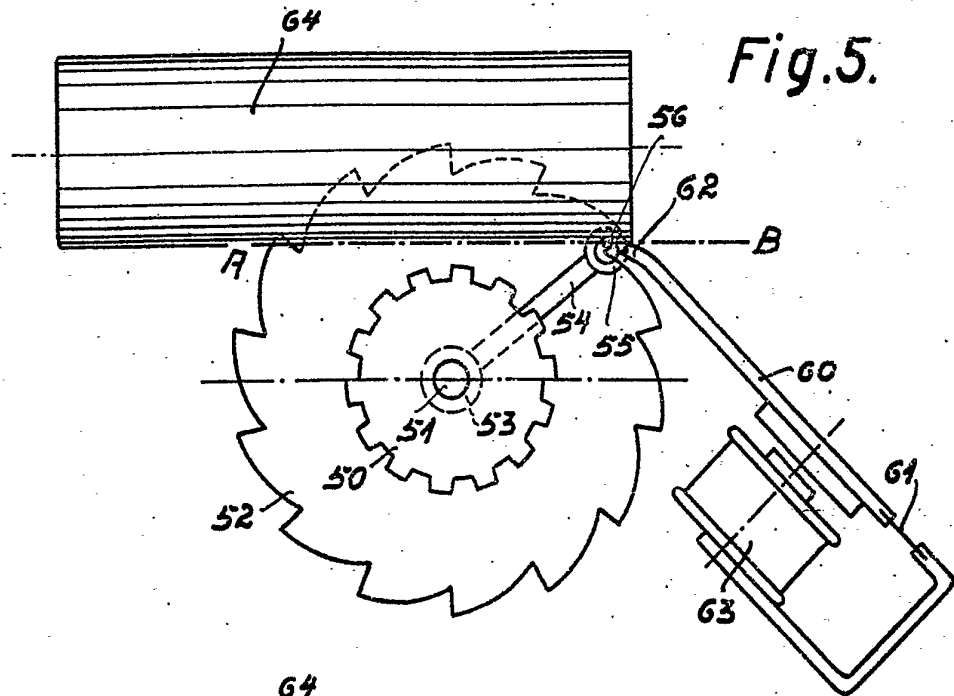


Fig. 5.

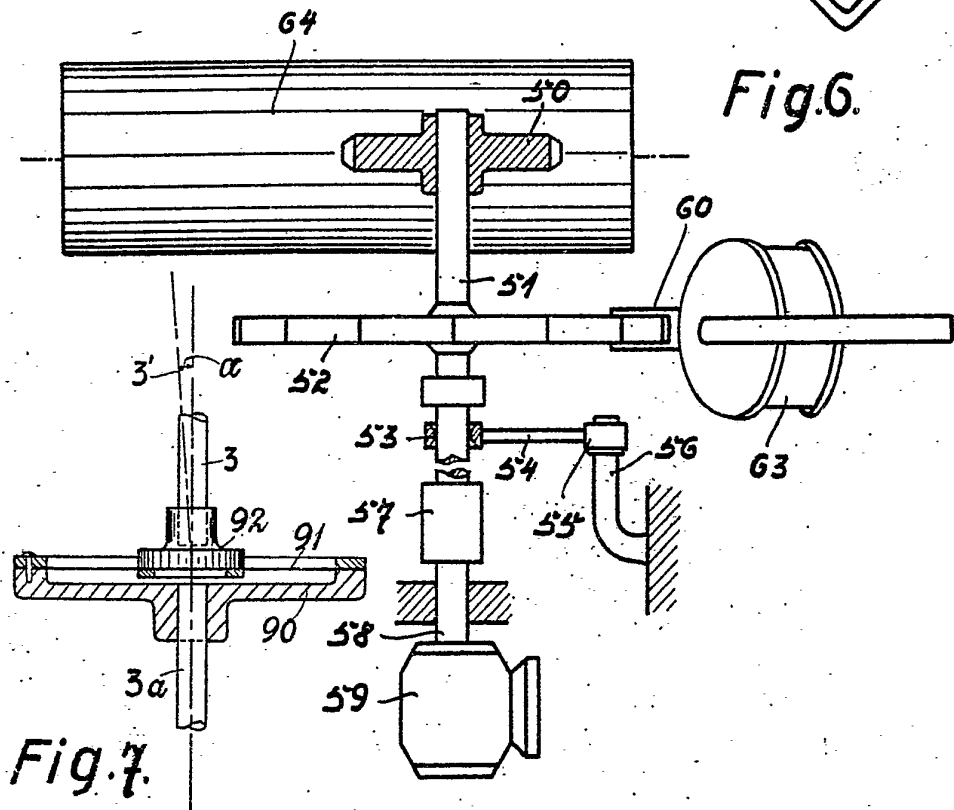


Fig. 6.

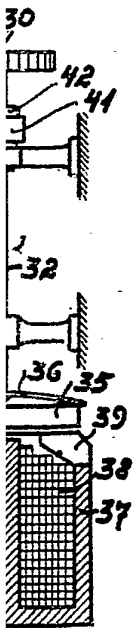
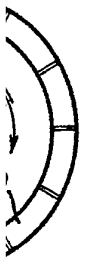


Fig. 7.

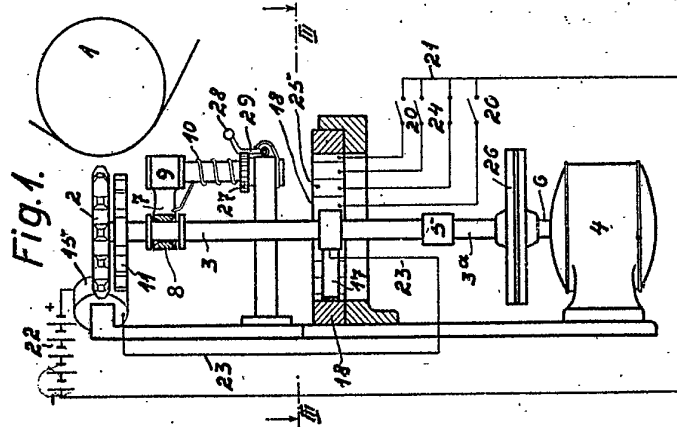


Fig. 1.

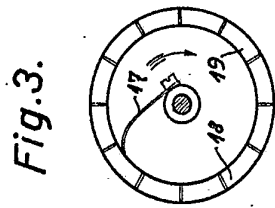


Fig. 3.

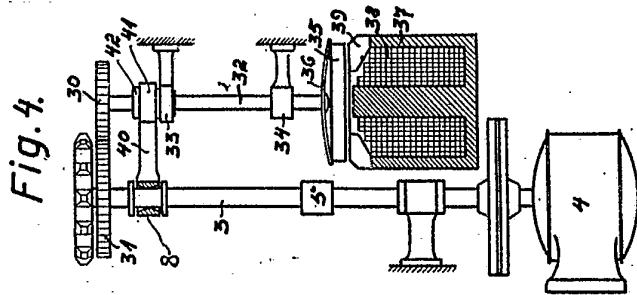


Fig. 4.

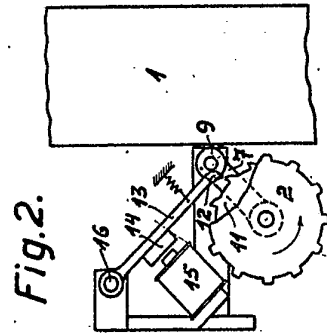


Fig. 2.

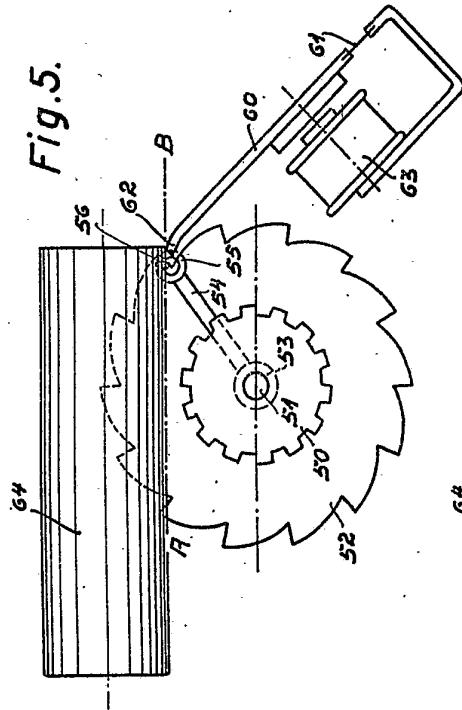


Fig. 5.

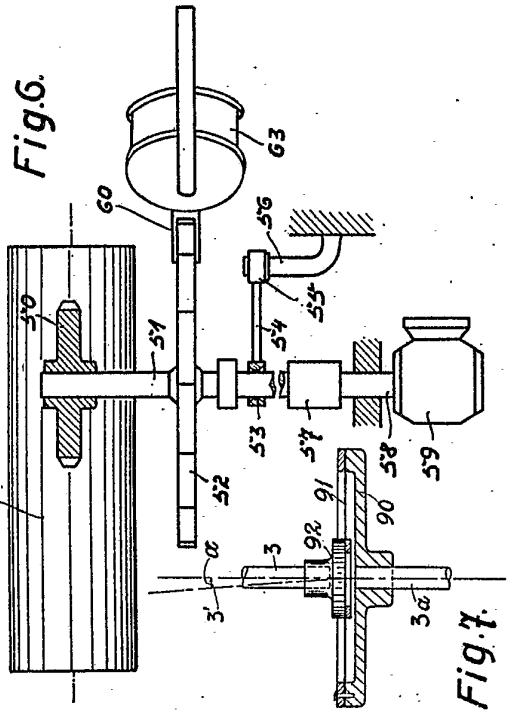


Fig. 6.

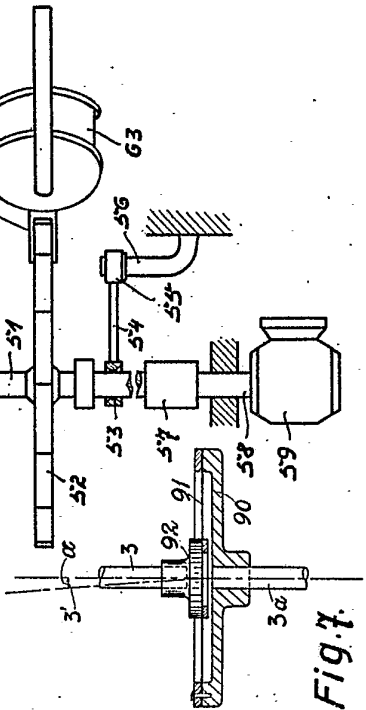


Fig. 7.

[This Drawing is a reproduction of the Original on a reduced scale]