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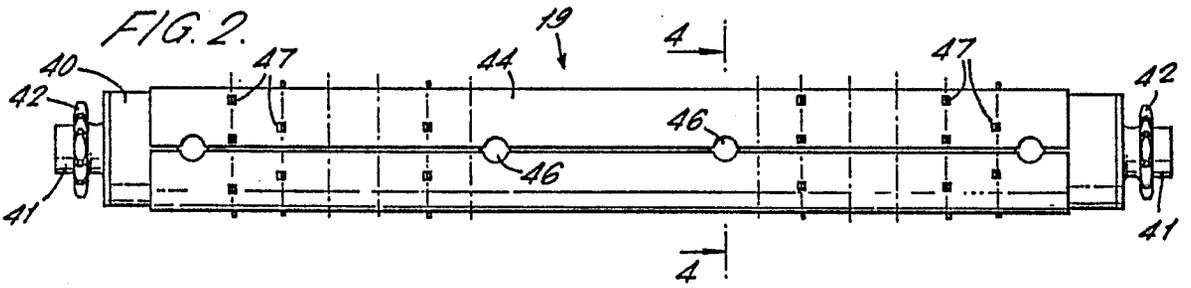
(54) Continuous towel cabinets for paper towel.

(57) A continuous towel cabinet for paper towel comprises an arrangement of rollers which allow clean towel to be withdrawn from a roll and for soiled towel to be rerolled on a roller (16) driven by an associated roller (19) through the outermost turn of the towel which has been rerolled. The drive roller (19) has a series of barbs (47) protruding from its peripheral surface with which the soiled towel makes contact in an arrangement which assists the maintenance of the drive effected by the drive roller on the soiled towel being rewound.

FIG. 2.



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Description

CONTINUOUS TOWEL CABINETS FOR PAPER TOWEL

This invention relates to continuous towel cabinets for paper towel.

In a continuous towel cabinet it is usual to provide an arrangement of rollers which allow clean towel to be withdrawn from a roll in a clean towel bin into a loop below the bin and for soiled towel to be taken up into the cabinet and rerolled. At the downstream end of the towel path, the soiled towel is rerolled on a roller which is driven by a roughened or rubber sleeved roller through the outermost turn of the towel which has been rerolled. Such an arrangement can reliably be used when the towel is cloth towel.

However, it has been found that when the towel is paper towel, the knurled or rubber sleeved drive roller cannot be reliably used. As the roll of soiled towel builds up, the roll distorts and the drive slips.

According to the invention there is provided a continuous towel cabinet for paper towel comprising an arrangement of rollers which allow clean towel to be withdrawn from a roll and for soiled towel to be rerolled on a roller driven by an associated roller through the outermost turn of the towel which has been rerolled, wherein the drive roller has a series of barbs protruding from its peripheral surface with which the soiled towel makes contact in an arrangement which assists the maintenance of the drive effected by the drive roller on the soiled towel being rewound.

Preferably the barbs are arranged around the whole periphery of the drive roller so that a continuous positive drive on the soiled towel is maintained.

It is also preferred that each barb has a leading corner to transmit a positive drive to the towel. Preferably each barb also has a flat edge which makes contact with the towel surface, which edge extends generally parallel to the towel surface and longitudinally in the direction of movement of the towel. Conveniently the drive roller may comprise an outer sleeve having pressed out portions which constitute the barbs.

In one embodiment of the invention the barbs are provided at each end of the drive roller leaving a clear space therebetween to allow safe handling of the roller.

By way of example, a specific embodiment in accordance with the invention will be described with reference to the accompanying drawings in which:-

Figure 1 is a side elevation of a continuous towel cabinet, one side wall of the cabinet being removed;

Figure 2 is an elevation of the soiled towel drive roller of the cabinet of Figure 1;

Figure 3 shows one end of the outer sleeve of the roller of Figure 2 in its preformed state;

Figure 4 is an enlarged section along line 4-4 in Figure 2; and

Figure 5 is a detail view of one of the barbs viewed longitudinally of the roller.

This example concerns a continuous towel cabinet for paper towel. Generally, the towel cabinet is similar to a towel cabinet for cloth towel except for the rewind drive roller which is the subject of the present invention.

Referring first to Figure 1, the towel cabinet comprises a back portion 10 to which a front cover 9 is hinged. The back portion 10 incorporates two side walls 11 (only one of which is shown) from which a clean towel bin 12 is hung. Between the side walls 11 extend an arrangement of rollers which allow clean paper towel to be withdrawn into a loop 13 below the bin 12 and for soiled towel to be taken up into the cabinet and rerolled. At the upstream end of the towel path, the clean towel passes upwardly from the bin 12 over a metering roller 14, around a guide roller 15 and then downwardly into the loop 13. The roller 14 is a tube on which a roughened or rubber sleeve is attached to provide a frictional drive to the towel. At the downstream end of the towel path, the soiled towel is rerolled on a roller 16 mounted in generally upwardly extended grooves 17 in the side walls 11 and which is driven by another metering roller 19 to be described in detail below through the outermost turn of the towel which has been rerolled. A toothed belt or chain drive 20 interconnects adjacent ends of the metering rollers 14, 19 which are of a similar diameter so that the length of soiled towel taken up onto the roller 16 is similar to the length of clean towel withdrawn at the front of the cabinet, whereby the size of the loop 13 remains constant. As the diameter of the roll of soiled towel increases the roller 16 slides up the grooves 17. A division plate 50 is provided between the rolls of clean and soiled towel, the ends of the plate being received in slots in the respective side walls 11 of the cabinet.

To limit the length of clean towel which is intended to be withdrawn at any one time, there is provided a device which acts to stop rotation of the metering roller 14 after it has turned through two revolutions. This limiting device is described in detail in British Patent Specification No. 2096099. It is therefore sufficient to state that the limiting device is associated with the opposite end of the roller 14 to the end engaged by the drive belt or chain 20 and comprises a plate 25 mounted for vertical sliding movement between guide bars 26 provided on the adjacent side wall 11. In operation, a pin 38 eccentrically mounted on the adjacent end of the roller 14 lifts the plate 25 to a raised stop position in which a sucker 30 carried by the plate engages a fixed sucker 31. The suckers 30, 31 hold the plate 25 in its raised stop position for a predetermined period of time. After that time, the suckers disengage and the plate 25 falls under gravity and pressure of a spring 37 into its release position. A further length of clean towel may then be withdrawn into the loop 13 and the cycle of operation repeated.

As stated above, this invention concerns the rewind metering roller 19. The conventional roughened or rubber sleeved roller has been found to be inadequate for paper towel to provide a positive

drive throughout the rewinding of the whole length of towel.

With reference to Figures 2 to 5, the roller 19 comprises an inner metal tube 40 having at each end a plastics plug 41 carrying a sprocket wheel 42. Internally of the tube 40 three splines 43 (Figure 4) interconnect with corresponding peripheral grooves on each plug 41 and provide a positive drive connection between the sprocket wheels 42 and the tube 40.

An outer metal sleeve 44 formed from a blank sheet 45 (Figure 3) is formed around the inner tube 40 and rivetted thereto at four points through holes 46 in the inner tube. As shown in Figures 2 and 4, the adjacent longitudinal edges of the outer sleeve, between which there is a small gap, are aligned with the holes 46 so that the respective portions of the outer sleeve can be punched into the holes 46 before the rivetting step is performed. Also, prior to the forming of the blank sheet 45 into the sleeve 44, an arrangement of barbs 47 are pressed out of the sheet 45 in a direction in which they will protrude radially outwardly from the surface of the finished roller 19. Each barb 47, in this embodiment, is rectangular thereby providing a leading corner 48 to drive the towel positively and a flat edge 49 extending longitudinally in the direction of movement of the towel to make surface to surface contact with the soiled towel with minimum penetration into the towel as described below.

The barbs 47 are disposed circumferentially around the periphery of the roller 19. The number and arrangement of the barbs 47 is selected to provide a constant positive drive to the paper towel being rewound. If too many barbs are provided, i.e. to give overall coverage, the positive drive could be lost. Similarly, the barbs are preferably disposed around the whole periphery of the roller, at least at both ends, so that the drive provided thereby remains constant. In this embodiment the barbs 47 are omitted from the central portion of the roller 19 so that if the roller is required to be removed from the cabinet, the roller can be handled safely. A workable number of barbs has been found to be thirty four at each end of the roller disposed in six circumferential rows as shown by the teeth positions 51 in Figure 3. It will be appreciated that in other embodiments there may be a different number of barbs and/or rows of barbs.

The drive rollers 14, 19 are interconnected by the drive chain 20 giving, in this emodiment, a 1 to 1 driving ratio. The barbs 47 on the roller 19 provide a positive drive to the soiled paper towel being rewound. However, because paper towels differ considerably from manufacturer to manufacturer their operational characteristics also change. In particular, a varying amount of pentration of the barbs into the towel causes a corresponding change in the drive ratio between the rollers 14, 19 and a consequential change in the length of the pre-set loop of towel 13. For example, it was found that use of pin-like barbs could penetrate the towel to an extent that the drive ratio was changed from 1 to 1, to 0.9 or less, resulting in an unacceptable lengthening of the loop. Variation of the length of the loop can also result from different enviromental conditions. Simply if the soiled towel being rewound is very wet, there may occur an unacceptable lengthening of the loop caused by too great a penetration by the barbs, whilst if the soiled towel is very dry there may be practically nil penetration by the barbs and a shortening of the loop.

To minimise these changes, the barbs 47 of this embodiment are shaped and arranged to give minimum pentration of the towel whilst maintaining their positive drive thereto. It will be appreciated that the leading corner 48 of each barb creates the positive drive to the towel, and because the contact edge 49 of the barb is flat a surface area of bearing is exposed to the towel resulting in negligible penetration.

Claims

1. A continuous towel cabinet for paper towel comprising an arrangement of rollers which allow clean towel to be withdrawn from a roll and for soiled towel to be rerolled on a roller (16) driven by an associated roller (19) through the outermost turn of the towel which has been rerolled, wherein the drive roller (19) has a series of barbs (47) protruding from its peripheral surface with which the soiled towel makes contact in an arrangement which assists the maintenance of the drive effected by the drive roller on the soiled towel being rewound.

2. A continuous towel cabinet as claimed in Claim 1, wherein the barbs (47) are arranged around the whole periphery of the drive roller (19) so that a continuous positive drive on the soiled towel is maintained.

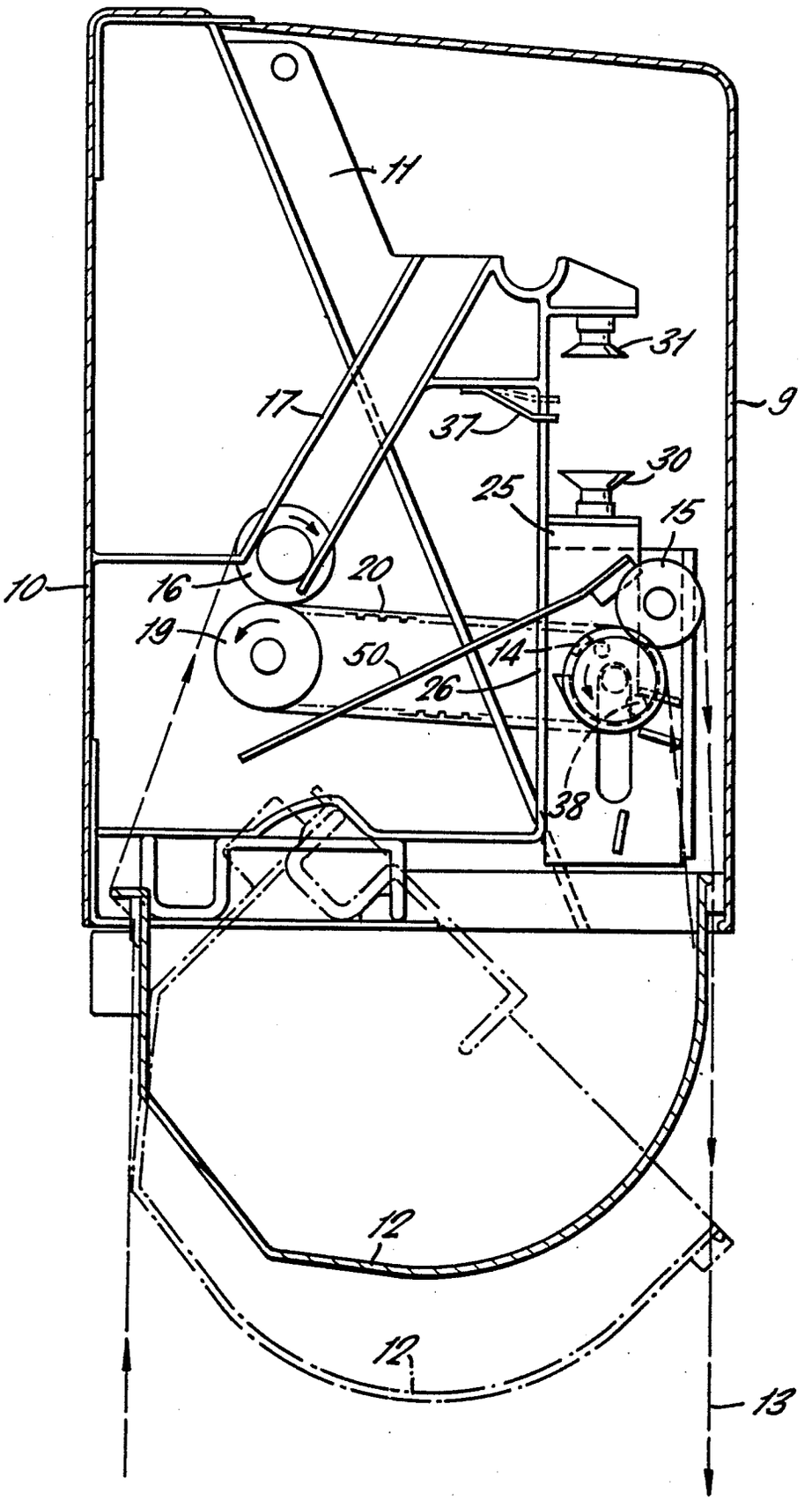
3. A continuous towel cabinet as claimed in claim 1 and claim 2, wherein each barb (47) has a leading corner (48) to transmit a positive drive to the towel.

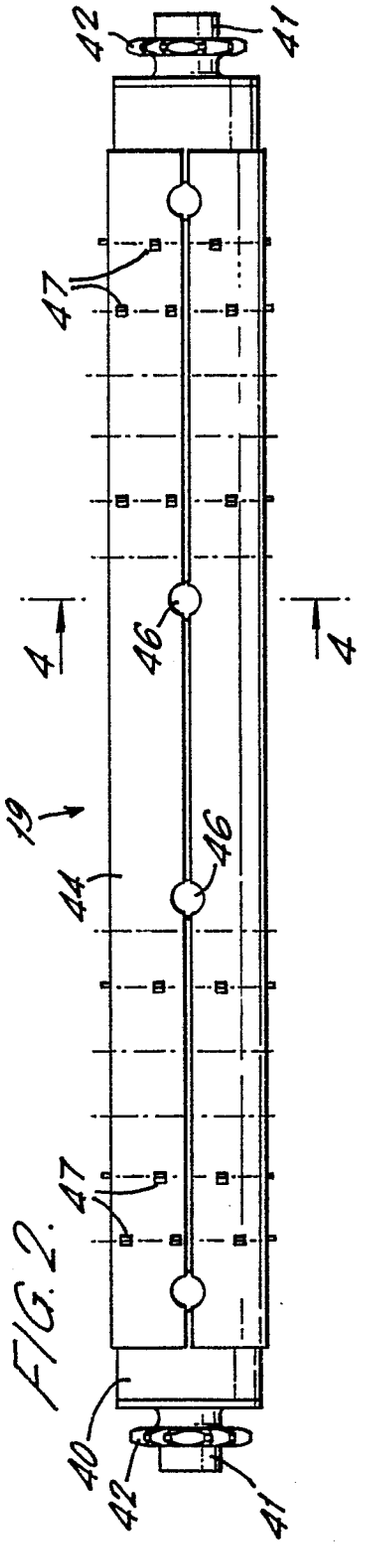
4. A continuous towel cabinet as claimed in any one of the preceding claims, wherein each barb (47) has a flat edge (49) which makes contact with the towel surface, which edge extends generally parallel to the towel surface and longitudinally in the direction of movement of the towel.

5. A continuous towel cabinet as claimed in Claim 3, wherein the drive roller (19) comprises an outer sleeve (44) having pressed out portions which constitute the barbs (47).

6. A continuous towel cabinet as claimed in any one of the preceding claims, wherein the barbs (47) are provided at each end of the drive roller (19) leaving a clear space therebetween to allow safe handling of the roller.

FIG. 1.





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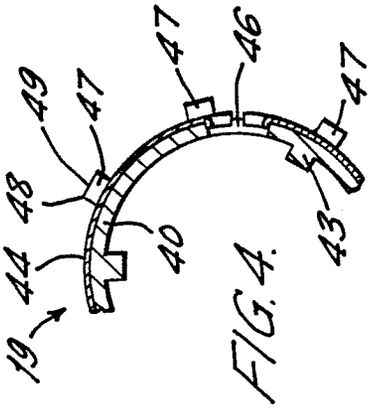

FIG. 4.

FIG. 5.

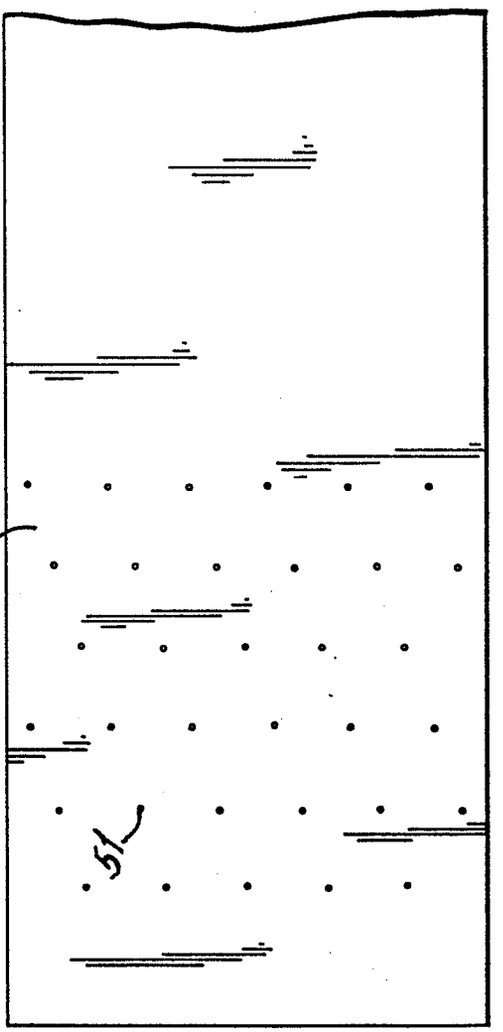

FIG. 3.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 87 31 0381

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.4)
X	US-A-1 902 198 (THOMPSON) * Page 2, lines 90-104; page 3, lines 12-111; figures *	1,2	A 47 K 10/28
A		3	
X	US-A-1 494 080 (STEINER) * Page 1, lines 44-84; figures *	1,2	
A		3	
X	GB-A- 732 768 (KNOX) * Page 2, lines 21-25,51-69; figures *	1,2	
A		3	
A	GB-A-2 173 475 (KENNEDY) * Whole document *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 47 K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09-02-1988	LAUE F.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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