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⑦① Applicant: **Kristensson, Ingvar, Letter Box 1001, S-280 64 Glimakra (SE)**

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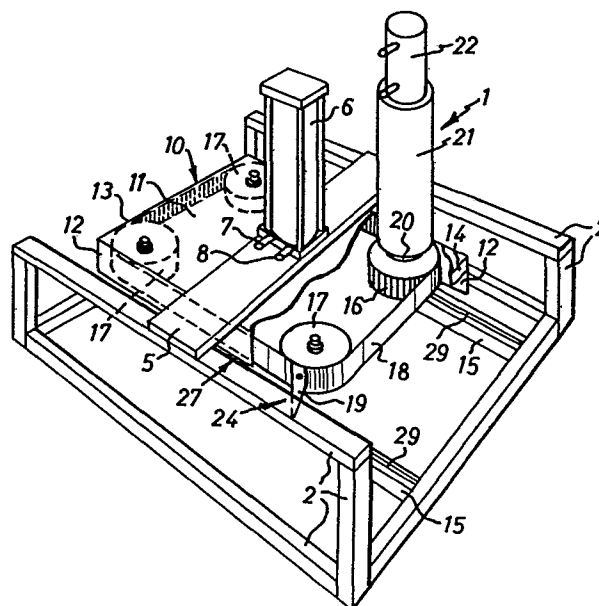
⑦② Inventor: **Kristensson, Ingvar, Letter Box 1001, S-280 64 Glimakra (SE)**

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⑦④ Representative: **Franzén, Lars Hjalmar et al, AWAPATENT AB Box 5117, S-200 71 Malmö (SE)**

⑤④ **Cutting device.**

⑤⑦ A cutting device (1), intended particularly for cutting out handles in plastic carrier bags, has a holder (10) connected to a frame (3) and carrying on its underside a driving wheel (16) driven by means of a ball bearing screw (21), and three idle wheels (17). The wheels (16, 17) are toothed wheels, and a toothed belt (18) passes over the wheels and carries a cutting knife (19) for cutting out the handles. The holder (10) is vertically movable by means of a pneumatic cylinder (6) from a resting position to a working position for abutment against the carrier bag and with the cutting knife (19) in a starting position. When the cutting knife 19, after passing beyond the end position, has returned to the starting position, the holder (10) can be returned to the resting position for releasing the carrier bag. The cutting knife (19) is movable from the starting position to the end position and back again in that the belt (18) is driven back and forth by means of the driving wheel (16) connected to the ball bearing screw (21).



CUTTING DEVICE

The present invention relates to a cutting device, particularly for cutting out handles in plastic carrier bags or the like.

In a prior-art machine for cutting out handles in plastic carrier bags, use is made of a punch and an associated die for cutting out the area between the handles of the carrier bag. The cutting tool consisting of punch and die is very costly, since it must have the same size as the area to be cut out and must have a continuous cutting edge along the entire cutting line. In addition, the cutting edge will gradually become blunt as a result of the repeated cutting engagement with the consecutive plastic carrier bags, which makes it necessary to sharpen the cutting edge of the punch and the counter-edge of the die.

Another prior-art machine contemplated for the above-mentioned purpose has a rotatory cylinder with a protruding cutting edge which has the same shape as the area between the handles of the plastic carrier bag, the cutting edge cooperating with a generally rubber-coated counter-cylinder which then serves as a die. This "roller cutting tool" suffers from the same drawbacks as the above-mentioned cutting tool with a movable punch and a stationary die.

The object of the present invention primarily is to provide a cutting device which does not suffer from the drawbacks discussed above but which is relatively inexpensive and easy to manufacture and, above all, to service.

According to the invention, this object is achieved in that the cutting device has a holder which carries a driving wheel and at least one idle wheel, and a belt or the like which is passed over the wheels and on which a cutting knife is mounted. In the most preferred embodi-

ment, the driving wheel is caused, during each working cycle, to drive the belt in such a manner that the cutting knife is moved from a starting position to an end position and thence back to the starting position.

5 In order to ensure the required high velocity of the cutting knife to comply with the capacity of the preceding manufacturing machine which in the manufacture of plastic carrier bags is an automatic welder with a capacity of 80-100 cycles/min., the driving wheel is
10 mounted on the free end of a screw spindle in a ball bearing screw whose nut is connected to operating means for axial displacement of the nut and thus rotation of the screw spindle and the driving wheel at a large gear ratio between nut and spindle.

15 In order to ensure accurate guiding and thus obtain the same starting position and end position for the cutting knife during all working cycles, the belt is a toothed belt and the driving wheel and the idle wheels are toothed wheels.

20 In order to permit supplying the plastic carrier bags to and removing them from their correct position under the cutting knife in the starting position thereof, the holder is connected to a frame and vertically movable by control means from a resting position to a working
25 position for abutment against the carrier bag and with the cutting knife in the starting position, said holder, when the cutting knife has passed beyond the end position and returned to the starting position, can be returned to the resting position for releasing the carrier bag.

30 Since the automatic welder and also the ancillary equipment for manufacturing plastic carrier bags are operated and controlled pneumatically, the cutting device is suitably also pneumatically operated, the operating and control means suitably being double-acting pneumatic
35 cylinders.

The invention will be described in greater detail hereinbelow with reference to the accompanying drawings



showing a particularly preferred embodiment and in which:

Fig. 1 shows the particularly preferred embodiment of the cutting device according to the invention in perspective as seen obliquely from above and in front;

5 Fig. 2 schematically shows the cutting device of Fig. 1 in perspective substantially as in Fig. 1;

Fig. 3 shows in full lines a ready-welded blank for a plastic carrier bag, the dashed line illustrating the portion to be cut out to form the handles of the bag and the dot-dash line indicating the following bag not yet severed; and

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Fig. 4 shows part of the cutting device of Figs. 1 and 2 from underneath.

As shown in the drawings, the cutting device according to the invention, generally designated 1, has a substantially box-shaped frame 3 composed of square tubes 2. The inner width between the sides of the frame 3 approximately corresponds to the width of a ready-folded plastic carrier bag 4 (Fig. 3) supplied from an automatic welder (not shown) for a purpose described in greater detail hereinbelow. A cross beam 5 is mounted on the sides of the frame 3, there being provided approximately in the middle of the cross beam 5 a vertical double-acting pneumatic cylinder 6 whose inlet and outlet 7, 8 are connected to a source of compressed air (not shown) and whose piston rod 9 passes through a hole in the cross beam 5 and carries at its lower free end a hood-like holder generally designated 10. The holder has a covered top 11, two downwardly extending long sides 12 and a likewise downwardly extending short side 13 facing the automatic welder (not shown). The opposite short side 14 extends downwards only a short distance. The downwardly extending long and short sides 12, 13 cooperate with square tubes 15 mounted on the frame 3, in order to clamp the carrier bag 4 for a purpose which will be described in greater detail hereinbelow.

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On its underside and adjacent its four corners,

the holder 10 carries four wheels of which one is a driving wheel 16 and the other three are idle wheels 17. The wheels 16 and 17 are toothed wheels, and a toothed belt 18 is passed over the wheels 16, 17 and carries
5 on its outside a downwardly directed, readily interchangeable cutting knife 19.

The driving wheel 16 is mounted on the free end of a screw spindle 20 in a ball bearing screw 21 whose nut (not shown) is connected to a double-acting pneumatic
10 cylinder 22 for axial displacement of the nut and thereby rotation of the screw spindle 20 and the driving wheel 16. Alternatively, the driving wheel 16 can be mounted on the nut of the ball bearing screw 21, the screw spindle 20 being then connected to the pneumatic cylinder 22
15 and axially movable to rotate the nut and the driving wheel 16. During this rotation, the driving wheel 16 is caused, during each working cycle, to drive the toothed belt 18 in such a manner that the cutting knife 19 is moved from a starting position 23 (see Figs. 1 and
20 4) to an end position 24 (see Fig. 2) and from there back to the starting position.

During this movement, the cutting knife 19 will cut out the two handles 25 normally existing on plastic carrier bags, by cutting off the area 26 located within
25 the dashed line in Fig. 3.

In order that the carrier bag 4 should be secured in position during the cutting operation of the cutting knife 19 from the starting position 23 and up to the end position 24, the holder 10 is vertically movable
30 by means of the pneumatic cylinder 6 from a resting position 27, shown in Fig. 2, to a lowered working position 28 in which the downwardly directed long and short sides 12, 13 of the holder 10 will press the plastic carrier bag 4 against the square tubes 15 serving as supports.
35 After completion of the cutting operation, the holder 10 can be returned to the resting position 27 for releasing the carrier bag 4. In order to obtain an improved



and even more reliable fixation of the carrier bag 4 in the working position 28 of the holder 10, the long and short sides 12, 13 and/or the square tubes 15 may be provided with interengaging friction-increasing rubber strips 29 or the like.

The invention must of course not be considered restricted to the embodiment described above and shown in the drawings but may be modified in various ways within the spirit and scope of the claimed patent protection.



CLAIMS

1. A cutting device, particularly for cutting out handles (25) in plastic carrier bags (4) or the like, characterized by a holder (10) which carries a driving wheel (16) and at least one idle wheel (17),
5 and a belt (18) or the like which is passed over the wheels (16, 17) and on which a cutting knife (19) is mounted.

2. Device as claimed in claim 1, characterized in that the driving wheel (16) is caused, during
10 each working cycle, to drive the belt (18) in such a manner that the cutting knife (19) is moved from a starting position (23) to an end position (24) and thence back to the starting position.

3. Device as claimed in claims 1 and 2, characterized in that the driving wheel (16) is mounted
15 on the free end of a screw spindle (20) in a ball bearing screw (21) whose nut is connected to operating means (22) for axial displacement of the nut and thus rotation of the screw spindle (20) and the driving wheel (16).

20 4. Device as claimed in any one of the preceding claims, characterized in that the belt (18) is a toothed belt and that the driving wheel (16) and the idle wheel or wheels (17) are toothed wheels.

5. Device as claimed in any one of the preceding
25 claims, characterized in that the holder (10) is connected to a frame (3) and vertically movable by control means (6) from a resting position (27) to a working position (28) for abutment against the carrier bag (4) or the like and with the cutting knife (19) in
30 the starting position (23), said holder, when the cutting knife has passed beyond the end position (24) and returned to the starting position, can be returned to the resting position (27) for releasing the carrier bag or the like.

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6. Device as claimed in claims 3 and 5, c h a r a c -
t e r i z e d in that the operating and control means
(22, 6) comprise double-acting pneumatic cylinders.

Fig. 1

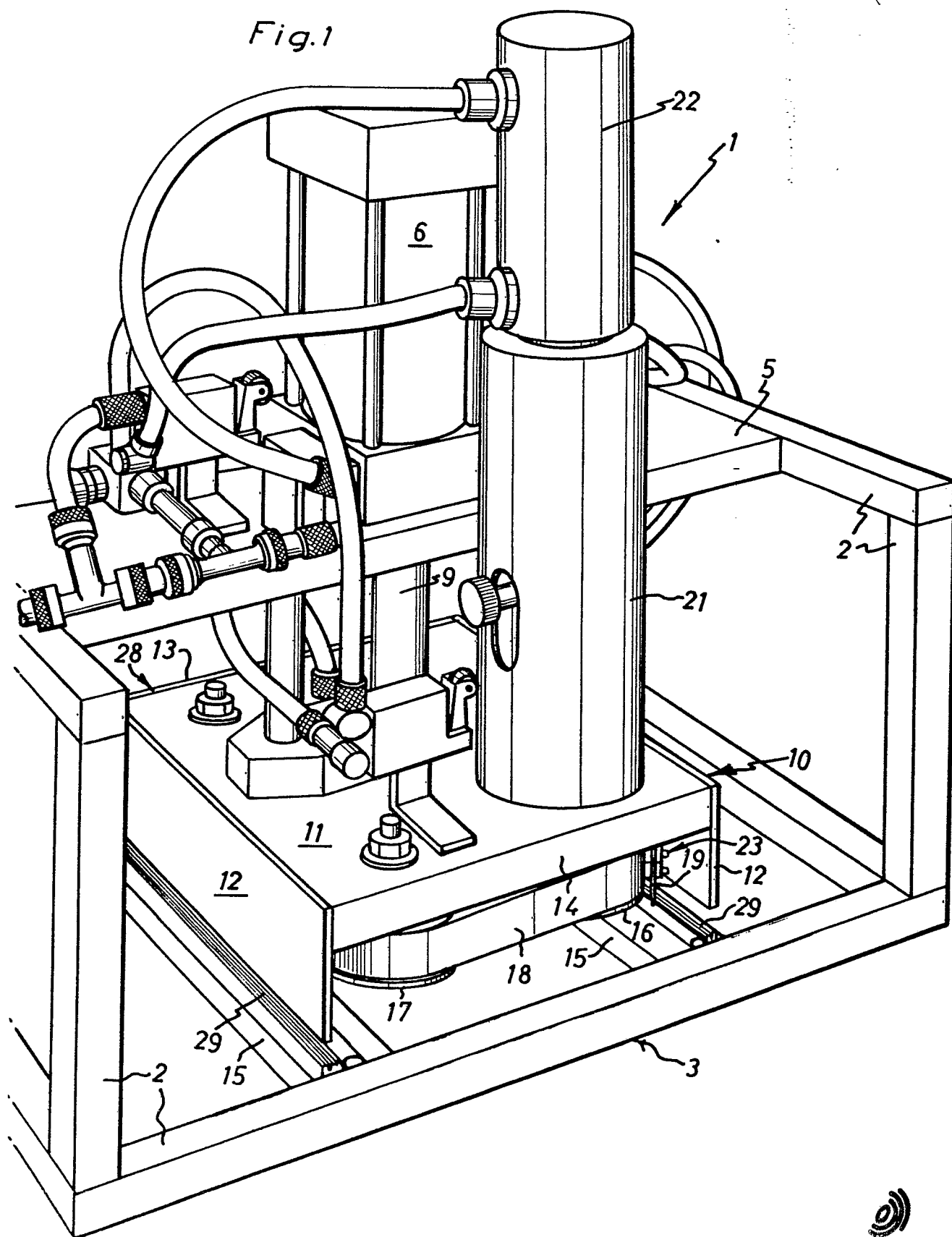


Fig. 2

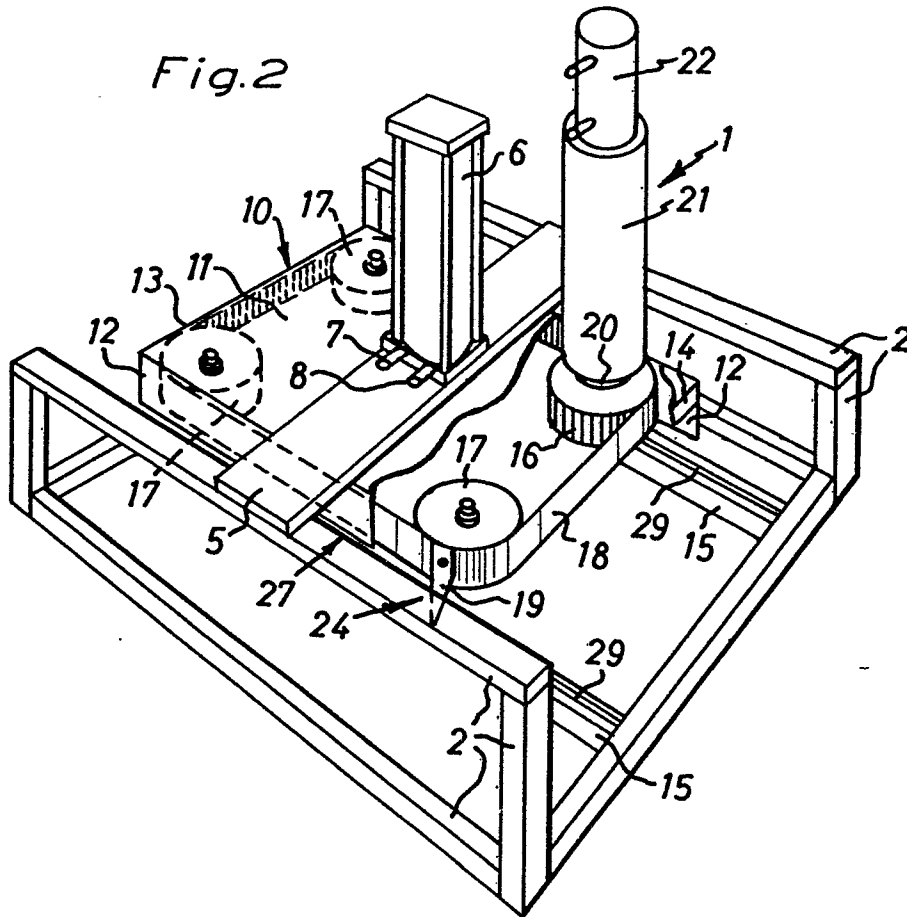


Fig. 3

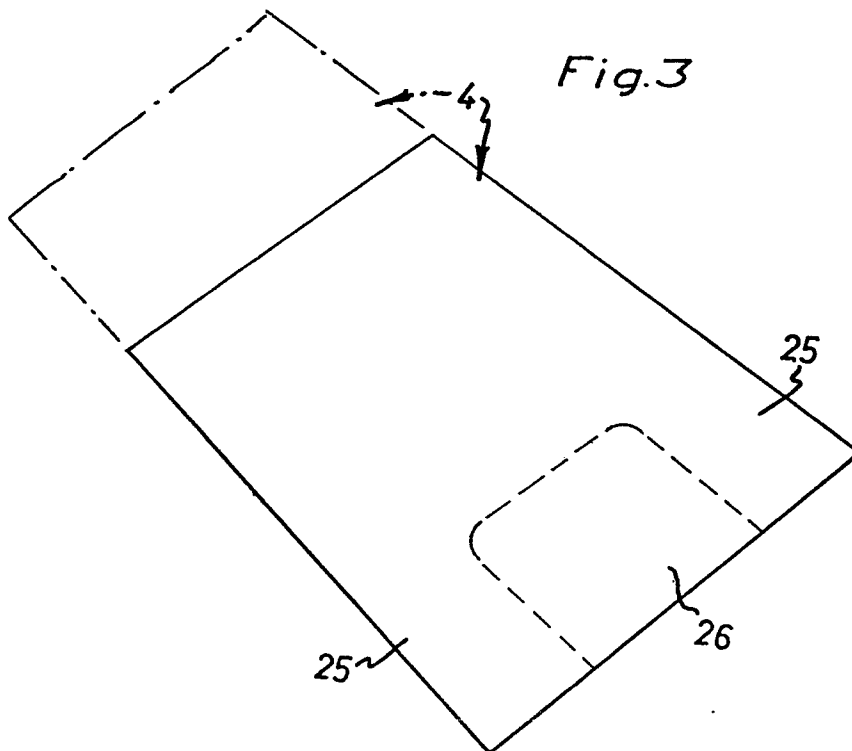


Fig. 4

