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(71) Applicant: **O T S S.r.l.**
Via Sismondi, 67
Milano(IT)

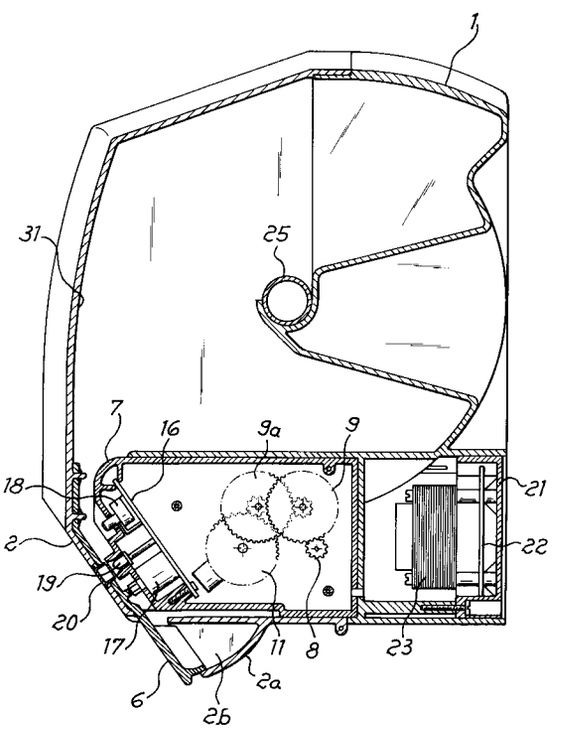
(72) Inventor: **Niada, Gianandrea**
Via Carlo Poma, 4
MILANO(IT)

(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A.
Via Carducci, 8
I-20123 Milano (IT)

(54) An automatic dispenser for paper towels severable from a continuous roll.

(57) An automatic dispenser for paper towels shaped in strips of an appropriate length severable from a continuous feed roll (25), outputs from the device a portion of paper of an appropriate length cutting it by means of a stationary blade located in a less accessible area of the apparatus for user's safety reasons. Dispensing is controlled by means of pushbutton (17) photoelectric cell or the like, which actuates a switch for supplying power to a motor during a time period predetermined by means of a timer (18), and which therefore causes rotation of a dragging roller adapted to cause a certain extent of unrolling of the feed roll (25). Said timer inhibits dispensing, in case the switch is kept continuously actuated, before a predetermined pause interval has elapsed.

Fig.2



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This invention concerns an automatic dispenser for paper towels which are severable from a continuous roll in the shape of predetermined length strips made available on the outside of the dispensing apparatus so that they can be subsequently torn off manually against a stationary blade in a relatively hidden position within the device.

A number of types of paper towel dispensers are already known, adapted in particular to enable a manual pulling of the free flap which has remained accessible after a previous usage, and the "ripping" thereof against a stationary blade. A brake device is sometimes provided which is adapted to block the unwinding of the strip from the feed roll, after a certain length, thereby making it easier to tear off the paper to be used, whereafter a further clean flap of material may be allowed to project outside to be manually grabbed for a subsequent usage cycle. In other embodiments, a side crank or handle is provided for rotating the feed roll in the unwinding direction, in order to have available on the outside a paper strip of a desired length.

In any case, actuation is always manual, while motorized actuation is usually a feature of fabric towel dispensers, where the higher cost caused by automatic controls and motor actuation seems to be justified by the different properties of the material, which is substantially reusable and lasts longer.

On the other hand, use of the so called "manual" dispensers for tear-off paper towels has a few drawbacks first among them the uneasiness the user feels when he or she has to grab and pull towards himself(herself) a flap of paper that, by getting soaked with water, may loose its strength and tear-off in a random and abnormal fashion. In addition, an even worse drawback may arise in that the user's hands, in an effort to reach for the residual flap of paper in order to pull it downwards, may hit the cutting blade with dangerous results, also because said blade cannot be hidden too far inside, just for the purpose of making such a grabbing action easier. Nor is the approach with a side crank or handle favoured by the users, because of apparent reasons of natural reluctance to bring one's wet or moist hands into contact with a member, like the handle, which has already been actuated previously by others and which might still be carrying traces of water left thereon by a previous user.

Therefore, it is an object of this invention to provide a dispenser for paper towels severable from a continuous feed roll, which is free from the drawbacks mentioned above, and which does not require a manual action by the user but for possibly actuating a control pushbutton in order to have the required paper length dispensed automatically.

Another object of this invention is to provide a dispensing apparatus of the type mentioned herein above, adapted to guarantee top safety, both by carrying the portions subjected to electrical voltage in an insulated and normally unaccessible position of said device in order to avoid dangerous contacts, and by providing a cutting blade in an area as hidden and as recessed as possible within the device, in that there is no longer a requirement, as in the case of a manual actuation, to reach for a small residual paper flap to be grabbed and suitably operated upon, because now the dispensed paper length is more than enough for having it available outside at a safety distance from the blade.

The above and other objects, advantages and features of the dispensing apparatus according to this invention will become more apparent from the following detailed description of a preferred embodiment thereof, which is given herein for exemplary and non limiting purposes, reference being made to the attached Figures wherein:

Figure 1 shows a front view of the device support portion only, without the cover;

Figure 2 shows a cross-sectional view along line II-II of Figure 1;

Figure 3 shows another cross section along line III-III of Figure 1, with a paper feed roll mounted therewithin, in oder to show the paper path all the way to the outlet opening and further on;

Figure 4 shows a top plan view of said apparatus, without the cover and in partial cross section, along line IV-IV of Figure 1; and

Figure 5 is a block diagram schematic of the electrical power supply portion for actuating the apparatus.

Referring now to the drawings, the inventive device includes a housing thereof comprising a wall mounted support portion 1 having a back portion 31 adapted to be fastened to a wall, two side walls 41a and 41b and a paper feed roll support comprising a pair of bracket or cantilever members, 43a, 43b, having a substantially semicircular recess 45a, 45b adapted to provide a rolling engagement seat for the ends of a tubular member 25 used as a core for roll 10. Cover 2 has a downwards facing paper dispensing port 2a, directed in such a way as to provide a guiding action for paper 10a towards the outside, after the paper has passed in front of a cutting blade 3 mounted on cover 2 in a position set back within the recess defined by port 2a, in order to be scarcely accessible from outside. As it is shown more clearly in Figure 3, said recess is protected also on the sides, at both ends of dispensing port 2a, by a pair of walls 2b integral with cover 2 as well. In this way accessibility to blade 3 from the outside is reduced to a minimum, by the way no accessibility being

required in this case, contrary to what holds true for the majority of the dispenser devices of the prior art, in that there is made available on the outside a paper flap 10a having a length sufficient for using it and thereafter tearing it off by applying a pressure on said blade without having to grab the paper close to the blade.

Paper dispensing is performed by dragging the paper by means of a pulling roller 12 actuated by a small motor 8 fastened to support portion 1, in particular on an internal side shoulder 7 thereof. Referring now to the drawing, pinion 8 on the motor output shaft meshes with a first gear 9 of a reduction gar whose second gear 9a meshes in turn with a further motion transmitting gear 11 mounted on roller 12 shaft.

Paper 10a coming from roll 10 is led between the surface of roller 12 and a confronting roller 13 rotatingly mounted for instance on a pair of journals fastened to the ends thereof, each of them being rotatable within a small support plate 14 provided with biasing springs 15 adapted to press the opposing roller 13 against dragging roller 12. Preferably, roller 12 will be made of a certain number of cylindrical rubber lined members integrally provided on a shaft rotatably mounted, at the ends thereof, on structural parts of support 1, like for instance shoulder 7 mentioned above and a rib 7a on the opposite side, which supports as well the corresponding end of opposing roller 13 as it is best shown in Figure 4. In the spaces included between said roller 12 cylindrical members, stationary tongue shaped members, or the like, may be provided in order to prevent the paper from winding back around roller 12 and to induce the paper along its regular path.

As it will be explained in more detail referring to Figure 5, the dispensing control is performed by means of a switch 17 actuated through a pushbutton 6, comprising for instance a flexible blade having one end fastened to cover 2, and bearing on the switch 17 in order to supply power to motor 8 through a timer 18, the power supply being made available as a rectified 12V DC current from a transformer 23 connected to the grid. A printed control circuit 16 connects switch 17 to timer 18 as well as to a LED 19 for displaying the apparatus operating condition, the assembly being mechanically supported by said shoulder 7 integral with support 1, while cover 2 carries, besides pushbutton 6, also a clear inspection hole 20 to display the LED light. Instead, transformer 23, together with program printed circuit 22, is mounted within a support or fastening box 21 on the bottom of back panel 31, in order to be accessible only upon having withdrawn fastening screws 26 and after having necessarily taken the device off the supporting wall. The same holds true to gain access to the location of electrical connections 27, which is protected from the outside by means of a cover 24, still on the back side of the device.

Operations are as described in the following. Once cover 2 has been opened by authorized personnel who are able to operate lock 5 by means of an appropriate key, in a new paper roll 10 to be used there is inserted a supporting tubular member 25, to be set, at the ends thereof, in special seats 45a and 45b of side supports 43a and 43b. The roll is manually unwound enough to insert the paper free end between dragging roller 12 and opposing roller 13 (while pushing the latter downwards in order to compress springs 15), possibly by taking advantage of motor 8, which is actuated by means of switch 17. Springs 15, which are now free, will bias roller 13 against roller 12, in order to provide the friction necessary to drag paper 10a. To that end, roller 13 will preferably be rendered rough, by any known method, according to the material thereof (wood, plastics, and so on), in particular in the central area of said roller 13, having preferably a larger diameter.

In fact, the paper dragging action will be more effective in the roller central area, and in particular dragging roller 12 will comprise a number of rubber lined cylindrical areas, separate from each other, whose size is increasing towards the center, in order to prevent the paper from contacting the rollers along the whole width thereof, which might cause the paper to curl if the paper were irregularly engaged within the roller nip. Therefore, it is preferable that friction is concentrated in a single central area corresponding to the enlarged and knurled portion of roller 13 and to the central rubber lined cylinder of roller 12, while the other cylindrical portions thereof provide more of a guiding than of a dragging action.

Actuation is performed by enabling, by means of switch 17 controlled through pushbutton 6, a potentiometer or timer 18 which, as it is more clearly shown in the block diagram of Figure 5, makes it possible to supply motor 8 for a predetermined time, with DC electrical power coming from the rectified output of transformer 23. It should be noted that, instead of pushbutton 6, or in addition or as an alternative thereto, a photoelectric cell or proximity switch control might be provided in a completely similar arrangement. LED 19 may be the normally lit type, being turned off while the device is operating, i.e. during the entire period motor 8 is actuated, or vice-versa it might be normally off, with a red light being turned on during operation to warn the user that a further actuation of pushbutton 6 or photoelectric cell will have no result. The printed circuit 16 connections will be such as to prevent any further operating cycle until switch 17 is in any way actuated, in order to

prevent the paper from unrolling continuously for instance in case a match or similar sharp member is inserted to keep pushbutton 6 in a depressed position, or else if the photoelectric cell is kept persistently blinded.

The actuation time may be set on timer 18 by the service personnel only, and only after the cover has been opened to gain access to shoulder 7 carrying said control members, as well as for possible maintenance of the mechanical parts. The overall actuation time will depend upon the unrolling speed, therefore on roller 12 peripheral speed, but in any case it will be long enough to let out a paper flap 10a of a sufficient length for various uses. Preferably, right after each operating cycle a "pause" period will further be provided, during which any actuation will have no result. This will be provided for instance by arranging that timer 18 may inhibit, for a predetermined time period a new actuation of motor 8, starting from the end of an operation thereof.

Referring now more particularly to Figure 5, transformer 23 is shown therein as being supplied with power from the grid through a fuse 23a, whose secondary side supplies separately the reduced voltage driving motor 8 and an enable circuit for actuating said motor. The pair of DC supply circuits are shown at 22, which is the same reference number used for the program printed circuit of Figure 4. The enable circuit, which may comprise the printed control circuit 16 of Figure 2, includes an ON-OFF circuit 34, in series to switch 17, which is possibly actuated not through a push-button but by means of an electronic or photoelectric cell control, or proximity detector. In this case, an operating distance control 34a may be provided, said enable circuit including as well timer 18 with an associated control 18a of the operating time, therefore of the amount of paper dispensed, as well as a pause circuit 32 and relevant controls 32a. The pause circuit prevents timer 18 from enabling a subsequent operation, for a predetermied time period after motor 8 has stopped its operating cycle, as controlled by said timer. Therefore, after a cycle has been started, the whole time period set in the timer 18 will have to elapse (during which motor 8 is in operation and rotates dragging roller 12 which dispenses the paper) as well as the whole time period set in pause circuit 32, possibly adjustable in 32a, before next cycle can be started. Indicator light 19 of the dispenser operating condition might indicate as well if the motor is operating or not, and possibly also the pause period, as mentioned above, thereby indicating if the dispenser can be actuated or not.

From the above, all the advantages of safety, reliability, easy operation, sturdy and simple construction of the dispensing device of this invention should be apparent.

Those skilled in this art may possibly make additions and/or modification to the embodiment of the dispenser described and shown above, without exceeding the scope of the invention, whose limits of protection extend to all possible equally useful mechanical equivalents. In particular, differences may concern the paper roll support, the position and embodimental shape of the dragging rollers, the position of the various components and the shape of the structure parts.

Claims

1. An automatic dispenser for paper towels severable from a continuous roll including, within a housing (1) which may be closed by meas of a cover (2), a support for a paper roll (10), a dragging roller (12) and an opposing pressure roller (13) for dragging, under the action of a motor (8), a paper strip (10a) which has been unrolled from said roll (10), leading it in front of a cutting blade (3), characterized in that said cover (2) is hingedly connected at (4) to the bottom of housing (1) and it carries said blade (3) mounted on the lower portion thereof, in a position set back within dispensing port (2a) which is also provided on the lower side of cover (2), transmission means (9, 9a, 11) being provided between motor (8) and said roller (12), which are all mounted, like said motor (8), on a side shoulder (7) integral with said housing (1).

2. The dispenser of claim 1, characterized in that said motor (8) is actuated by means of a pushbutton (6) or the like, for enabling an ON-OFF circuit (17) by means of a timer (18) in order to supply power to motor (8) during a possibly adjustable predetermined time period.

3. The dispenser of claim 2, characterized in that it includes as well a pause circuit (32) adapted to inhibit power from being supplied again to motor (8), for a possibly adjustable time period starting from the time the motor actuation has been stopped.

4. The dispenser of claim 2 or 3, wherein said circuit (17) and timer (18) are mounted on a printed control circuit (16) within the front portion of said side shoulder (7), accessible only by opening the cover (2), together with an indicator light (19) showing motor (8) operating condition.

5. A dispenser according to one or more of the previous claims wherein said cover (2) may be

locked to the top portion of housing (1) by means of a lock (5), and on the rear side or back plate (31) of housing (1) there is mounted a transformer (23) provided with a relevant program printed circuit (22) for supplying power to motor (8) and to control circuit (16), said transformer and control circuit being accessible from outside only after having removed a support (21) normally fastened by screws to said back plate (31), after said dispenser has been taken off the supporting wall.

6. The dispenser of claim 1, wherein said support of roll (10) comprises a pair of cantileverd side members (43a, 43b) integral with hounsing (1) and having a substantially semicircular seat (45a, 45b) adapted to support the ends of a cylinder shaped roller (25) used as a core for said roll, the opposing roller (13) being mounted at the ends thereof in small plates (14) wherein springs (15) are housed in order to bias said roller against said dragging roller (12), the contact area between said two rollers being mainly located in the central area of said rollers.

7. The dispenser of claim 2, characterized in that it includes, besides said pushbutton (6), a photoelectric cell device or the like, as alternate means for actuating said circuit (17).

Fig.1

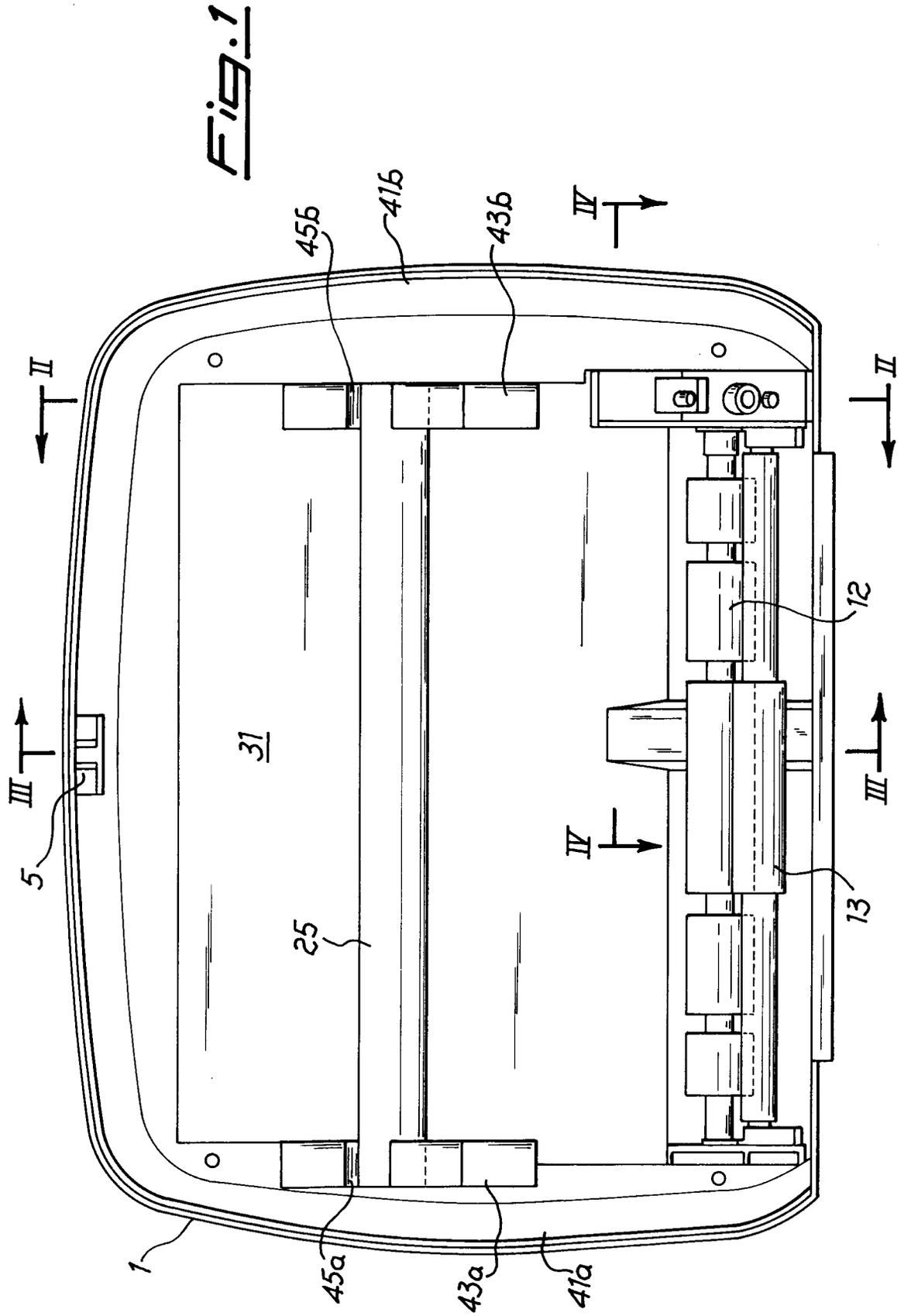


Fig.2

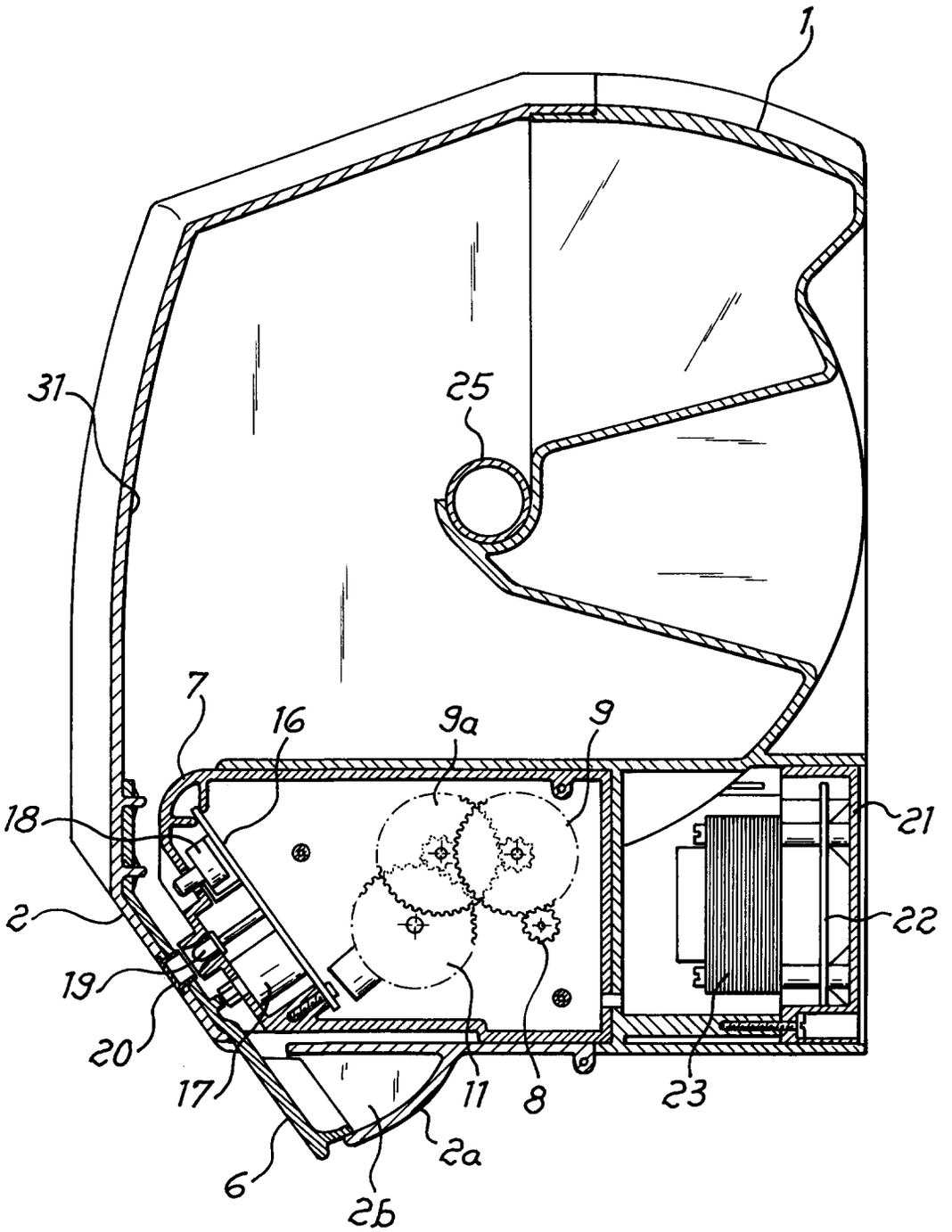
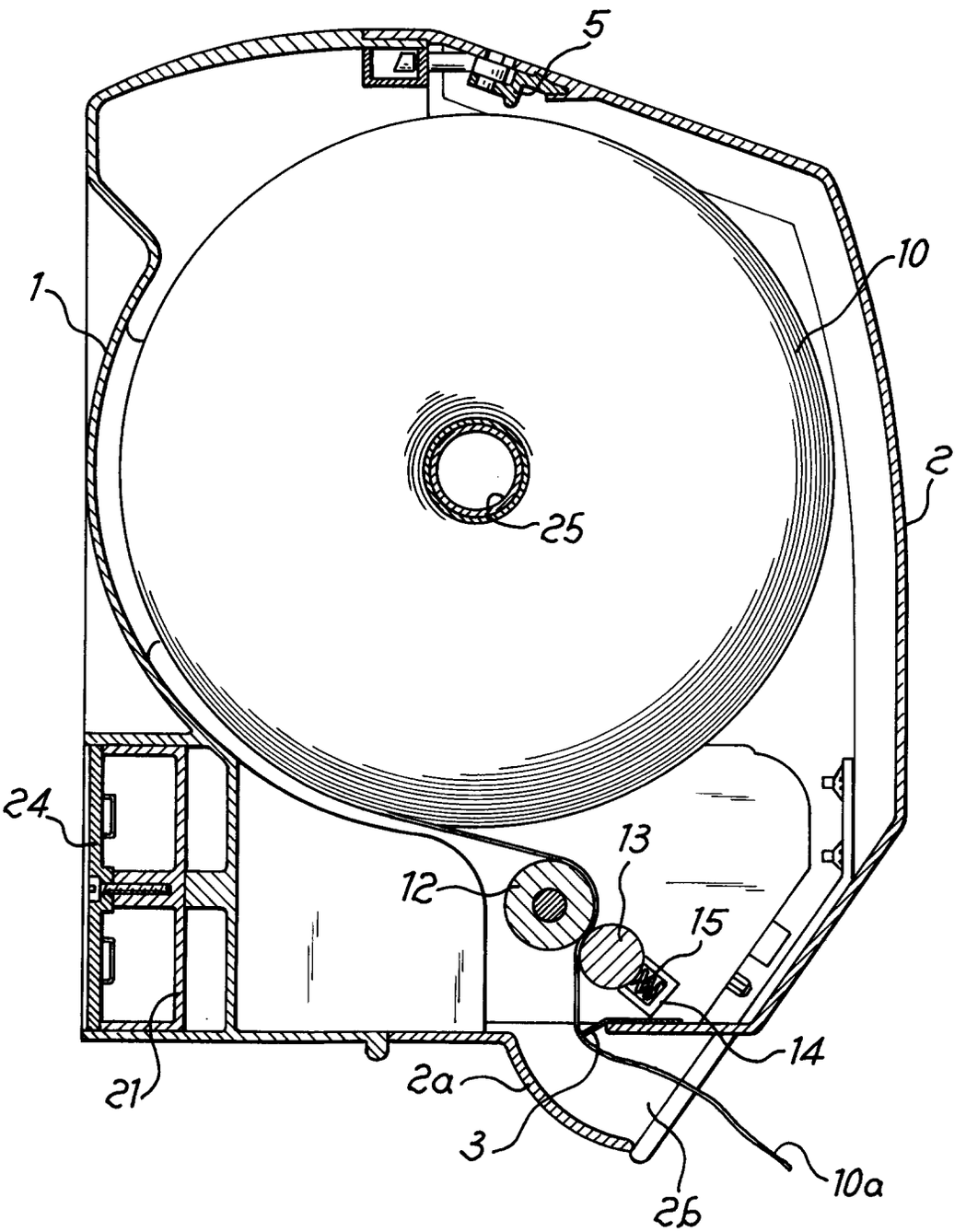


Fig.3



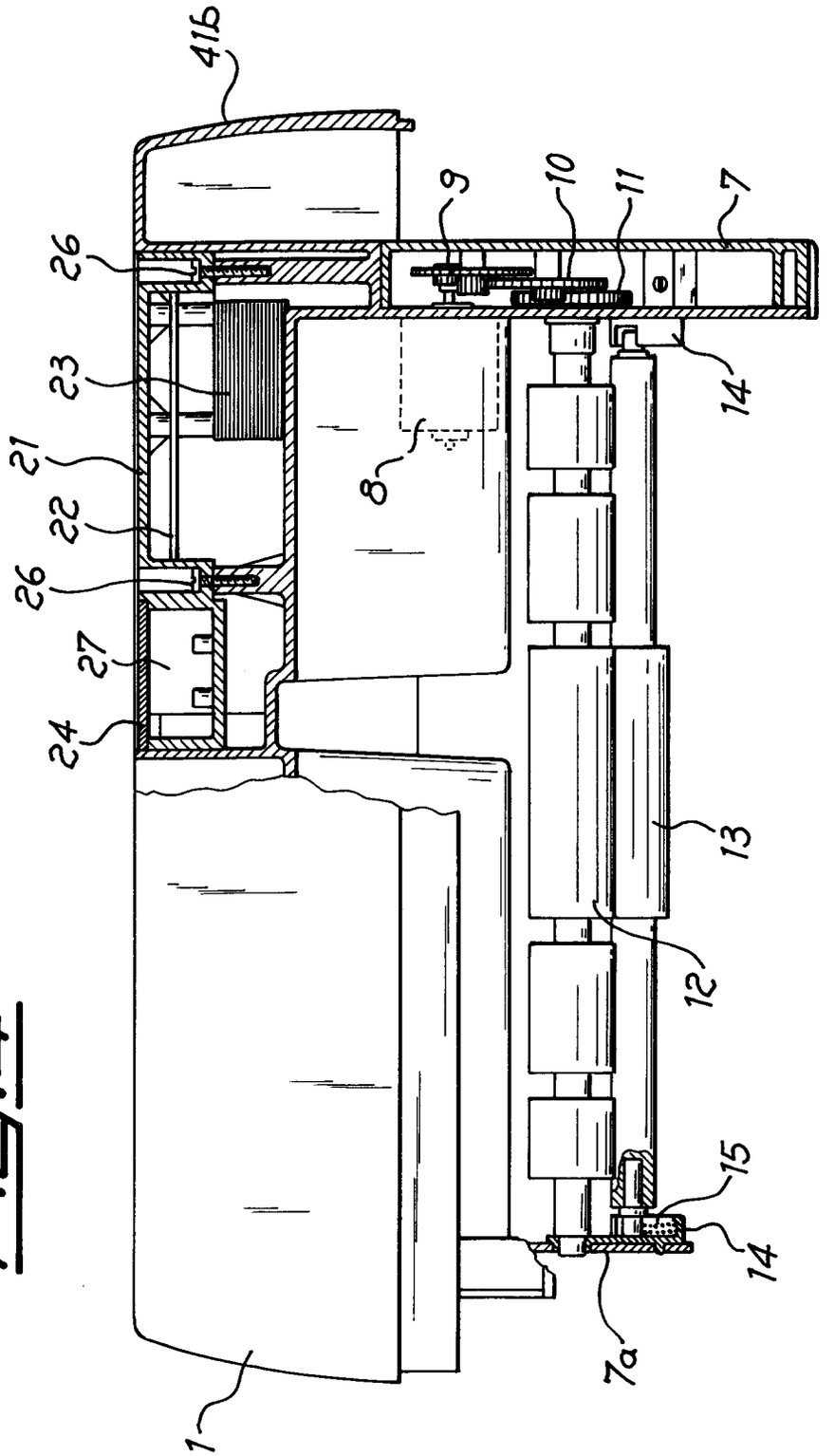


Fig.4

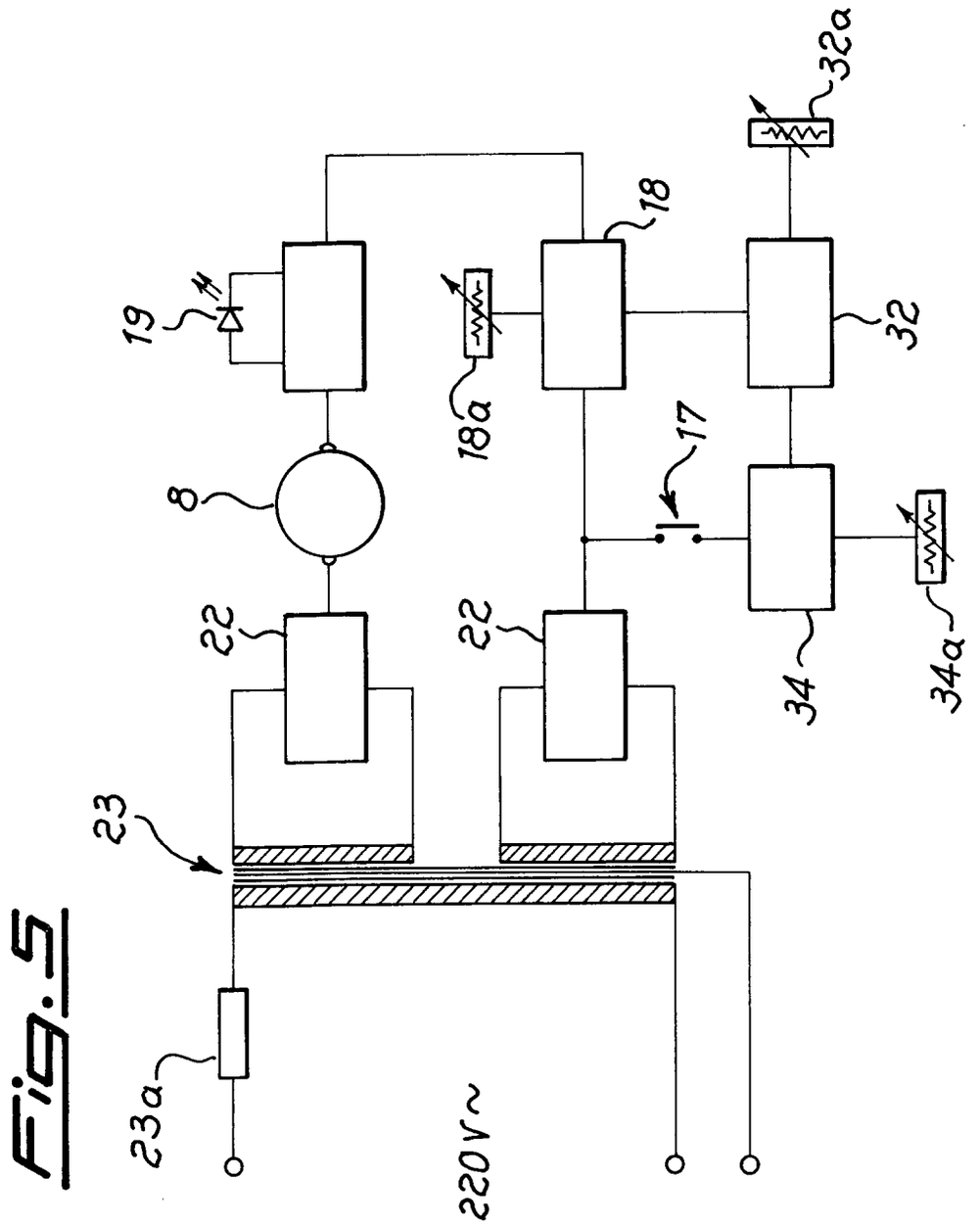


Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 92 83 0402

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y A	US-A-4 666 099 (HOFFMAN ET AL) * column 3, line 20 - column 5, line 35 * * column 6, line 56 - column 8, line 31; figures *	1 2-4,6,7	A47K10/34
Y	US-A-4 358 169 (FILIPOWICW & CORNELL) * column 3, line 60 - line 64; figures 1-4 *	1	
A	US-A-4 119 255 (D'ANGELO) * column 2, line 38 - column 3, line 2 *	2,4	
A	EP-A-0 235 438 (STEINER COMPANY,INC.) * column 5, line 52 - column 6, line 4 * * column 11, line 5 - line 10 *	3,5,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 FEBRUARY 1993	FORDHAM A.

CATEGORY OF CITED DOCUMENTS

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