United States Patent

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[54] **FABRIC-CUTTING MACHINE**
2 Claims, 1 Drawing Fig.

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[50] **Field of Search** 30/210, 215, 216, 240, 276, 228, 264

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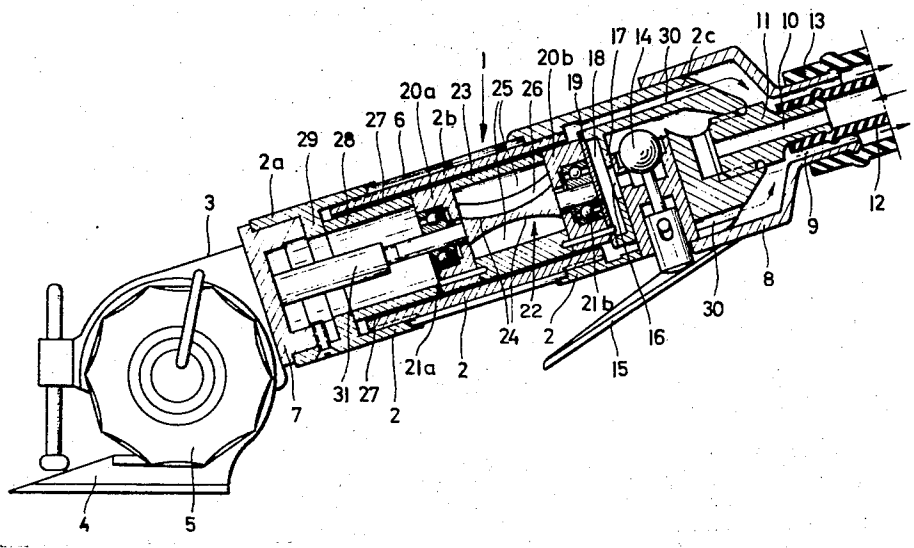
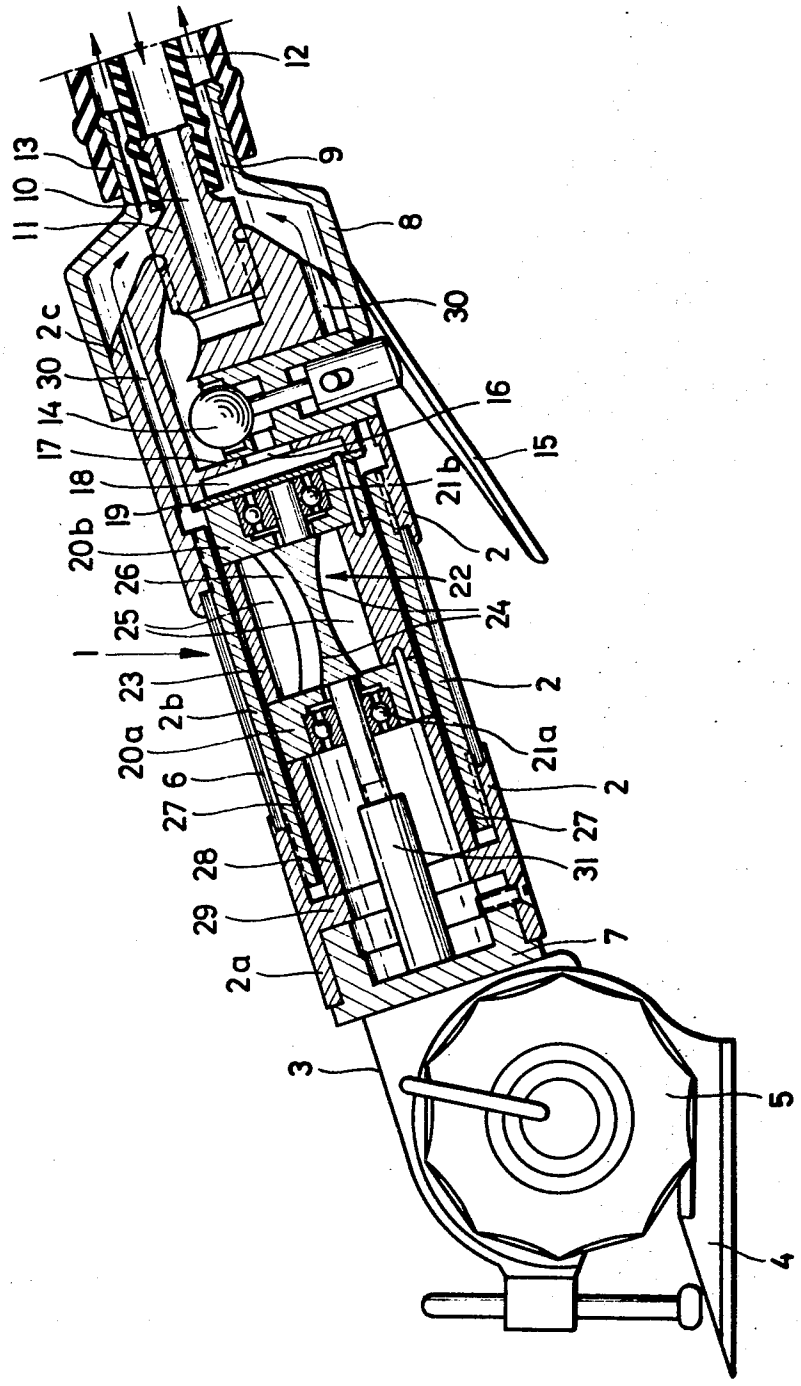
ABSTRACT: A pneumatically operated cutter in which the spent air is recovered and vented remotely of the machine.

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FABRIC-CUTTING MACHINE

BRIEF DESCRIPTION OF THE DRAWING

The sole FIGURE is a side view of a cutter of the invention, partly in axial section.

DETAILED DESCRIPTION

This invention relates to manual fabric-cutting machines of the type having an air-operated cutting blade such as, for example, a rotary blade or a reciprocating impact blade or the like.

Driving the cutting blade of such a machine by means of an electric motor or an air-operated motor integral with the machine is known. In various respects an air motor is more advantageous for this special purpose, than an electric motor. For example, an air motor of very small dimensions is capable of delivering relatively considerable power without any undue temperature rise, as would occur with an electric motor. Also, the effectiveness of a manual fabric-cutting machine driven by an air motor, as compared to a machine driven by an electric motor of approximately identical size is several times greater. This advantage has considerable economical importance, particularly in the cutting of hard and resistant clothing materials such as natural leather, imitation leather, plastics, and so forth.

In a known manual fabric-cutting machine with an air-driven cutting blade, the exhaust openings for the spent air are located on the top of the motor housing and are oriented forwards on a slant. The purpose of this arrangement is to prevent the exhausted air from swhirling up the fabric to be cut, or the layers of such fabric already cut, or from disarranging their relative positions. Whatever merits this precaution may possess, it cannot prevent an oil mist forming from oil particles residually contained in the spent air and originating from the minute oil quantities which have to be added to the compressed air supply for perfect operation of the oil motor, which oil mist inevitably soils the fabrics as well as the hands of the machine operator. It cannot prevent either, that in spite of the upward slant of the air exhaust orifices on the machine, the fabric will still be disturbed occasionally by the airstream. Last, but not least, the whistling noise generated by the passage of the spent air through said orifices, and the pronounced cooling effect of the expanding air, on the handle of the machine, as well as the air blasts hitting persons occasionally approaching the cutting table, are disagreeable side effects.

The invention pursues the objective of creating an air-operated manual fabric-cutting machine, which is free of all these undesirable effects enumerated above.

As a solution for this problem, the invention proposes to provide on a machine of the type described, means for leading away the spent air coming out of the motor to a location, where it cannot interfere with the manipulation of the machine, nor with the cutting of the fabric.

Further details and characteristics of the invention are explained in the following description of an embodiment, given as an example and shown partially in longitudinal section in the drawing.

In said drawing, the housing of the manual fabric-cutting machine is composed of a connection bushing *2a* accommodating the cutting head **3**, a center bushing *2b*, and an end bushing *2c*. The cutting head **3**, provided with a skidlike support **4**, contains a rotating disc blade **5**. In the case of a reciprocating blade-type machine, known per se, the cutting head would contain a reciprocating impact blade. The center bushing *2b*, which connects the bushings *2a* and *2c* to each other, can be provided with a plastic jacket **6**.

The cutting head **3** is provided with a connection flange **7** with which it is inserted into the open end of the connection bushing *2a*. A cap **8** with an exhaust opening **9** of smaller diameter is screwed onto the outer end of the end bushing *2c*. Inside this cap there is a stud **11** provided with a bore **10**, which stud tightly seals off the recessed opening in the center of the face wall of the end bushing *2c*. For a purpose to be described later, a hose **12** for the arriving compressed air, and another concentric hose **13** of larger diameter for the spent exhaust air are attached onto the inlet opening of the stud or pipe socket **11** and the outlet opening **9** of cap **8**, respectively.

As can be seen in the drawing, an "ON and OFF" control **14**, devised as a ball valve and shown in the drawing in its shut position, is subjected to the pressure of the compressed air arriving through the inlet bore of stud **11**. By pressing a control handle **15** against the housing, the operator can open the ball value against the pressure of the input air, so that this air may flow through an orifice **16** in flange **17** into a chamber **18**.

Between the end bushing *2c* and the center bushing *2b* screwed onto same, there is a gasket **19** provided with an off-center aperture (not shown).

Two bearing supports *20a* and *20b* for accommodating ball bearings *21a* and *21b* are located inside the center bushing *2b*. The shaft of the rotor **22** of the air motor is supported by said bearings inside a rotor housing **23** which, with regard to its wall thickness has an eccentric configuration. The rotor **22** of essentially cylindrical shape is provided with four symmetrically arranged slots running parallel to the shaft axis. The longitudinal slot shown in the drawing extends through two opposite slots. The land of the slots, which curves inward to the shaft, is referenced as **24**. Plates **25**, for example of plastic material, are loosely inserted into the slots. Upon rotation of the rotor **22**, the plates **25** are propelled outward following the reduction in thickness of the wall of rotor housing **23**, so that a gap **26** is formed.

From the aperture in the gasket **19**, there extends an eccentric recess (not shown) through the bearing support *20b*. This recess leads to the slots of rotor **22**. The compressed air flowing through said recess rotates the rotor and then flows through a further recess (not shown) as spent exhaust air into a circular groove **27**, located between the rotor housing **23**, the bearing supports *20a* and *20b* and a spacer bushing **28** adjacent bearing support *20a*, on the one side, and the inner wall of center bushing *2b* on the other side.

As the drawing shows, the annular groove **27**, at its end facing the cutting head, is sealed off by a flange **29** originating from the connection bushing *2a* and extending radially inwards. The other end of the annular groove **27** leads into another groove **30** inside the end bushing *2c*. The spent exhaust air issuing from the end of groove **30** flows through the cap **8** and escapes through the outlet opening **9**, whence, by means of the concentric outer hose **13** it can be brought to any desired location remote from the machine, whereas through the inner concentric hose **12** compressed air is supplied to the air motor.

The outlet opening **9** on cap **8** and the inlet opening arranged concentrically inside it are provided with beads around their rims in order to assure secure connection of the two flexible hoses. For completely eliminating the undesirable phenomena, which, as initially described, occur with known types of air-operated manual fabric-cutting machines due to the spent air blasts from orifices on the machine itself, it is mostly sufficient with the machine of this invention to provide an air exhaust hose of about **10** feet length and a diameter of approximately ½inch.

In lieu of the two concentric hoses, it is of course also possible to use two parallel and mechanically interattached airhose lines. For this purpose, it is necessary to modify the configuration and arrangement of the air inlets and outlets on the machine.

The flow path of the compressed input air and of the spent exhaust air is shown by arrows in the drawing.

It should further be noted that the shaft of the rotor **22** is coupled by a junction piece **31** with the gear assembly of the cutting head **3**.

For air-operated manual fabric-cutting machines the housing of which possesses one or more air outlets oriented obliquely forwards, the disclosed basic idea of the invention

can also be applied, if an air exhaust hose leading upwards and away from the machine is attached to said outlet openings, or if said openings are surrounded by a ring-shaped manifold with a pipe connection for attaching such a flexible hose.

I claim:

1. A fabric-cutting machine comprising a cutting blade, a housing, a compressed air motor in the housing and coupled to said blade to drive the same, a cap on said housing, air supply means extending through said cap and connected to said housing for supplying compressed air thereto to operate said compressed air motor, said motor including a rotor housing disposed in the first said housing and defining therewith a first annular gap for receiving discharge air from the motor, said housing comprising a forward connection bushing coupled with said cutting blade, a central bushing joined to said forward bushing, said first annular gap extending through said forward and central bushings, an end bushing secured to the second bushing, said cap being mounted on said end bushing, said end bushing having a second annular gap in communication with the first gap for continued flow of the discharge air, said cap being hollow and in communication with said second annular gap for receiving the discharged air, a flexible hose on said cap and communicating with the interior thereof for conducting the discharged air away from said housing, and a valve in said end bushing for controlling the supply of compressed air to said motor, said air supply means comprising a stud in said end bushing and having an inlet bore leading to said valve, and a second flexible hose attached to said stud and coaxially mounted within the first flexible hose, said end cap and stud including respective beaded necks which are engaged by respective hoses, said annular gaps defining a path of travel for the discharged air which is opposite the direction of flow of the air supplied to said housing, said discharged and supplied air flowing in opposite directions in said hoses.

2. A machine as claimed in claim 1 comprising a control handle on said end bushing controlling said valve.