

Aug. 24, 1965

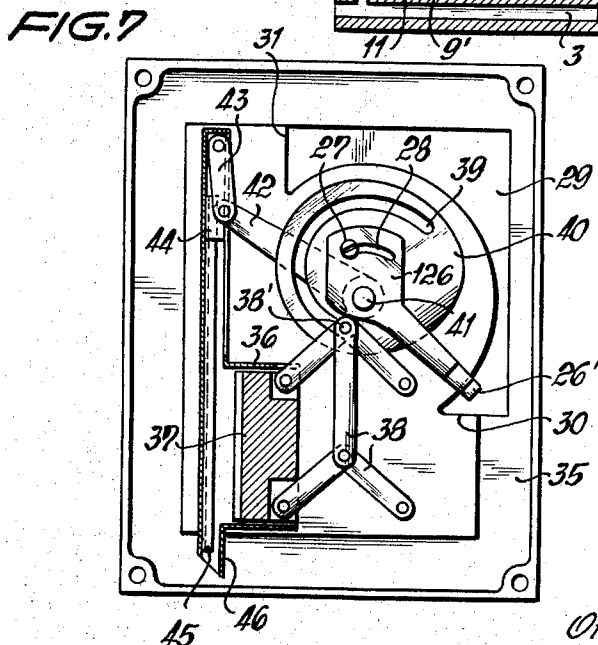
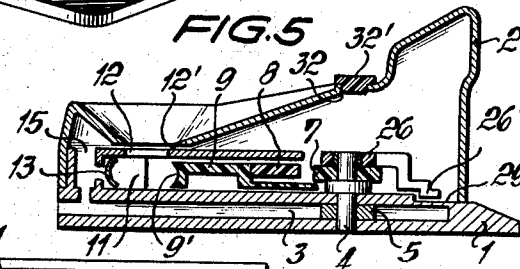
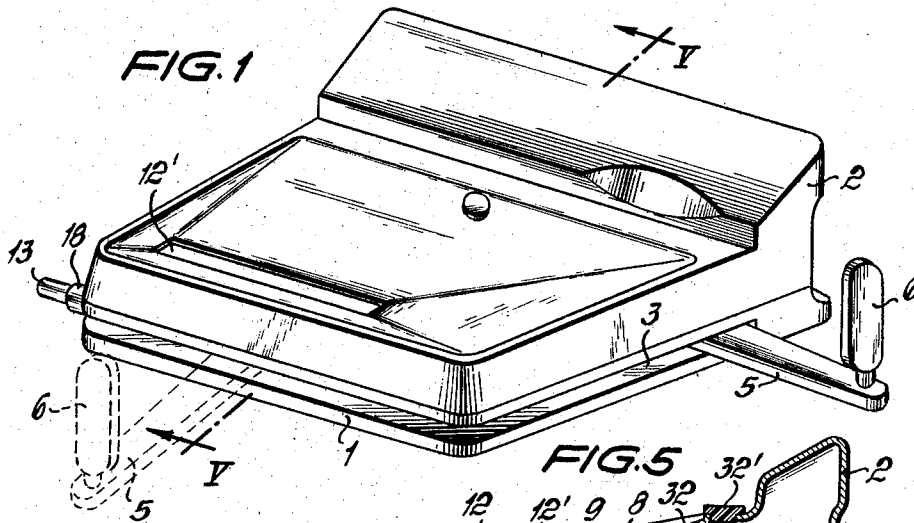
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3,202,156

APPARATUS FOR FILLING PAPER CIGARETTE TUBES WITH TABACCO

Filed Jan. 15, 1964

3 Sheets-Sheet 1



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FIG. 2

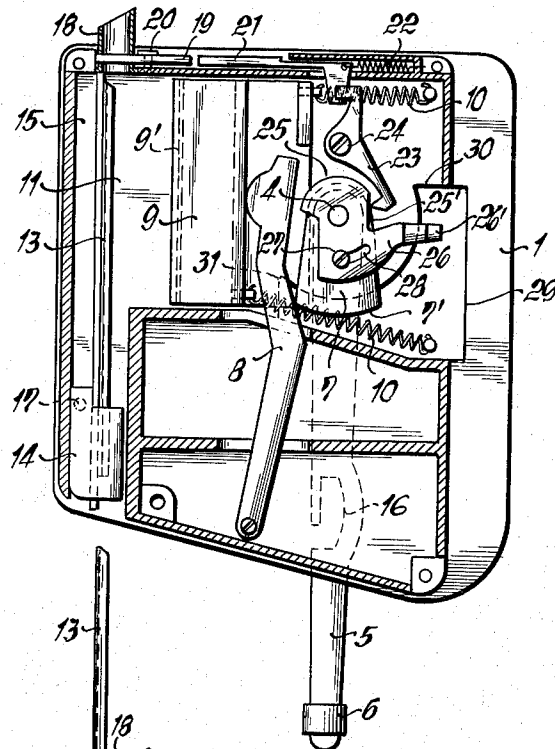


FIG. 3

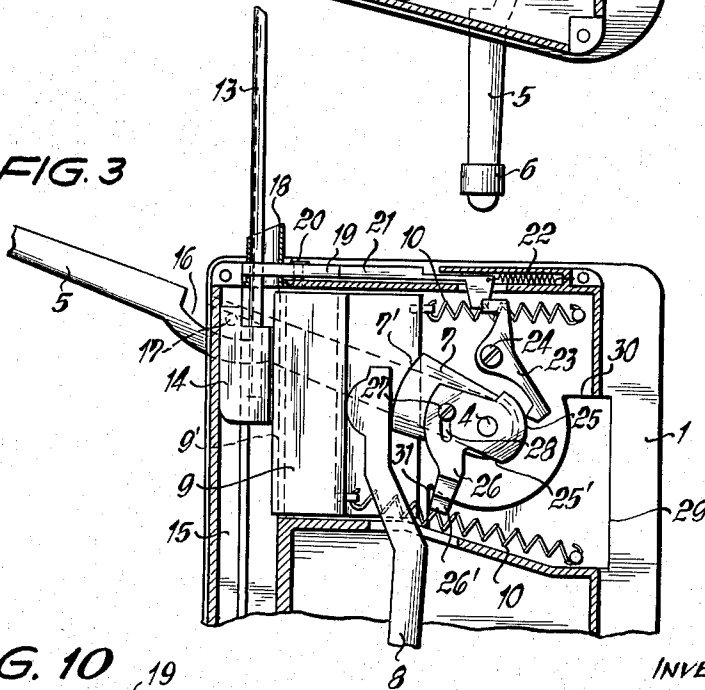
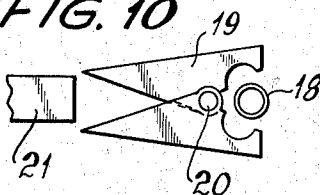


FIG. 10



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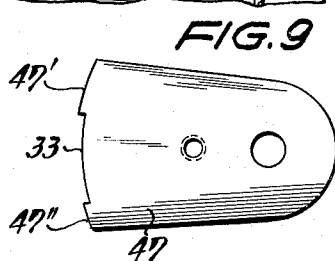
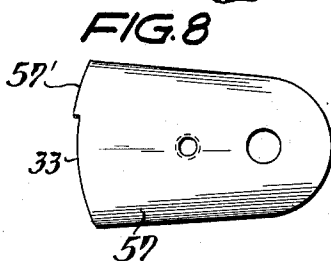
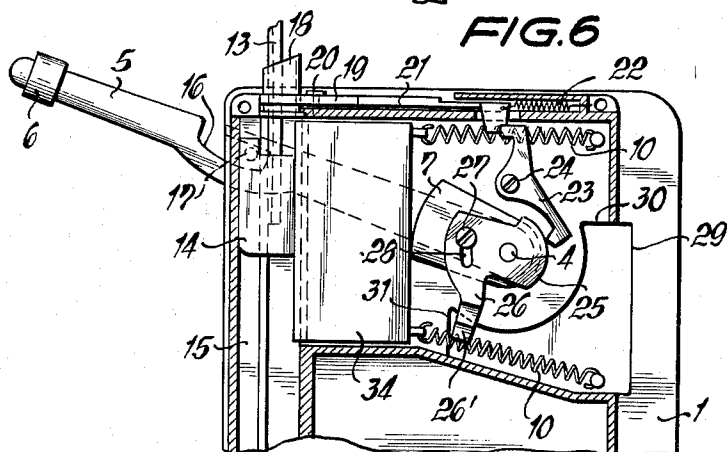
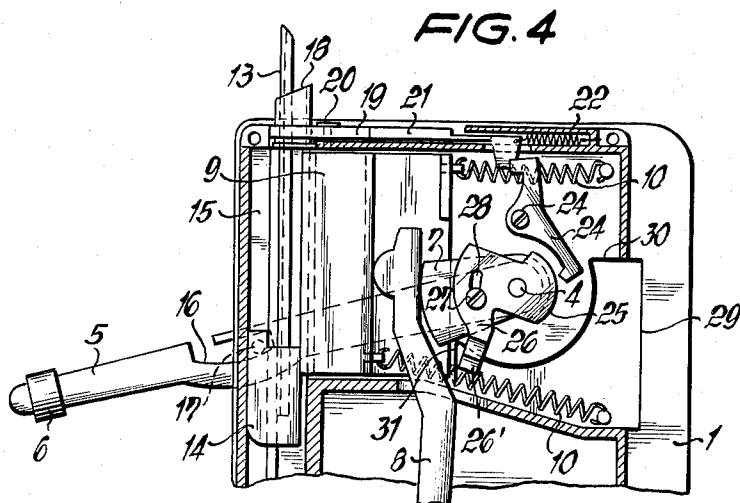
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3 Sheets-Sheet 3



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3,202,156

APPARATUS FOR FILLING PAPER CIGARETTE TUBES WITH TOBACCO

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E 24,208

10 Claims. (Cl. 131—70)

This invention relates to an apparatus for filling paper cigarette tubes with tobacco, wherein a cam disc acting directly or indirectly, for example through intermediate levers, on a press plate, and a tobacco slide are operated by an operating lever.

In apparatuses of this type it is already known to effect the movement of the press plate for compressing the tobacco by swinging an operating lever through a first part of an angle and to eject the compressed tobacco by means of the slide into the paper cigarette tube by movement of the lever over the remainder of said angle. In such arrangements it is found that only definite predetermined lengths of paper cigarette tubes can be filled, while tubes of different lengths are not utilisable because of the predetermined path of the slide for the operation of ejecting the tobacco.

The primary object of the invention is to adapt the filling operation to various lengths of cigarette tubes. This object is achieved by providing the cam disc with a stop which is joined fast but adjustably to the cam disc and which limits the movements of the tobacco slide by co-operation with stationary stop surfaces projecting into its path of movement. For this purpose the stop may be mounted rotatably on the driving shaft of the cam disc and be adjustable and fastenable with the aid of clamping means, for example clamp screws or the like, projecting through a slot-shaped aperture in the projection. It preferably cooperates with the stop surfaces through a finger formed on it and penetrating into a stationary aperture which is provided in the casing of the apparatus and the bounding surfaces of which form the stop surfaces.

Depending on the positions of the stop, the latter cooperates earlier or later with the stop surfaces. When the swinging angle of the cam disc and of the operating lever is varied the length of the column of tobacco ejected is adapted to the length of the paper cigarette tube.

In devices provided with clamp means for securing and releasing the paper cigarette tubes, the stop can be utilised for controlling said clamp means.

It is a further object of the invention to facilitate the ejection of the tobacco and to permit complete filling of the cigarette paper tubes. For this purpose the trailing curved portion of the cam disc which cooperates with the press plate can be provided with at least one recessed face portion, whereby the initially more powerful pressing operation is followed by premature relaxation of the press plate.

Preferred embodiments of the invention are illustrated by way of example in the accompanying drawing in which:

FIGURE 1 shows a perspective view of an apparatus, FIGURE 2 is a sectional plan view of the apparatus of FIG. 1 with the top portion of the casing removed and with the tobacco slide in the starting position.

FIGURE 3 shows a plan view similar to FIGURE 2 with the tobacco slide brought into the front end position,

FIGURE 4 is a plan view corresponding to FIGURE 2, with the tobacco slide in an intermediate position,

FIGURE 5 illustrates a section through the apparatus of FIG. 1 on the line V—V,

FIGURES 6 and 7 show further embodiments of the invention in sectional plan view,

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FIGURES 8 and 9 illustrate various cam discs for use with the devices of FIGS. 1 to 7 in plan view, and FIGURE 10 shows a detail of the apparatus of FIG. 1 in elevation.

The apparatus shown in FIGS. 1–5 has a bottom casing part 1 and an upper casing part 2 adapted to fit on to the lower part. The casing supports the operating elements of the apparatus. The lower part 1 of the casing is provided with a slot-shaped aperture 3 through which passes an operating lever 5. The lever 5 is fixed on a shaft 4 which is journaled in the casing. The end of the lever 5 which passes out of the aperture carries a rotatable handle 6. A cam disc 7 is made fast to the shaft 4 and the lever 5, and acts on a press plate 9 through a rockable intermediate lever 8. The press plate 9 is slidable in the bottom part 1 of the casing in the direction toward a tobacco magazine 11 against the action of springs 10 and at the end penetrating into the magazine is bounded by a surface 9' curved in the shape of an arc of a circle and adapted to the peripheral surface of the paper cigarette tube.

At its upper side the magazine 11 is provided with a filling aperture 12 which is aligned with an aperture 12' in the upper part 2 of the casing. The apertures 12 and 12' enable tobacco to be introduced into the magazine 11. A longitudinally slidable tongue 13 also projects into the magazine 11 and holds fast an ejecting slide 14 which is guided in a longitudinal slot 15 in the bottom part 1 of the casing. The slide 14 carries a driver pin 17 which projects into the aperture 3 and can be brought into operative connection with the operating lever 5. For this purpose the latter has a guide slot 16 in which the driver pin 17 engages when the operating lever 5 is swung accordingly.

On the side situated opposite the slide 14 in the showing of FIG. 2, a tube 18 is connected to the magazine 11. The cigarette tubes can be pushed on to the tube 18 and secured by means of clamp tongs 19. The tongs are rockable by means of a slide 21 about a stationary pin 20 mounted on the bottom part 1. The slide 21 is accommodated in a guide slot in the bottom part 1 of the casing and adapted to be moved longitudinally against the action of a spring 22 by a two-armed lever 23 which is rotatable at 24.

The rotational movements of the lever 23 are actuated by a cam 25 on a stop 26, which is adjustably attached to the cam disc 7. The stop 26 is movably mounted on the top end of the shaft 4 and connected to the cam disc 7 by a clamping screw 27 guided in a slot 28. The stop 26 is associated with a recess 29 which is provided in the bottom part 1 of the casing and extends over the swinging path of the cam disc 7. The walls 30, 31 of the recess 29 form the abutment surfaces for the stop 26 or an abutment finger 26' formed thereon and penetrating into the recess. An aperture 32 above the screw 27 in the upper part 2 of the casing permits the passage of a tool for loosening or tightening the screw 27. During the operation of the apparatus, the aperture 32 is closed by an insert 32', preferably of transparent material.

The operation of the apparatus will be described with initial reference to FIGURE 2. The operating lever 5, the cam disc 7, the press plate 9, and the slide 14 with its tongue 13 are in the starting position. The plane surface 25' of the stop 26 engages the lever 23, and the slide 21 is withdrawn by the spring 22 from the clamp tongs 19, so that the latter are opened by a non-illustrated spring and a paper cigarette tube can be placed on the tube 18 (see FIG. 10). After tobacco has been introduced through the apertures 12' and 12 into the magazine 11, the operating lever 5 is swung clockwise to bring the curved portion 7' of the cam disc 7 into contact with the intermediate lever 8, whereby the intermediate lever

pushes the press plate 9 toward the magazine 11, and the tobacco contained therein is compressed into a column, FIG. 4. At the same time the cam 25 rocks the lever 23, and the slide 21 closes the clamp tongs 19 about the paper cigarette tube on the tube 18.

After this first angular movement of the operating lever 5 into an intermediate position, it is further rocked to actuate ejection of the tobacco by the cooperation of the pin 17 and guide slot 16, FIG. 3. The slide 14 with the tongue 13 is moved by the operating lever toward the paper tube 18 and the column of tobacco contained in the magazine 11 is inserted through the tube 18 into the paper cigarette tube held on the latter. The operating lever 5 assumes the terminal position of maximum angular displacement from the starting position, as illustrated in FIGURE 3. In this position the slide 14 with the tongue 13 has been pushed out into the outer end position filling cigarette paper tubes of great length.

When the operating lever 5 is swung back, the slide 14 is first brought back until the pin 17 passes out of the guide slot 16 in the intermediate position of the lever 5, and thereupon, as the cam disc 7 and stop 26 are turned further back, with the assistance of the restoring force of the springs 10, the intermediate lever 8 and the press plate 9 are brought into their starting positions. At the same time, the return movement of the lever 23 enables the slide 21 to be brought back so that the clamp tongs 19 are opened and release the filled paper cigarette tube. If it is desired to fill paper cigarette tubes of shorter length, the screw 27 is loosened, and the stop 26 is swung toward the wall 31 (FIGURE 4) while the position of the cam disc 7 remains unchanged. After tightening of the screw 27, the stop 26 is again locked on the cam disc.

After a quantity of tobacco has been introduced into the magazine 11 and a paper cigarette tube placed on the tube 18, the operating lever 5 is turned in the previously described manner, the press plate 9 is moved in order to compress the tobacco, and through the subsequent cooperation of the operating lever 5 and pin 17 the slide 14 with the tongue 13 is moved in the direction of the tube 18 in order to eject the tobacco. This ejection operation is stopped when the finger 26' of the stop 26 bears against the wall 31 of the recess 29 (FIGURE 4). It is found that in dependence on the positions of the stop 26 and the cam disc 7 the swinging movements of the operating lever 5 are terminated earlier or later and thereby the slide 14 with its tongue 13 is moved farther or less far in the direction of the paper cigarette tube. The tobacco is not excessively compressed when it is pressed into paper cigarette tubes of shorter length, nor is it left loose in paper cigarette tubes of great length.

The cam disc illustrated in FIGURES 2 to 5 may be replaced by cam discs which are stepped in the manner illustrated in FIGURES 8 and 9. In the cam 57 illustrated as an example in FIGURE 8 the operative curved portion 57' is provided with a shoulder 33 extending over trailing portion (in the direction of pressing), whereby towards the end of the ejection movement the pressure is released in order to facilitate the ejection and complete filling of the paper cigarette tubes with tobacco. If on the other hand a cam disc 47 of the type illustrated in FIGURE 9 is used, after full pressure is exerted at the beginning by a curved cam portion 47', there is a temporary relaxing of pressure over the region of the shoulder 33, while the major portion of the tobacco column is ejected into the paper cigarette tube, and towards the end of the ejection movement the pressure for the remainder of the tobacco is increased again over the region of the curved portion 47'', in order to fill a tube of greater length uniformly.

The movable parts of the apparatus, such as the cam disc 7, stop 26, intermediate lever 8, press plate 9, lever 23, slide 21, and clamp tongs 19 or slide 14 are made of synthetic plastic in the embodiments illustrated.

FIGURE 6 shows an apparatus in which the cam disc 7 acts directly on a press plate 34 in a known manner. The cam disc 7 is provided with a curved portion 7' of the type illustrated in FIGURES 1 to 5, but may also have a curved portion of the type illustrated in FIGURES 8 and 9. It carries a fixed but adjustable stop 26 which abuts against the stationary walls 30, 31 to terminate the rocking movements of the operating lever 5 earlier or later and to permit the uniform filling of paper cigarette tubes of different lengths.

The further embodiment illustrated in FIGURE 7 shows a stop 126 for a cam disc. In this embodiment the sliding movements of the press plate 37 mounted in a guide 36 on the bottom part 35 are actuated by means of a link or parallelogram linkage 38 which is operated through a pin 38' and a cam slot 39 on the disc 40. The driving shaft 41 of the disc 40 is connected to an operating lever (not illustrated) and through links 42, 43 acts on a tobacco slide 44 having a tongue 45 which passes through the paper receiving tube 46 during the ejection operation. The stop 126 is loosely mounted on the driving shaft 41 and is adjustably fastened to the disc 40 by means of a clamping screw 27 and shiftable in a slot 28. A finger 26' on the stop 126 engages a recess 29 whose walls 30, 31 stop the finger 26'. Depending on the position of the stop 126, the finger 26' abuts against the walls 30, 31 after movement of the operating lever through a smaller or larger angle for filling shorter or longer paper cigarette tubes.

We claim:

1. Apparatus for filling cigarette tubes with tobacco comprising, in combination:

- (a) a support member;
- (b) an operating member mounted on said support member for movement relative to said support member in a path between a starting position, an intermediate position, and a terminal position, said intermediate position being oppositely spaced from said starting and terminal positions;
- (c) cooperating abutment means on said members for arresting movement of said operating member in said terminal position;
- (d) fastening means for releasably fastening one of said abutment means to a corresponding one of said members in a plurality of positions spaced from each other in the direction of said path and for thereby varying the spacing between said intermediate and terminal positions;
- (e) pressure means movable on said support member for compressing an amount of tobacco into a column;
- (f) holding means on said support member for holding a cigarette tube;
- (g) ejecting means movable on said support member for ejecting said column into a cigarette tube held by said holding means;
- (h) first motion transmitting means interposed between said operating member and said pressure means for moving said pressure means over a fixed distance while said operating member moves from said starting position to said intermediate position; and
- (i) second motion transmitting means interposed between said operating member and said ejecting means for moving said ejecting means while said operating member moves from said intermediate position to said terminal position, and for thereby ejecting said column over a distance which is a direct function of the spacing of said intermediate and terminal positions.

2. Apparatus as set forth in claim 1, wherein said holding means are movable on said support member between a cigarette tube holding position and a cigarette tube releasing position, the apparatus further comprising third motion transmitting means interposed between said operating member and said holding means for moving the holding means between said positions thereof when said

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operating member is moved between said starting position and said terminal position.

3. Apparatus as set forth in claim 1, wherein said support member includes a casing portion normally enclosing said abutment means, said fastening means, and at least a portion of said operating member, said casing portion being formed with an opening therein for access to said fastening means.

4. Apparatus as set forth in claim 3, further comprising insert means releasably received in said opening for closing the same.

5. Apparatus as set forth in claim 1, wherein said operating member is mounted on said support member for angular movement about an axis, one of said motion transmitting means include a cam member operatively connected to said operating member for joint angular movement about said axis, and said one abutment means include an abutment member releasably fastened to said cam member by said fastening means, said plurality of positions of said one abutment means being angularly spaced about said axis.

6. Apparatus as set forth in claim 5, wherein said cam member and said abutment member constitute a pair of members, one member of said pair being formed with an elongated arcuate slot about said axis, and said fastening means include a clamping member engaging said slot for longitudinal movement therein and movable on the other member of said pair toward and away from a position in which said clamping member engages said one member of said pair for fastening the same to said other member.

7. Apparatus as set forth in claim 5, wherein said support member is formed with a recess, said abutment member being movable in said recess, and a face of said support member in said recess constituting the other abutment means cooperating with said one abutment means.

8. Apparatus as set forth in claim 5, wherein said abutment member has a cam face, and said holding means are

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movable between a cigarette tube holding position and a cigarette tube releasing position, the apparatus further comprising third motion transmitting means interposed between the cam face of said abutment member and said holding means for moving the holding means between said positions thereof when said operating member is moved between said starting position and said terminal position.

9. Apparatus as set forth in claim 5, wherein said one motion transmitting means is said first motion transmitting means, and said cam member has two arcuate face portions about said axes, said face portions being circumferentially consecutive and the spacing of one of said face portions from said axis being smaller than the spacing of the other face portion from said axis, said pressure means sequentially engaging said face portions during said angular movement of said cam member.

10. Apparatus as set forth in claim 5, wherein said one motion transmitting means is said first motion transmitting means, and said cam member has three circumferentially consecutive face portions, said face portions being arcuate about said axis, one of said face portions being circumferentially interposed between the other two face portions, and the spacing of said one face portion from said axis being smaller than the corresponding spacings of said other face portions, said pressure means sequentially engaging said face portions during said angular movement of said cam member.

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