

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in and relating to Ciphering Machines.

We, CHIFFRIERMASCHINEN AKTIEN-GESELLSCHAFT, of Steglitzerstrasse 2, Berlin, W. 35, Germany, a German company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

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Electric ciphering machines are known, in which from one operating point an electric current is sent through a plurality of ciphering elements, for instance, sliding members, drums or the like, and produces at an indicating point, for instance glow lamps, keys of a typewriter or the like, a cipher letter which corresponds to the particular position of the ciphering members with respect to one another and to the terminal members connected to the same. When, for instance, rotatable drums are used as such ciphering members, a plurality of such drums is mounted rotatably one behind the other on one shaft and are provided with actuating means, for instance toothed wheels or ratchet wheels, which, driven by other toothed wheels or ratchet wheels produce a rotary motion of the drums with respect to one another each time they are actuated. The drums are provided on both sides with contacts, for instance of the same number as the letters of the alphabet. The contacts on one side are connected to the contacts on the other side in an irregular manner by intermediate conductors. At both ends of such a set of rotary drums fixed end drums are provided, the electric current entering at one end drum and leaving by the other. When deciphering the electric current travels through the rotary drums and terminal drums in the opposite direction.

Such ciphering machines have the disadvantage that they thus have entirely

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separate positive paths for the electric current and there was a certain possibility of anyone having a knowledge of the connections of the machine deciphering the cipher with the aid of existing cipher texts and a machine having similar connections. Such a ciphering machine is in any case a relatively bulky apparatus which for the sake of secrecy must of course be kept under lock and key and occupies a considerable amount of space.

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According to the present invention these drawbacks are overcome, by the most important part of an electric ciphering machine, viz. the ciphering elements, being removable, from the ciphering machine and having its separate parts interchangeable and removable.

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At the same time means are provided for a particularly favourable way of conducting the electric current through the ciphering device.

In the accompanying drawing a constructional example of the invention is shown,

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Figure 1 being a side elevation, partly in section of a drum ciphering device of an electric ciphering machine in the operative position,

Figure 2 is a view from the rear of the device shown in Figure 1,

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Figure 3 a side elevation of the device at the moment of removing the ciphering drums from the device,

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Figure 4 a rear view of the device, similarly to Figure 3, but having the parts in position, in which the ciphering drums can be removed,

Figure 5 a view partly in elevation and partly in section of a detail to an enlarged scale, and

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Figure 6 a section on line VI—VI of Figure 5.

In such an electric ciphering machine

- a number of ciphering elements, for instance drums 1, 2, 3 is provided, which are mounted rotatably on one shaft. The ciphering drum 1 is provided with contacts 1^a, 1^b, corresponding for instance to the number of letters in the alphabet, on both sides, these contacts being interconnected in an irregular manner, as is indicated diagrammatically by the lines
- 5 4. The ciphering drums 2 and 3 have similar interconnections, each however to a different scheme of connections. 5 represents a ratchet wheel for driving the ciphering drum 2, and 6 a stepped wheel for fixing the ciphering drum 2 in any required position. The ciphering drums 1 and 3 are also provided with similar driving ratchet wheels and stepped wheels. 7 represents the input drum for the electric current, and 8 is an output roller for the electric current, in the present case of a special construction, which will be described in detail below.
- 10 25 In the case of the constructional example illustrated, the end drum 7 is stationary, that is, not rotatable upon the bed plate of the ciphering machine, for example rigidly connected with the end plate 9, which is secured to the bed plate by a corresponding foot 9^a. The end drum 8 is adjustable upon the end plate 10 into different positions. The end plate 10 comprises a fastening foot 10^a.
- 30 35 According to the invention the ciphering drums 1, 2, 3 are preferably so arranged as to be capable of being removed together with their actuating and securing parts from the ciphering machine. This can for instance be effected by the shaft carrying the said parts being capable of being withdrawn from the side, so that the parts just referred to may be lifted out from
- 40 45 between the fixed terminal drums. In a preferred construction, as shown in the accompanying drawing, the arrangement is as follows:
- 50 The ciphering drums 1, 2 and 3 are slipped onto a short shaft 11 on one end of which is a collar 12. For journaling the shaft stub shafts 13 and 14 having central holes 15 and 16 are fixed to the end plates 9 and 10. The holes 15 and 16 in the stub shafts 13 and 14 provide dished parts 17 and 18, whereby the removal of the shaft 11 is facilitated, as will be explained below. For enabling the ciphering drums 1, 2, 3 to be lifted out, the end drum 8 is not fixed to the stub shaft 14 but is made slidable thereon. For this purpose it is provided with a bush 19 and is fixed to a plate 20 which determines its position. The plate 20 is provided
- with a recess 21, by which its position is determined and by which it is guided on a pin 22 when being longitudinally displaced. On the plate 20 are also provided inclined or curved pieces 23, serving for the displacement of the end drum 8.
- 70 In order to make it possible to slide the end drum 8, the drum is constructed so that the electric current will not pass through it but will be reversed at it, the electric connections following the lines 24, so that the electric current entering at 25 leaves the system of drums at 26. This makes it possible to do away with all connecting cables which would interfere with the motion of the end drum 8.
- 75 80 For sliding the end drum 8 a lever 27 is mounted on the stub shaft 14 so as to be rotatable on the same, the lever having a handle 28 and pressure pins 29 or the like, capable of coacting with the inclined parts or curved pieces 23. When the arrangement is in the operative position (cf. Figs. 1 and 2) the pressure pins 29 rest on the highest parts of the curved pieces 23 and the bush 19 through its pressure on the collar 12 of the shaft 11 keeps the latter and the ciphering drums in the correct position. A suitable recess 30 at the inner end of the bush 19 at the same time causes the shaft 11 to be centred. At the other end of the shaft 11 the flange 31 of a bush 32 embracing the stub shaft 13 forms the abutment for the set of ciphering drums.
- 85 90 95 100 For retaining the ciphering drums in what is at any moment the correct position, i.e. so that the separate contacts of the separate drums are in correct contact with one another, auxiliary members are provided, which will be described below with reference to the drum 2.
- 105 110 A spring-controlled lever 33 supports a roller 34 which is adapted to engage in the recesses of the stepped wheel 6. In order to be able to move this lever out of contact with the stepped wheels, for the purpose of lifting out the set of ciphering drums, and to release the entire system for its removal, the following provisions are made:
- 115 120 A lever 35 having a roller 36 which is also kept pressed inwards by a spring 37 is kept continuously in contact by the said roller with the edge 38 of the lever 27. A lever 39 is provided at the other end of the set of ciphering drums and both levers are connected together by a bar which is adapted to act on the levers 35 and 39 at the fulcrums thereof. The pivot for the levers 35 and 39 is preferably provided by a bar 41 which forms the pivot for the levers 33.
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By the levers 35 and 39 and a rod 40 is formed an oscillatable bent frame which lifts the controlled levers 33 out of the notches in the wheels 6 when the said bent frame, by oscillation of the lever 27, 28, is rocked outwards by the edge 38 thereof; see Fig. 4.

The set of rotatable ciphering drums with the end drums and the other parts described above, is housed in a casing which is indicated at 42 and is provided with a hinged or removable cover 43. As will be seen from Fig. 2, this cover is so arranged that, when the device is in the operative position, it just covers the handle 28, but cannot be brought into its correct position, when the lever 27 with its handle 28 is in any other position (cf. Fig. 4).

The arrangement works in the following manner: For removing the arrangement it is only necessary to rock the lever 27 by means of the handle 28, for instance into the position shown in Fig. 4. Through the pressure pieces 29 moving over the inclined pieces 23 the end drum 8 is thereby released so as to be capable of sliding longitudinally on the stub shaft 14, the levers 33 with the check rollers 34 being raised out of the stepped wheels and forced back. The end drum 8 can thereupon be pushed back easily with the finger and the set of ciphering drums 1, 2, 3 with the shaft 11 will lie in the dished parts 17 and 18 of the stub shafts 13 and 14, so that they can be lifted out (cf. Fig. 3).

In this way it is possible, for instance, to interchange the ciphering drum 1 with the ciphering drum 2 or with the ciphering drum 3 in its position on the shaft 11, which makes it possible to alter the key of the ciphering device. It is however also possible to replace one or all the ciphering drums 1, 2 and 3, by other ciphering drums which are differently interconnected. By employing a plurality of sets of drums differing from one another for an electric ciphering machine it becomes possible to make the ciphering machine relatively small and to use only a few drums, for instance only three, as in the example shown in the drawing, while infinitely increasing the degree of safety of the cipher, which otherwise is only possible when using ciphering machines in which a great number of such ciphering elements are provided one behind the other and which, in consequence, of the the complicated mechanism required for operating them, would be relatively bulky and costly to make.

A further very important advantage consist in this, that it is possible with

the arrangement according to the present invention to lock away by themselves the set of drums which only take up a small space and to let the rest of the machine remain open, as nothing can be done with it by itself.

In case of war there is the further advantage, that, for instance when surprised by the enemy it is only necessary rapidly to remove the set of drums or even only one drum, thus rendering the ciphering machine useless for deciphering purposes. After the set of drums has been removed, the drums should be slipped off the shaft, only the drums being locked away, while the shaft is placed back in the machine and kept with the same.

For placing the set of drums in position it is only necessary to move the lever 27 into the position shown in Figure 2, provision being made by the arrangement of the cover 43 that this manipulation cannot be forgotten, as otherwise the cover will strike against the handle 28 and cannot be moved into its correct position.

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

1. A ciphering device for use in ciphering machines, having a plurality of ciphering elements, for instance ciphering drums, capable of being moved with respect to one another, and presenting on two opposite sides electrical contacts which are irregularly connected with one another through the ciphering element by electrical conductors, characterised by the feature that the said ciphering elements are arranged so as to be readily released and removed from the ciphering device.

2. A device as claimed in Claim 1, with ciphering drums, characterised by the feature that the ciphering drums which are capable of being turned relatively to one another are mounted on a short shaft which, when the parts are in the position in which the drums can be removed, rests with its ends in dished members open at the top in fixed stub shafts.

3. A device as claimed in Claim 2, having non-rotatable end drums, characterised by the feature that one of the end drums is capable of sliding, keeps the set of drums in the operative position, when the device is in the operative position, and at the same time centres the shaft, for instance by means of a bush embracing a part of the shaft.

4. A device as claimed in Claim 3, characterised by the feature that the slidable end drum is arranged so as to act as a reversing drum, i.e. has its electric connections such that the electric current arriving through the rotatable drums returns through the same drums. 20
5. A device as claimed in Claim 3 or 4, characterised by the feature that, for sliding the end drum, a lever is provided which acts by means of pressure pins on curved pieces and, when rocked out of the operative position, at the same time by means of its outer edge rocks a system of levers, which by means of a bar raises another set of levers provided with rollers which, when the device is in the operative position, hold the drums in the contact making positions, by the said rollers entering stepped wheels. 25
6. A device as claimed in Claim 5, characterised by the feature that a cover is provided which covers the device in such a manner that, when the device is in the operative position, it just covers the handle of the pressure pin lever, while it cannot be closed, when the said lever is in any other position. 30
7. The improved ciphering device for use in ciphering machines, substantially as hereinbefore described and as illustrated in and by the accompanying drawings. 35

Dated this 10th day of January, 1927.

MARKS & CLERK. 35

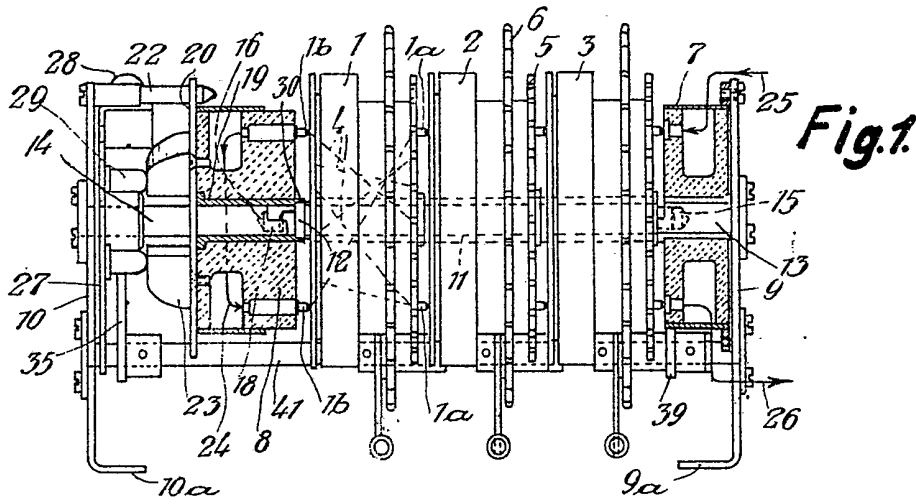


Fig. 2.

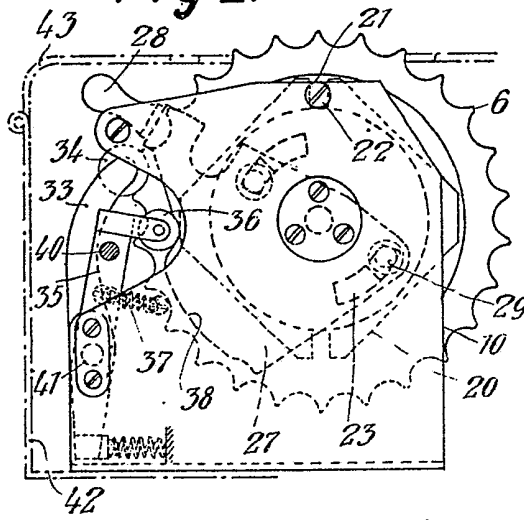
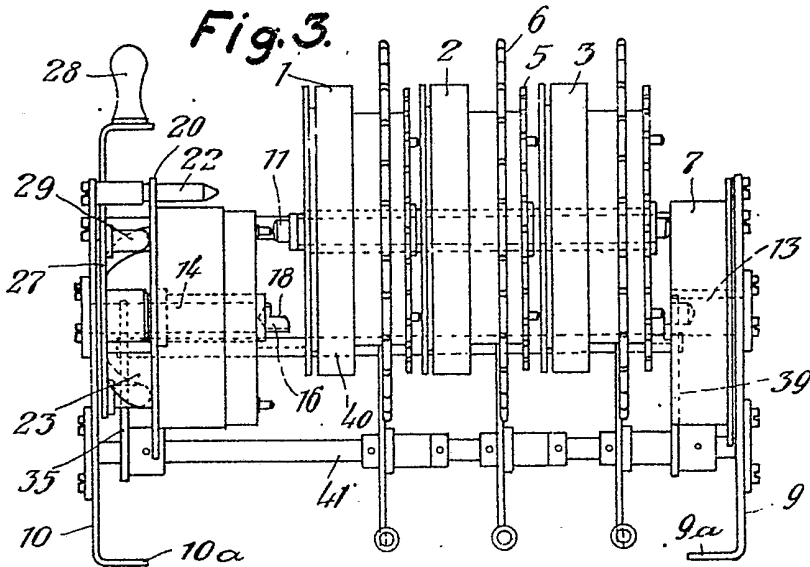


Fig. 3.



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

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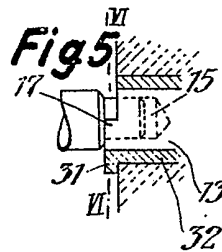
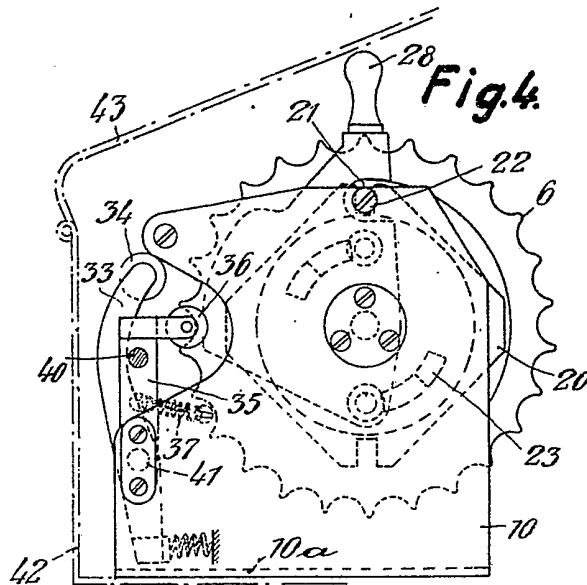
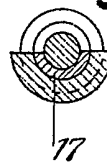


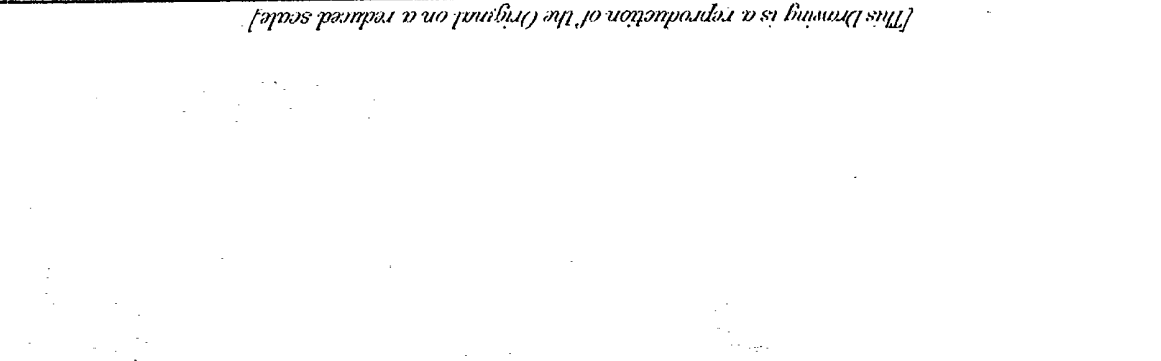
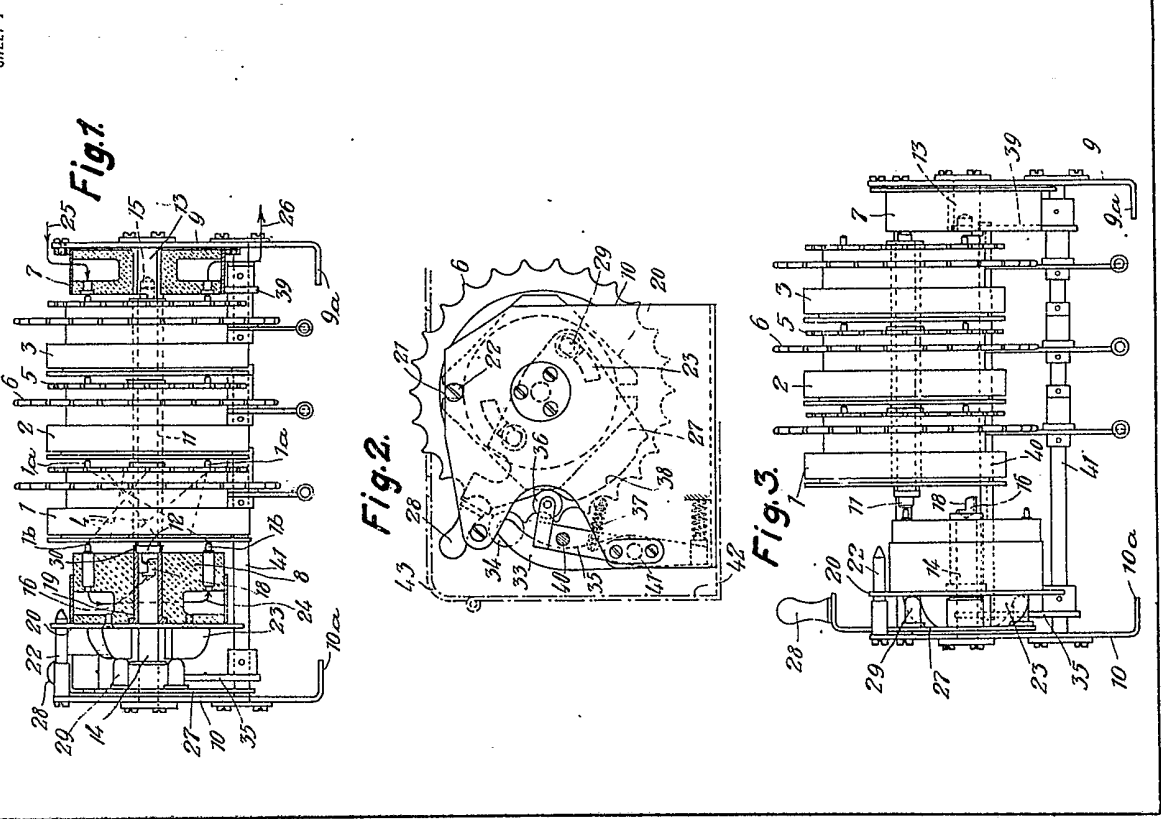
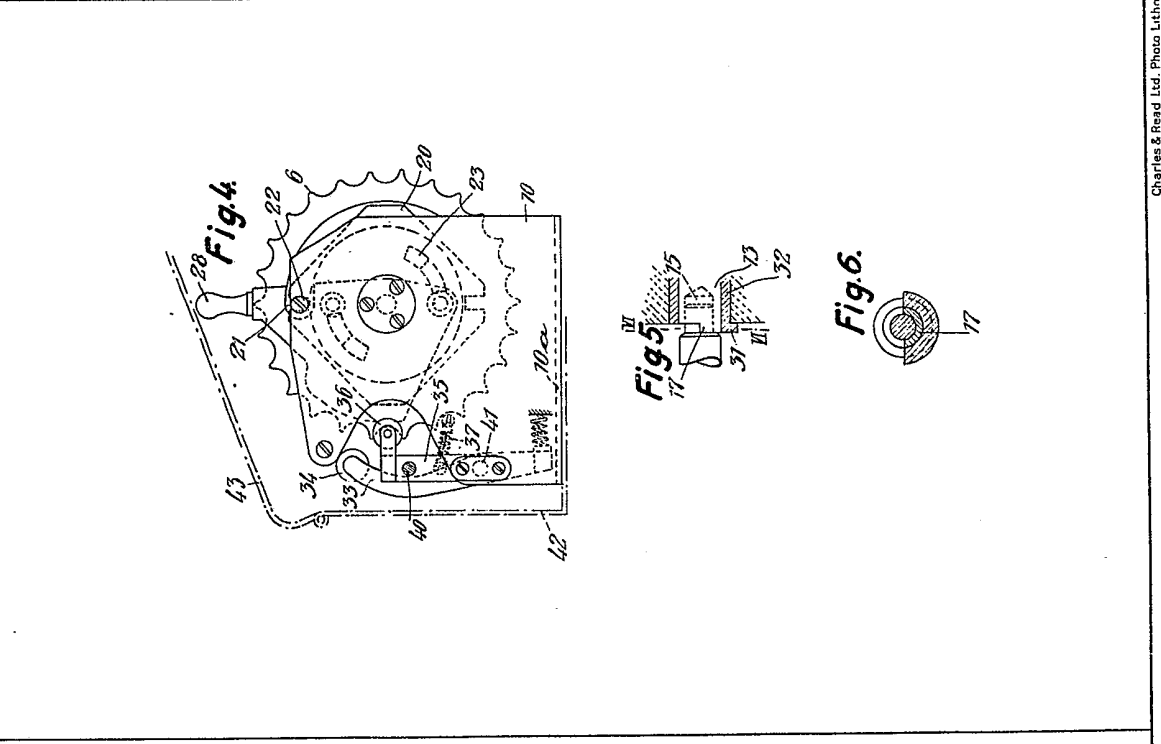
Fig. 6.



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