(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 053 712 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.11.2000 Bulletin 2000/47

(51) Int. Cl.[7]: **A47K 10/28**

(21) Application number: **99830313.5**

(22) Date of filing: **21.05.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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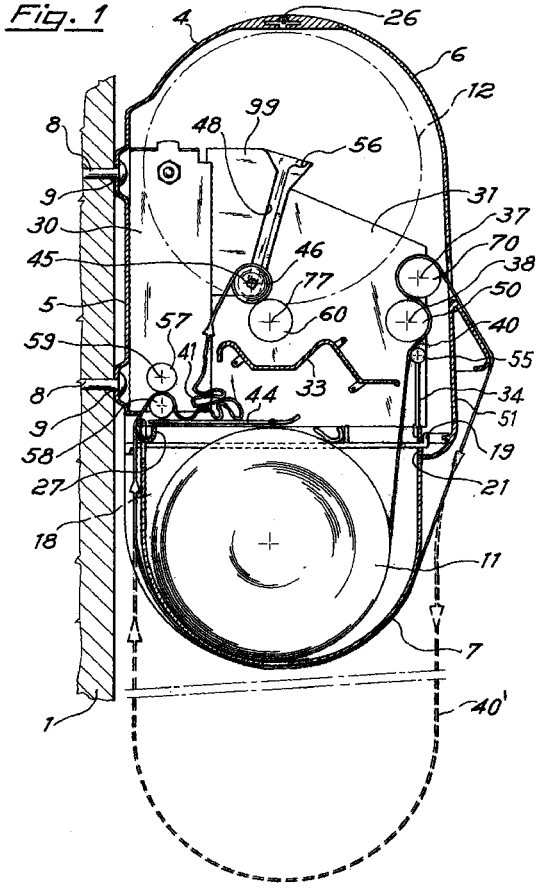
(54) Towel dispenser for a continuous band

(57) A towel dispenser for a continuous band (40) includes a cabinet containing a frame (30) formed by two parallel walls (31, 32) between which there are pivoted a drive roller (50) rotatable around an axis (38) due to the friction of the band (40) being unwound by the user's pull, a roller (60) for winding up the soiled band (40) onto a second roll (46) through a kinematic connection with said drive roller (50), a roller (57) for taking up the soiled band (40) within the cabinet through a kinematic connection with an energy accumulator charged by the winding roller (60), an idle roller (70) arranged above the drive roller (50) and pivoted between two plates which are in turn pivoted on the walls (31, 32) so as to oscillate forward under the pulling action exerted by the user on the band (40), as well as a ratchet gear mobile between a rest position wherein the energy accumulator is free and an engagement position wherein the energy accumulator is charged by the rotation of the winding roller (60). The engagement position is reached due to the above-cited forward oscillation of the plates and is maintained for a certain time after the ceasing of the user's pulling action thanks to a pair of suction cups which delay the return of the multiple lever ratchet gear to the rest position and the subsequent release of the energy accumulated by the accumulator which drives the take-up roller (57) so as to take up the soiled band within the cabinet, the length remaining outside being pulled close to the lower surface of the cabinet whereby the soiled band is not visible and the next user does not have the tendency to wipe his hands in the exposed soiled band rather than pulling out a clean portion thereof.

Fig. 1



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Description

[0001] The present invention relates to a continuous band towel dispenser, i.e. an apparatus suitable to make accessible on the outside of a cabinet a portion of a band of material (cloth or the like) coming from a feed roll to be used as a towel, an equal length of soiled material being simultaneously taken up and wound onto a second roll also housed within the cabinet, which is mounted on a wall.

[0002] This kind of apparatus has been known and used since some time in order to provide the toilets of communities and public places with conventional towels, i.e. cloth towels, while simultaneously meeting the opposite requirements of assuring to each user the individual availability of a hygienically perfect towel and preventing the removal or improper use of the material.

[0003] An example of such a dispenser is disclosed in the European patent application n.59893 in the name of the same applicant, wherein an energy accumulator is progressively charged at each use of the apparatus so that upon exhaustion of the material the accumulated energy charge allows the taking up of the final portion of the band, thus avoiding to leave it on the outside of the apparatus.

[0004] Other examples of this type of dispenser are found in the US patents n.3.323.848 and n.3.893.738, wherein the accumulator not only provides the taking up of the final band portion when the roll of material runs out, but at each dispensing operation it allows to take up a portion of the soiled band so as to pull it close to the lower surface of the dispenser. This partial taking up at each dispensing operation is advantageous both for aesthetic and hygienic reasons, in that the soiled band is not visible and the next user does not have the tendency to wipe his hands with the exposed soiled band rather than pulling out a clean portion.

[0005] However, these prior art dispensers have the drawback of presenting rather complicated mechanisms for carrying out said functions, with subsequent disadvantages as to costs and reliability.

[0006] The object of the present invention is to provide a dispenser which carries out the same functions but with simplified and improved mechanisms suitable to achieve a more reliable operation and a cheaper structure.

[0007] This object is achieved by means of a dispenser having the characteristics disclosed in claim 1. Other advantageous features are disclosed in the dependent claims.

[0008] These and other advantages and characteristics of the dispenser according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig. 1 is a diagrammatic sectional view along the vertical mid-plane of the dispenser, showing the path of the band of material upon the dispensing and between an operating cycle and the next one;

Fig.2 is a diagrammatic top plan view of the main mechanisms for winding and taking up the band, wherein some members have been omitted for simplicity;

Fig.3 is a sectional view taken along line III-III of fig.2, showing the phase wherein the user is unwinding the band to use it;

Fig.4 is a partial enlarged view similar to the preceding view and showing the rest state between an operating cycle and the next one;

Fig.5 is a diagrammatic side view from the left showing the kinematic connection between the drive roller which feeds the band and the wind-up roller which winds it up on the soiled material roll;

Fig.6 is a diagrammatic side view from the right showing the kinematic connection between the energy accumulator and the take-up roller which takes up the band inside the apparatus, said view illustrating the rest state between an operating cycle and the next one;

Fig.7 is a view similar to the preceding one but illustrating the charging phase of the energy accumulator during the pulling out of clean band by the user.

[0009] Referring to fig.1 there is seen that the general structure of the present dispenser includes a cabinet, preferably of plastic material, consisting of three members: a base plate 5, provided with holes 9 for the mounting onto a wall 1 through screws 8 or the like, and two covers 6 and 7 hinged to the base plate 5. These three members together define a lower chamber, which houses a roll 11 of band material to be dispensed, and an upper chamber wherein the band material is taken up and wound to form an upper roll 12 of soiled material.

[0010] It should be noted that the situation illustrated in fig. 1 describes an initial state where the roll 1 of material practically has the largest extension, while the upper roll 12 is drawn in dotted line in that the two rolls 11 and 12 do not coexist with the largest size at the same time and just a short length of the band material 40, coming out through the front of the cabinet and re-entering therein in the back, forms a much smaller roll 46 of taken up material. Upon exhaustion of the roll 11 almost all the band material will be wound up to form the upper roll 12 while the lower chamber will be empty.

[0011] A metal frame 30 is arranged between these two chambers, in order to act as a support for the mechanisms and as a reinforcement for the base plate 5. The base plate 5 is provided with two projecting sidewalls (not shown for simplicity) having two parallel guides 18 ending at the forward end with two teeth 19 suitable to engage corresponding slots 21 provided at the forward edge of the lower cover 7. A lock or the like, not shown, provides the locking of the parts. The rear ends 27 of the lower cover 7 are slideably and rotatably mobile within guides 18, so as to allow the pivoting opening of

the lower cover for the introduction of roll 11.

[0012] The forward edge of cover 7 is provided with two brackets 34, arranged at a distance shorter than the cover width, between which there is pivoted a small rubberized roller 55 suitable to correctly position the material band 40 unwinding from roll 11 and having the function of positioning and pressing band 40 against a drive roller 50 which has a rough or knurled external surface and whose axis is fixed. On the outside of said forward edge of cover 7 there is also mounted a spacer 51 having a substantially P-shaped vertical section and extending upto roller 50.

[0013] The band 40, when unwound from roll 11, enters from the rear in the space between the rubberized roller 55 and roller 50, then winds around an overlying mobile-axis idle roller 70 and then comes out on the front of the cabinet through a slot defined between a recess in the upper cover 6 and spacer 51. From this point onwards, the portion of band 40 which is outside the cabinet can be used as a towel when the user exerts a pull on the band so as to form a lower loop (in broken line), whereas the band is close to the lower cover 7 between a utilization and the next one.

[0014] Thereafter, band 40 re-enters the cabinet through a rear slot close to which there are provided two take-up rollers 57 and 58, wherein the upper roller 57 is mounted on the metal frame 30 and roller 58 is mounted at the rear end of an oscillating shelf 44 pivoted onto frame 30. When the lower cover 7 takes the closed position shown in fig.1, shelf 44 is maintained horizontal by the rear end 27 thereof and roller 58 is arranged adjacent to roller 57 so as to nip band 40.

[0015] The band 40 is then wound on a core 45 mobile along guides 48 so as to receive roll 46 of progressively increasing diameter which is formed during the use. The winding up of roll 46 is produced by a roller 60 with a rough or knurled surface, mounted on frame 30, which frictionally engages the surface of the overlying roll 46 and is driven into rotation by roller 50. At the end of the two guides 48 there are provided two eave seats (one on each side) to receive the ends of core 45 so as to make easier the removal of the wound-up roll 12.

[0016] It should be noted that during the loading of the apparatus, after having introduced roll 11 in the lower cover 7 and passed band 40 between the rubberized roller 55 and rollers 50, 57, 58, 70, as well as prior to winding said band around the mobile core 45, it is necessary to leave a suitable "compensation" length (buffer) 40' outside the dispenser.

[0017] Fig.2 shows a top plan view of the apparatus frame with the main mechanisms, various members having been omitted for the sake of clarity. The metal frame 30 includes two parallel sidewalls 31 and 32 between which there are mounted the above-mentioned rollers 50, 57, 60, said walls being transversely connected by a shaped plate 33 located below rollers 50, 60 (fig.1). Furthermore, on the outside of said sidewalls there are mounted the driving mechanism (on the left side outside wall 31) and the mechanism for taking up band 40 (on the right side outside wall 32).

[0018] As already mentioned, the drive roller 50 has a rough external surface in order to engage the cotton cloth of the band to be used as a towel, and its axis 38 is pivoted between walls 31 and 32. Also between the walls there is arranged roller 70 which is made up of a plurality of small rollers 63 mounted on a common axis 37 and mutually spaced so as to distribute more evenly the pulling stress exerted on band 40. The axis 37 is movably mounted between two small plates 305 and 306, acting as levers, which are in turn pivoted onto the walls 31 and 32 at axis 38. These small rollers are preferably provided with smaller collars 64 so as to form recesses 67, and a curved sheet 181 also pivoted between walls 31 and 32 (in 188, fig.3) abuts thereon.

[0019] The roller 60 is similar to roller 50, i.e. has a rough external surface to engage the band of material, and is also kinematically connected with roller 50 in order to be driven. On the contrary, core 45 is free to rotate in guides 48, preferably formed on plastic insertions 99, and to shift therealong as the roll 46 of wound-up material increases in diameter. In fig.2 there are also shown rollers 57 and 58, with the former made up of a plurality of small rollers mounted on a common shaft 59, the end rollers being preferably made of knurled rubber and the central rollers having a rough external surface.

[0020] The metal plates 305 and 306 are pivoted, as mentioned above, on the axis 38 of the drive roller 50 on the inside of walls 31 and 32. As shown in figs.3 and 4, these plates are provided with shaped slots 318 in which the ends of axis 37 of roller 70 are mobile, and they have an identical structure. In particular, they are provided with lower transverse pegs 91, 92 and rear transverse pegs 173, 183 (see also fig.6).

[0021] Referring now to figs.1, 3 and 5, the mechanism for driving and winding up the band will be illustrated. More precisely, fig.5 shows the members arranged on the outside of wall 31 whereas fig.3 illustrates only the members arranged on the inside of wall 31 which was partially cut away to this purpose.

[0022] With particular reference to fig.5, it can be seen that on axis 38 of roller 50 there is provided a first toothed wheel 110 on which a counter-reverse spring 120 (hooked at the bottom to wall 31) is wound so as to prevent its reverse clockwise rotation. The toothed wheel 110 engages a second toothed wheel 105 of greater diameter pivoted onto wall 31 and engaging in turn a third toothed wheel 130 keyed onto axis 77 or roller 60 which provides the winding of the taken-up band.

[0023] Figs.3 and 4 show the members located just behind wall 31, among which plate 305 provided with the curved slot 318 in which axis 37 of the idle roller 70 is mobile. At the lower end of plate 305 there is provided a stop peg 91 suitable to abut against the sides of a horizontally extending rectangular window 81 formed in the

wall 31 under roller 50. Moreover, a rear extension 178 of plate 305 provides a connection to plate 31 through a spring 170 whose upper end is secured to peg 173 while the lower end is hooked to wall 31 at a seat 174. The spring 170 itself is arranged in second vertically extending rectangular window 175 formed in wall 31 to the rear of the first window 81.

[0024] The plate 305 is intended to move in synchronism with the identical plate 306 arranged on wall 32 which has a structure identical to that of wall 31. The rest position of the plates 305 and 306 is defined by the action of the return spring 170 and by the abutment of pegs 91 and 92 against the outer sides of windows 81 and 82 respectively (figs.4 and 6).

[0025] Fig.6 diagrammatically illustrates the energy accumulator 150 mounted on the outside of wall 32 and the multiple lever 190 controlling it. This lever 190 is pivoted at 192 and has a rear arm whose end 197 is suitable to abut against stop surfaces 198 of the accumulator 150 during the charging. A front arm 193 is arranged at an opposite position and acts as an integral return spring by abutting against the base of wall 32, so as to keep the end 197 disengaged from the stop surfaces 198 thus allowing the rotation in the direction indicated by arrow Z.

[0026] The rotation of lever 190 is controlled through an upper curved arm 195 extending upwards and passing before a vertical window 185 formed in wall 32 (corresponding to window 175 in wall 31) through which it is engaged by peg 183 of plate 306 (not shown). At the end of arm 195 there is mounted a first suction cup 201 facing forward which is positioned to couple with a second suction cup 203 secured onto wall 32 and facing backward. The function of the pair of suction cups 201, 203 is that of remaining coupled for a certain time so as to keep lever 190 in the rotated position, as it will be better explained further on. A more detailed description of the structure and operation of these known suction cups can be found in the above-mentioned US patents.

[0027] The mechanism is substantially a ratchet gear used to block the rotation in the direction of arrow Z in order to charge the accumulator during the winding up of roll 46, since axis 77 of the winding roller 60 is the same axis of the accumulator. The accumulator is not described in detail in that it is known, e.g. from the above-cited European and US patents. On the periphery of the accumulator there is formed a toothed profile 155 engaging a first toothed wheel 160 mounted on wall 32. The toothed wheel 160 engages in turn a second toothed wheel 157 keyed onto shaft 59 of roller 57 and projecting through wall 32.

[0028] After having completed the positioning of band 40 and having closed the apparatus, the latter is made ready for operation by exerting a pull on band 40 which is in the state of fig.1. In particular, the user can not wipe his hands in the length of band 40 already soiled and pulled close to the lower cover 7, so that he is forced to grip the front portion of band 40 (in the space between spacer 51 and cover 7) in order to pull out from the apparatus cabinet a length of clean band which will form a lower loop, illustrated in broken line in fig.1.

[0029] The state reached by the mechanisms during the unwinding of the band is illustrated in figs.3 and 7. Due to the pull exerted by the user on the band 40, the mobile roller 70 moves forward thus causing the forward inclination of plates 305 and 306 until pegs 91 and 92 abut against the inner side of windows 81 and 82 with subsequent stopping of the rotation of the plates.

[0030] In this condition, peg 183 has risen from the position of fig.6 to the position of fig.7 and during said movement has caused a counter-clockwise rotation of lever 190 by acting on a convex profile 196 formed on the rear side of arm 195. This rotation has taken end 197 into engagement with one of the stop surfaces 198, thus blocking the rotation of the outer case of the accumulator 150.

[0031] This blocked state implies that while the drive roller 50 rotates upon passage of band 40, the winding roller 60 is also rotated through the toothed wheels 110, 105 and 130 and in turn charges accumulator 150 through its axis 77. It should be noted that the presence of the "buffer" length 41, which in this phase is wound up on roll 46, allows the formation of the lower loop where the user can conveniently wipe his hands, otherwise the simultaneous winding up of band 40 by roller 60 would make its use impossible since it would remain close to the lower cover 7.

[0032] When the user stops pulling on band 40 the system, after a delay defined by suction cups 201 and 203, returns to the position shown in fig.6 where the accumulator 150 can release the accumulated energy. As a consequence, the toothed profile 155 rotates in the direction of arrow Z thus taking into rotation the toothed wheel 160 and the toothed wheel 157 which in turn rotates roller 57. In this way, the length of band 40 hanging below the cabinet is taken up therein and forms the "buffer" length 41 for the next operating cycle, the length remaining outside being pulled close to the lower cover 7.

[0033] When roll 11 runs out, the end portion of the band is then taken up inside the apparatus without winding it on roll 12 already formed. This allows to avoid possible operating irregularities whenever the band is wound in an incorrect way since the taking up of the end portion of the band takes place without winding it on roll 12 but merely by storing it on the underlying shelf 44.

[0034] It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, the exact shape of the multiple lever 190 may be somewhat changed as long as its rotation is controlled by the pull on band 40, and the same applies to the oscillating plates 305, 306.

Claims

1. Towel dispenser for a continuous band (40) unwinding from a first roll (11) housed in a lower chamber of a cabinet containing two sidewalls (31, 32) between which there are pivoted a drive roller (50) rotatable around an axis (38) due to the friction of the band (40) being unwound by the user's pull, a roller (60) for winding up the soiled band (40) onto a second roll (46) through a kinematic connection (110, 105, 130) with said drive roller (50), and a roller (57) for taking up the soiled band (40) within the cabinet through a kinematic connection (155, 160, 157) with an energy accumulator device (150) mounted on one of said sidewalls (31, 32) and charged by said winding roller (60), characterized in that it further includes an idle roller (70) arranged above the drive roller (50) and pivoted between two plates (305, 306) which are in turn pivoted on the sidewalls (31, 32) so as to oscillate forward under the pulling action exerted by the user on the band (40), as well as a multiple lever (190) pivoted (192) adjacent to the energy accumulator (150) and suitable to act as a ratchet gear in combination with peripheral stop surfaces (198) of the accumulator (150), said multiple lever (190) rotating between a rest position wherein the accumulator (150) is free and an engagement position wherein the accumulator (150) is charged by the rotation of the winding roller (60), said engagement position being reached due to the above-cited forward oscillation of said plates (305, 306) transmitted to the lever (190) through a peg (183) integral with one of the plates (306) and being maintained for a certain time after the ceasing of the user's pulling action thanks to delaying means (201, 203) which delay the return of the multiple lever (190) to the rest position and the subsequent release of the energy accumulated by the accumulator (150).

2. Towel dispenser for a continuous band according to claim 1, characterized in that the multiple lever (190) includes a rear arm whose end (197) is suitable to abut against the stop surfaces (198) of the accumulator (150), a front arm (193) arranged at an opposite position and suitable to act as an integral return spring by abutting against the base of the sidewall (32) so as to keep said end (197) disengaged from said stop surfaces (198), and an upper curved arm (195) extending upwards and passing before a vertical window (185) formed in the sidewall (32) through which it is engaged by the peg (183) of the plate (306) along a convex profile (196) formed on the rear side of said upper arm (195).

3. Towel dispenser for a continuous band according to claim 2, characterized in that the delay means consist of a pair of suction cups (201, 203) where a first suction cup (201) facing forward is mounted at the end of the upper arm (195) and positioned to couple with a second suction cup (203) secured onto the sidewall (32) and facing backward.

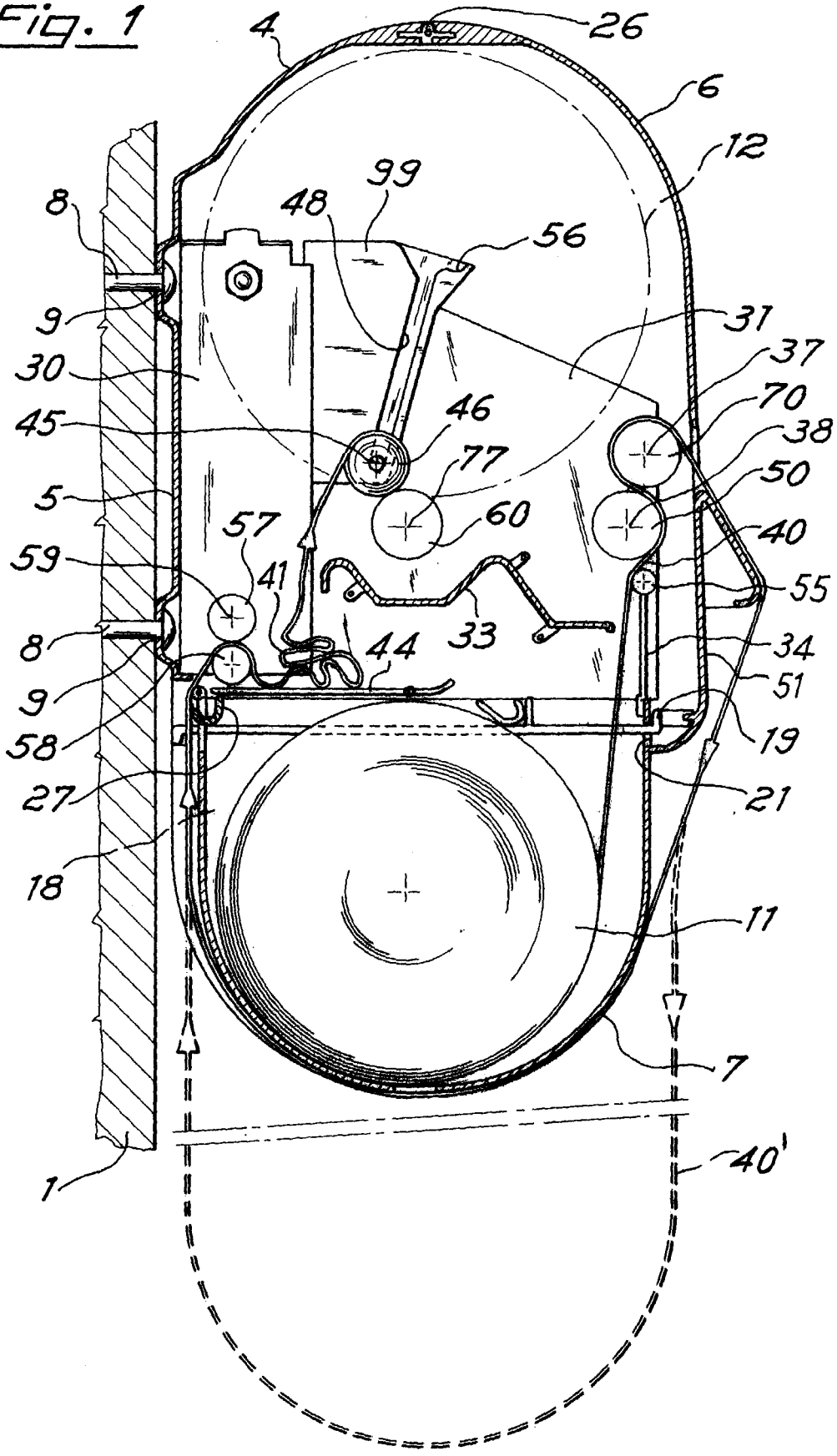
4. Towel dispenser for a continuous band according to one or more of the preceding claims, characterized in that it further includes an oscillating shelf (44) pivoted between the sidewalls (31, 32) and carrying at its rear end a roller (58), said shelf (44) being maintained in a horizontal position by the rear end (27) of a lower cover (7) of the cabinet whereby the roller (58) is positioned adjacent to the take-up roller (57) so as to nip the band (40).

5. Towel dispenser for a continuous band according to one or more of the preceding claims, characterized in that the kinematic connection between the winding roller (60) and the drive roller (50) is carried out through a first toothed wheel (110) mounted on the axis (38) of said drive roller (50) and engaging a second toothed wheel (105) of greater diameter pivoted on the sidewall (31) which in turn engages a third toothed wheel (130) keyed onto the axis (77) of the winding roller (60), the reverse rotation of the drive roller (50) being prevented by a counter-reverse spring (120).

6. Towel dispenser for a continuous band according to one or more of the preceding claims, characterized in that the kinematic connection between the take-up roller (57) and the energy accumulator (150) is carried out through a peripheral toothed profile (155) of said energy accumulator (150) which engages a first toothed wheel (160) pivoted on the sidewall (32) and engaging in turn a second toothed wheel (157) keyed onto the shaft (59) of the take-up roller (57).

7. Towel dispenser for a continuous band according to one or more of the preceding claims, characterized in that the drive roller (50), the take-up roller (57) and the winding roller (60) have a surface at least partially rough.

Fig. 1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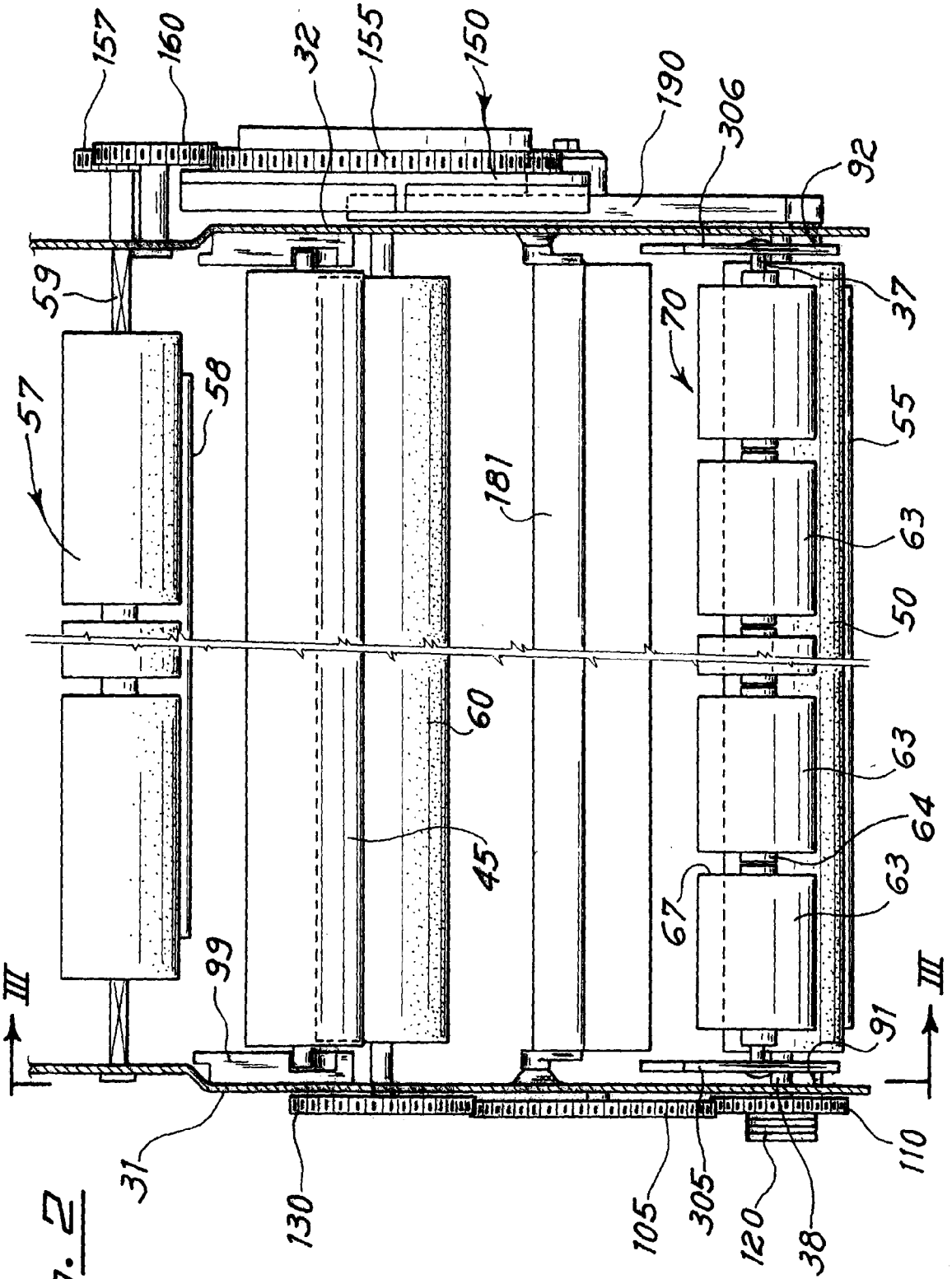
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Fig. 2

Fig. 3

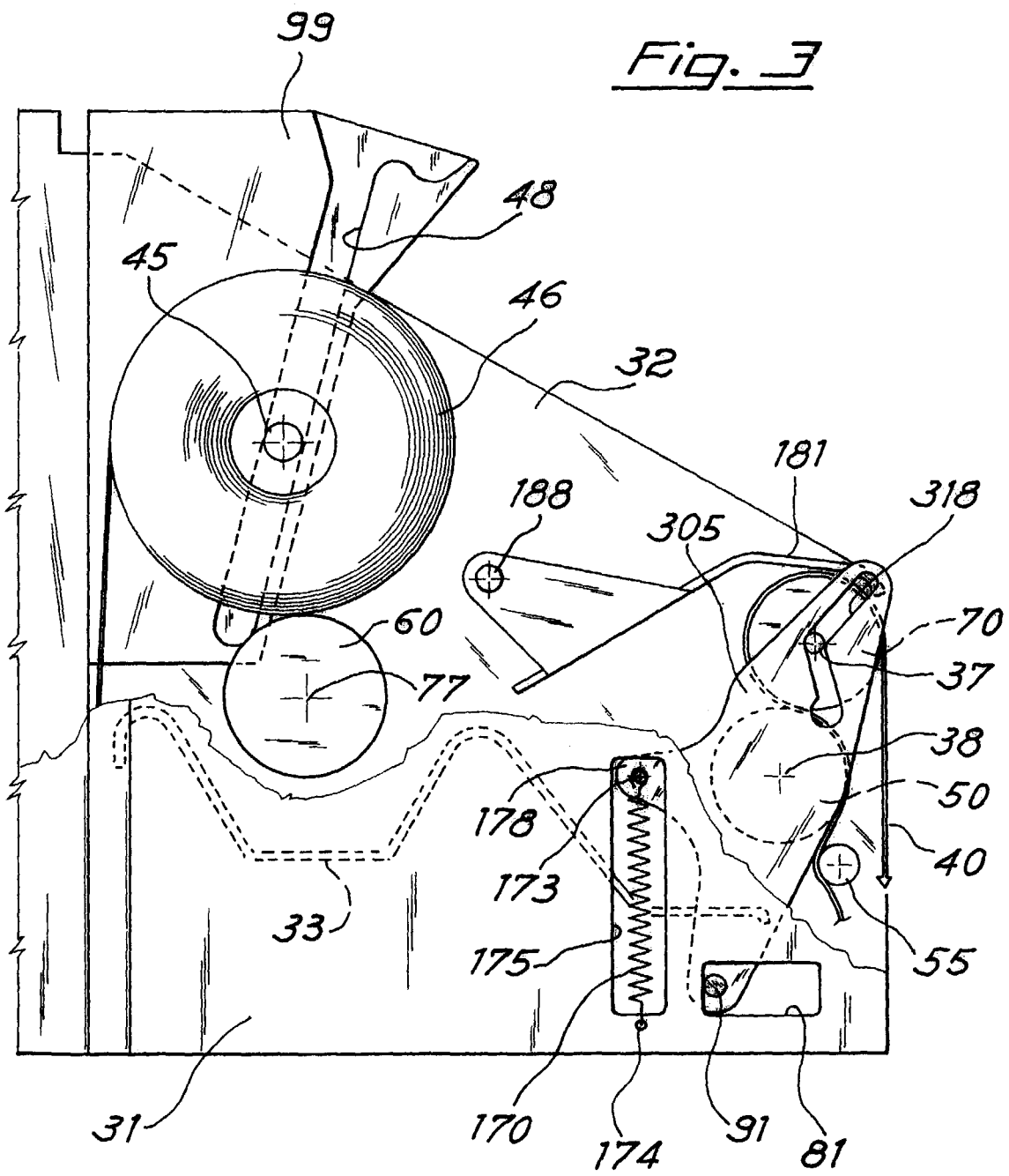
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Fig. 4

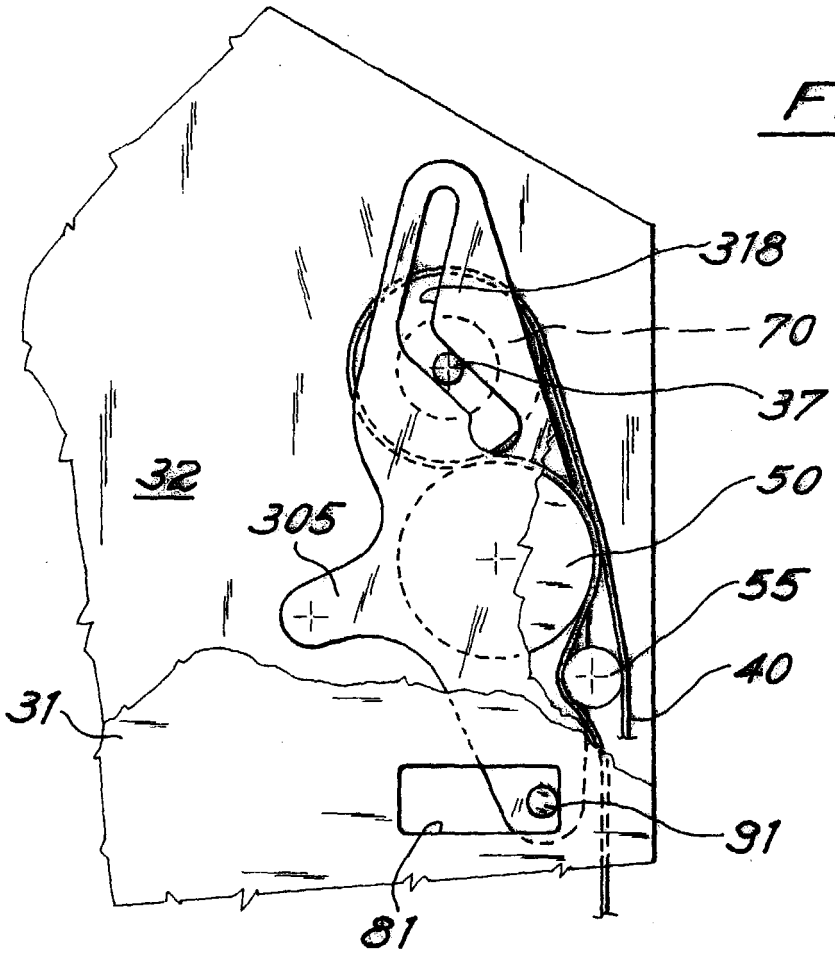

Fig. 5

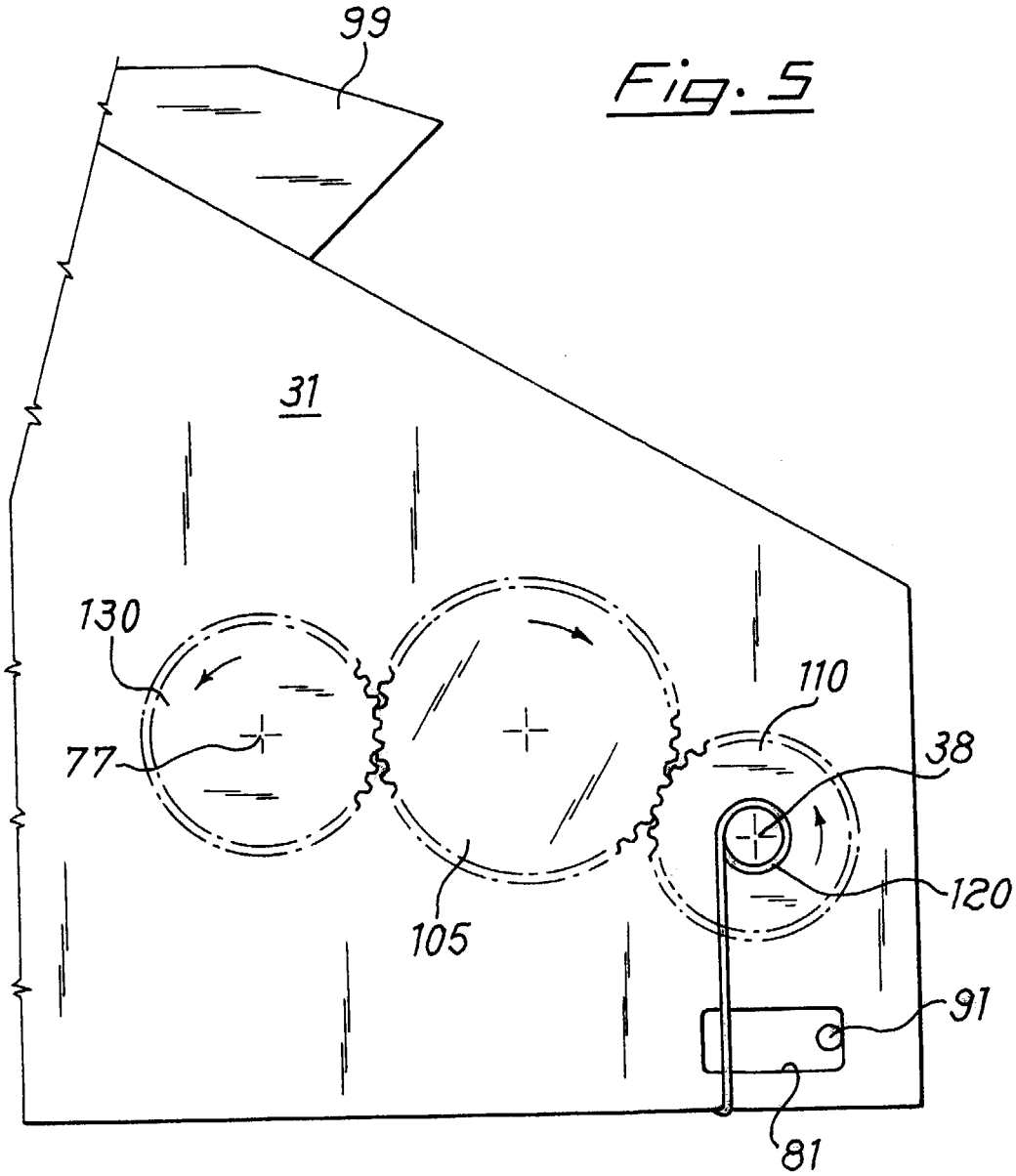

Fig. 6

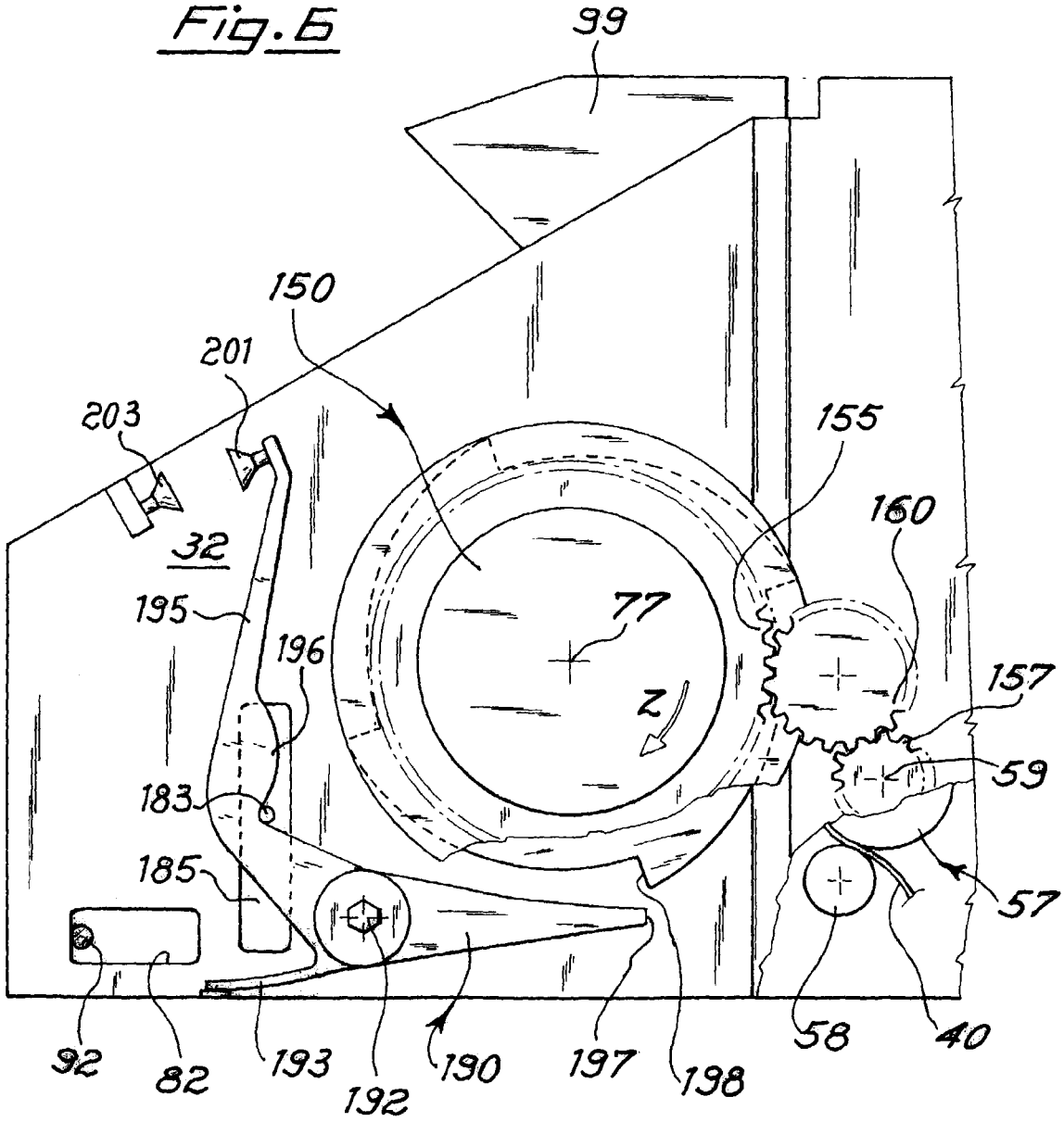
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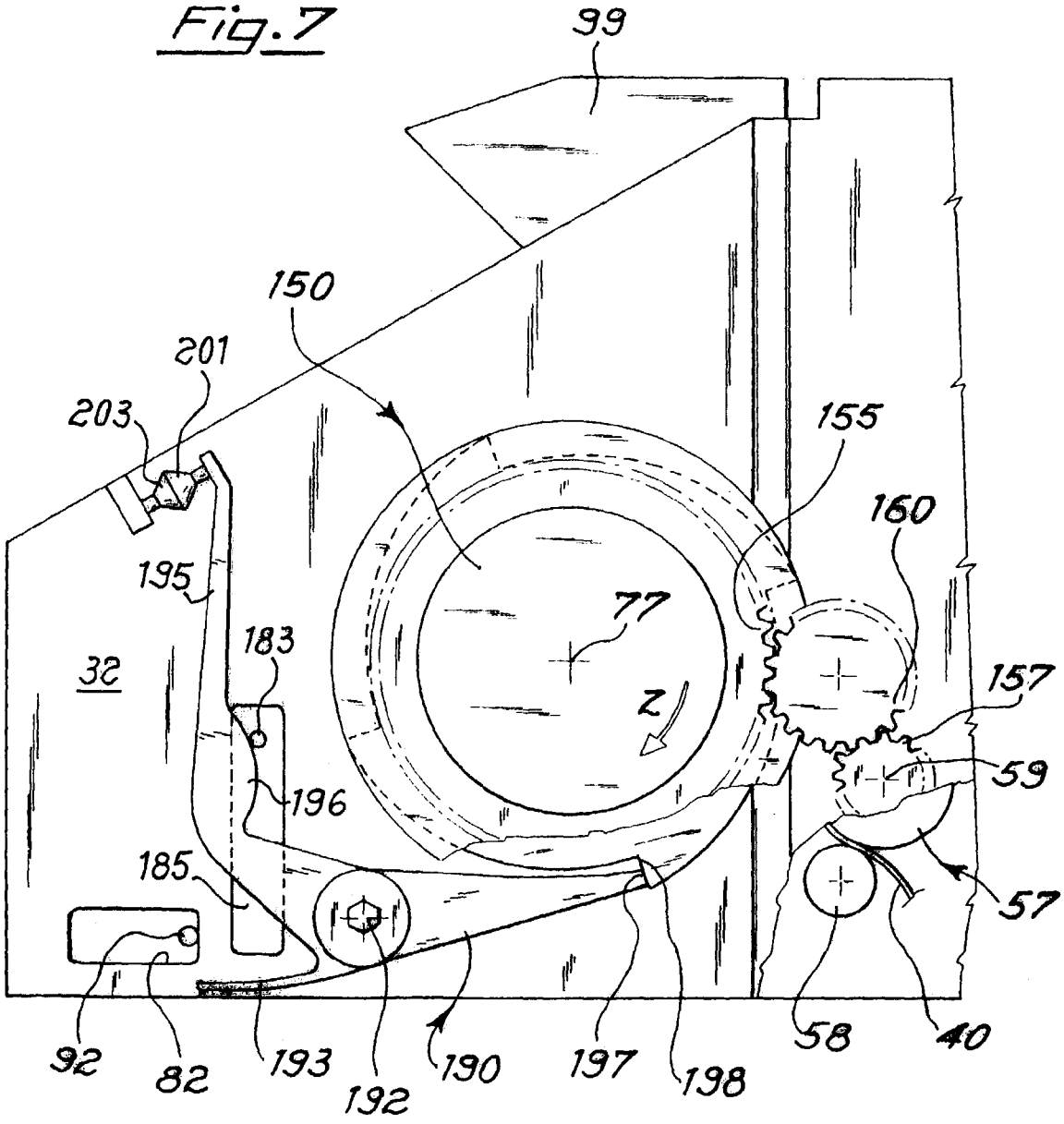
Fig.7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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0313

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 October 1999	Vrugt, S

CATEGORY OF CITED DOCUMENTS

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