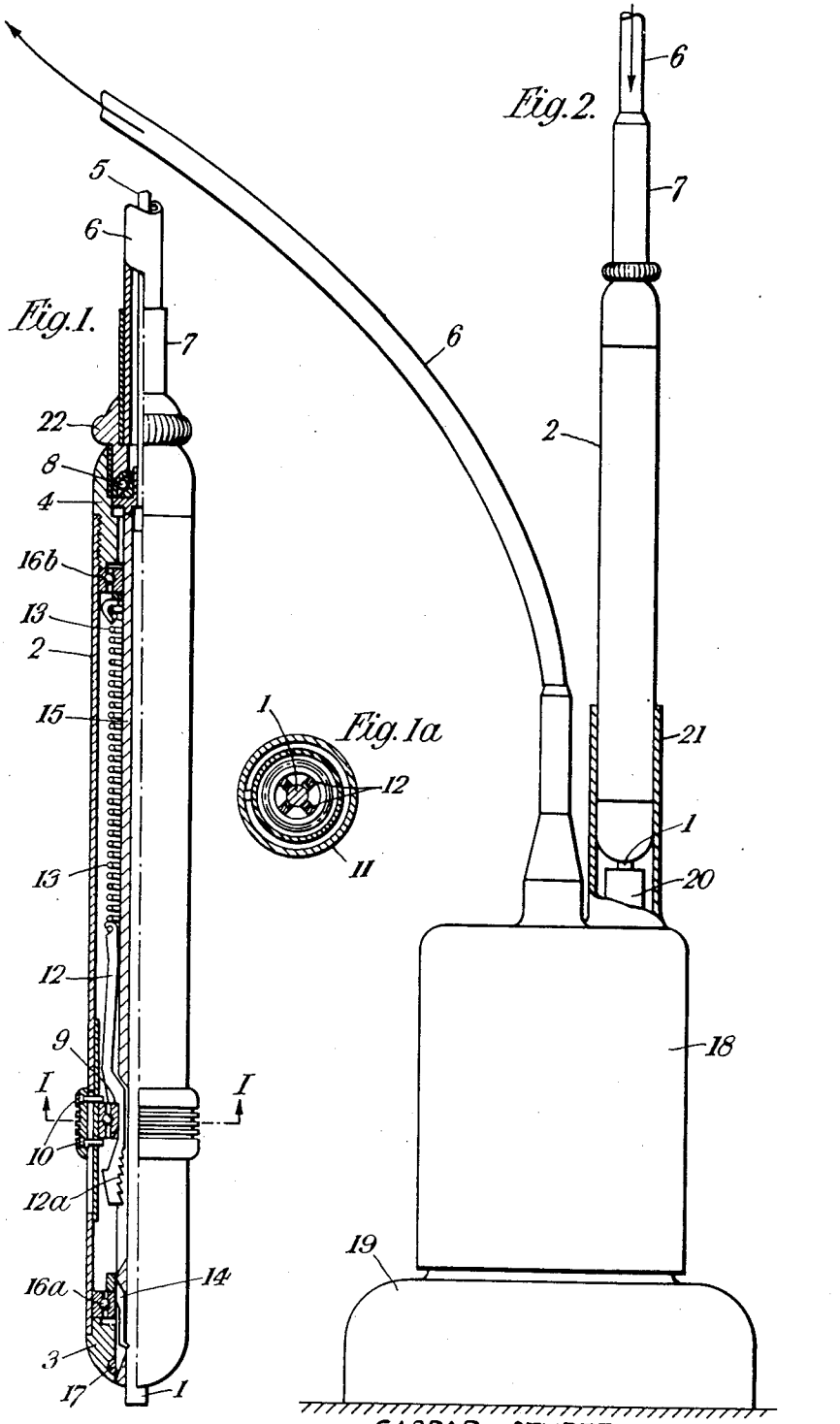
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MOTOR DRIVEN ADJUSTABLE ERASER

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MOTOR-DRIVEN ADJUSTABLE ERASER

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The invention relates to erasers of the type wherein the erasing means is slidably mounted in a tubular guide and is driven by an electric motor. In one known construction the motor for driving the eraser is built into the holder of the erasing means. Obviously such a construction must be rather heavy. The manipulation of an eraser more particularly an eraser driven by an electric motor is largely a matter of touch, that is, the pressure of the erasing means upon the matter to be erased must be capable of being regulated easily by hand. A too strong pressure would particularly if the number of revolutions of the eraser is high, result in heating excessively the part containing the matter to be erased or might even lead to the surface being rubbed away. Very sensitive manipulation of the apparatus by touch is possible only if the part of the apparatus guided by the hand of the operator is sufficiently light, that is, of very small weight.

The object of the invention is to improve erasers with electric drive by operatively connecting a holder in which an erasing member is rotatably mounted about its axis, with an electromotor in such a manner that the rotation of the motor is transmitted to the erasing means through a flexible shaft.

One construction of an electrically driven eraser according to the invention is shown by way of example in the accompanying drawings in which:

Fig. 1 shows in elevation and partly in sectional elevation the holder of the eraser,

Fig. 1*a* is a cross section through the holder on line 1—1 and

Fig. 2 shows the complete arrangement of holder, motor, and flexible shaft.

In the drawings 1 indicates an erasing means for instance made of erasing rubber, in the form of a rod. The erasing means may of course, consist of any other suitable material. The erasing means hereinafter referred to as eraser rod, is mounted in a holder which consists of a sleeve 2 having a head-piece 3 and an end or closing piece 4. The flexible shaft is indicated by the numeral 5, and is enclosed within a protective tube 6 and is fixed by means of a sleeve 7 in a socket 22. 8 indicates a thrust ball bearing which takes up the axial thrust of the eraser rod during the erasing operation. The outer

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race ring of a journal ball bearing 9 is connected by pins 10 with an outer sleeve 11. On the sleeve 11 being pushed downward or forward, the journal ball bearing 9 is carried in the same direction until the lower race of the bearing strikes against inclined surfaces of pawls 12 and presses the pawls against the eraser rod 1. As shown in Fig. 1*a*, four pawls 12 are provided. The pawls are provided with serrated surfaces 12*a* which grip the eraser rod and feed it forwardly against the action of a spiral spring 13. On the sleeve 11 being released, said spring returns both the pawls 12 and the journal ball bearing 9 and the sleeve 11 to their initial position. During this return movement of the pawls 12 the serrated surfaces 12*a* are drawn out of the eraser rod and release the latter.

In order to prevent the eraser rod 1 from being moved back into the holder during use, there are provided several, for instance, six, pawls 14 which are mounted in slots of the guide sleeve 15 of the eraser rod. These pawls have each at their forward ends a tooth, which on the eraser rod being pushed back, engage the rod, but on forward feed of the rod disengage from the rod. Therefore on the rod being pushed backwards, the pawls engage the rod and prevent the rod from moving backwards.

The guide sleeve 15 in which the rod is slidable, is rotatably mounted in the journal ball bearing 16*a* and 16*b*. 17 indicates a sealing device at the lower end of the holder which prevents entrance of dust produced by the erasing operation, and also prevents exit of the lubricant of the ball bearing.

The electro-motor 18 is mounted by means of a base 19 upon a suitable support in such a manner that its shaft is vertical. The motor is provided with a starting contact 20 over which is placed a sleeve 21 which has an internal diameter corresponding to the external diameter of the holder 2. Said holder is in its idle position inserted into the sleeve as shown in Fig. 2. In this position of the holder the eraser rod bears upon the starting contact 20 and breaks the contact so that no current is supplied to the motor. On lifting the holder from the sleeve 21 the contact is closed and the motor is started.

Refill eraser rods may after removal of the socket 22 be inserted from the rear.

I claim:

1. An eraser comprising in combination: a holder for an eraser rod rotatably mounted in said holder and adapted to be fed axially in said holder; an electro-motor operatively connected with said eraser rod by means of a flexible shaft; and means for axially feeding said eraser rod in said holder comprising an external sleeve slidably mounted on said holder; pawls axially movable in said holder adapted to grip and release said eraser rod, said pawls being operatively connected with said sleeve to grip the rod when the sleeve is moved forward and to release the rod when the sleeve is moved backwards.

2. An eraser comprising in combination: a holder for an eraser rod slidably and rotatably mounted therein; an electro-motor operatively connected with said eraser rod through a flexible shaft; and means for feeding said eraser rod axially in said holder comprising in combination pawls inside said holder adapted to grip and release said eraser rod; spring means tending to move said pawls in the direction required for releasing said eraser rod; and an external sleeve on said holder operatively connected with said pawls for moving the pawls into operative position.

3. An eraser comprising in combination: a holder for an eraser rod rotatably and slidably mounted in said holder; an electro-motor operatively connected with said eraser rod by means of a flexible shaft; and means for axially feeding said eraser rod comprising in combination pawls mounted inside said holder and adapted to grip and release said eraser rod and an external sleeve operatively connected with said pawls for moving said pawls into gripping position; and a journal ball bearing interposed between said external sleeve and said internal pawls.

4. An eraser comprising in combination: a holder for an eraser rod rotatably and slidably mounted in said holder; an electro-motor operatively connected with said eraser rod by means of a flexible shaft; and pawls inside said holder near the forward end thereof adapted to grip automatically said eraser rod when the latter is moved in the rearward direction and to release said rod when the rod is fed forward.

5. An eraser comprising in combination: a holder for an eraser rod rotatably and slidably mounted in said holder; an electro-motor operatively connected with said eraser rod by means of a flexible shaft; and pawls inside said holder near the forward end thereof adapted to grip automatically said eraser rod when the latter is moved in the rearward direction and to release said rod when the rod is fed forward and a journal ball bearing interposed between said pawls and the inner wall of the sleeve.

6. In an eraser of the type wherein an eraser rod is axially slidable in a sleeve driven by an electric motor, the subcombination of: a manually operable tubular holder; a sleeve for guiding and holding the eraser rod, said sleeve being rotatably mounted in said holder; and means for axially feeding the eraser rod step by step.

7. In an eraser of the type wherein an eraser rod is axially slidable in a sleeve driven by an electric motor the subcombination of: a manually operable tubular holder; a sleeve for guiding and holding the eraser rod, said sleeve being rotatably mounted in said holder; and means for axially feeding the eraser rod step by step, said feeding means comprising: pawls mounted on said guide sleeve adapted to grip and release the eraser rod, and means for operating said pawls mounted on said tubular holder.

8. In an eraser of the type wherein an eraser rod is axially slidable in a sleeve driven by an electric motor, the subcombination of: a manually operable tubular holder; a sleeve for guiding and holding the eraser rod, said sleeve being rotatably mounted in said holder; and means for axially feeding the eraser rod step by step, said feeding means comprising: pawls mounted on said guide sleeve adapted to grip and release the eraser rod; an external axially movable sleeve mounted on said tubular holder, operatively connected to said pawls so as to move said pawls into gripping position and axially to feed the rod; and spring means for retracting the pawls and the said external axially movable sleeve into the initial position.

9. In an eraser of the type wherein an eraser rod is axially slidable in a sleeve driven by an electric motor, the combination of a holder for the sleeve; a sleeve rotatably mounted in said holder, and means for feeding the rod comprising: pawls constructed for gripping the rod and feeding same forward, then releasing the rod and returning idly into the initial position; cam means for moving said pawls into gripping position; a sleeve slidably mounted on the holder for actuating said cam means; and a ball bearing carried by said slidably mounted sleeve, substantially as described.

10. In an eraser of the type wherein an eraser rod is axially slidable in a sleeve rotated by an electric motor, the combination of first pawl means for axially feeding the rod and second pawl means permitting feeding of the rod by the first pawl means, but preventing movement of the rod in the opposite direction.

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