This invention relates to a fabric cutting machine and, in particular, to such a machine having cutting oil cooling and lubricating means.

Standard forms of fabric cutting machines used in the garment industry are provided with a vertically reciprocating blade, which is adapted to be pressed against a pile of material and by following a pattern marked or placed on the uppermost piece of material, cutting each piece of material contained in the pile to conform to the pattern. The knife blade is generally provided with a cutting length of five to six inches allowing the stacking of a considerable number of pieces of cloth for concurrent cutting.

While such a machine operates satisfactorily on stacks of material such as cotton and the softer fibers when stacked up to the maximum height, it has been found that when a more readily cut material, such as leatherette, must be restricted generally to a stack containing no more than approximately thirty-six pieces due to the heat generating friction and binding developed. As the available cutting blade length could handle three times this thickness of leatherette material, this restriction is undesirable from a production efficiency point of view.

It has also been found that creepage between the layers of the material, occurring to a negligible extent when the softer materials are cut, becomes a serious problem with the tougher materials. Further, it has been found that even with the more readily cut materials, the useful life of the cutting blade is relatively short, approximating one week in normal production schedules so that considerable maintenance, involving sharpening of the blade and replacement thereof, is required.

The principal feature of my invention, therefore, is the provision of a new and improved fabric cutting machine arranged to allow satisfactory cutting of a pile of fabric of tough characteristics (as for example leatherette) in a stack approximating the height of the available knife blade length.

Another feature of the invention is the provision of such a fabric cutting machine having means for introducing a cutting lubricant to the knife to improve the cutting action with all types of material normally cut therewith.

A further feature of the invention is the provision of such a cutting machine utilizing a cutting lubricant, such lubricant having the qualities of restricting corrosion and wear of the knife blade as well as lubricating the knife edge for cooling and reducing the friction.

A still further feature of the invention is the provision of a fabric cutting machine which is arranged to utilize a cutting lubricant for improving the quality of the cutting operation and increasing the quantity of fabric pieces which may be cut satisfactorily in a single stack with means for storing the lubricant and transferring the minimum necessary amount to the cutting blade carried by the machine.

Other features and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevational view of a fabric cutting machine embodying the invention;

Fig. 2 is a rear elevational view of the fabric cutting machine;

Fig. 3 is a sectional view taken approximately along the line 3—3 of Fig. 1 and showing the means for transferring the cutting lubricant to the knife blade.

Referring now to the drawings, the fabric cutting machine may be seen to be provided with a base 10 having a vertically extending support 11 attached at its lower end to a central portion of the base. Movably carried on the vertical support is a knife 12 having a forwardly projecting cutting edge 12a and side portions 12b. A drive mechanism 13 is carried on the upper end of support 11 and is provided with an electric motor 13c and suitable power transmitting and converting drive means 13d arranged to vertically reciprocatorily move the knife 12. Such drive means are well-known in the art and require no further specification herein.

A sharpening means 14 which may be any of those well-known in the art, is carried by a portion of the drive means and is adapted satisfactorily to engage a grinding surface with the knife 12 so as to sharpen the knife when desired. When not in use, means 14 is positioned subjacent the drive means, being held there by a suitable latch 14a removable engaging a projecting element 13b' on the drive means. To yieldingly retain the means 14 in this position I provide a spring 14b acting between the drive means 13d and the sharpener mechanism to urge the latch tightly against the element 13b'. A presser foot 15 is also mounted on a portion of the drive means and may be adjustable positioned vertically so that its horizontal pile engaging portion 15a may be disposed so as to hold a pile of fabric placed between it and the upper side of base 10.

So that the machine may be readily moved during the cutting operation, a handle 16 is provided and arranged to extend rearwardly subjacent the motor 13a.

It has been found that fabric cutting machines, as described above, may be employed effectively and efficiently to cut piled fabric placed between the presser foot and the base with the knife edge being urged through the pile by the operator. Because of the limitations on the quantity of tougher materials which may be cut by this equipment, however, I provide cutting lubricating means which act to reduce the friction and binding between the knife edge 12a and the fabric being cut so that improved cutting is obtained with all types of materials and greater quantities of tougher materials may be cut at one time. As the lubricating fluid is disposed on the fabric during this process, I further provide means for restricting the flow thereof to a rate commensurate with satisfactory operation and fabric stain prevention requirements. These means are more fully set forth following.

Mounted on the upper portion of the motor 13a is provided a storage receptacle 17 internally containing a mass of wick material 17a. Mounted on the upper portion of the storage receptacle and extending upwardly therefrom is a cutting lubricant reservoir 18 which is provided with drip means 18a adapted to allow cutting lubricant contained in the reservoir to be discharged into the storage receptacle in small quantities thereby to maintain the wick material contained in the receptacle in a lubricant saturated condition.

To feed the cutting lubricant from the receptacle to the knife 12, I provide tubes 19 preferably formed of soft tubing material such as copper although any similar ducts may be used. At the upper end 19a, each tube communicates with the interior of the receptacle 17 so that lubricant may be fed therefrom and through the tubing. Interiorly of the tubing is placed wick material 19b, so that the tubing wicking forms a continuous mass with the wick 17 in the receptacle. The lower end 19c of the tubing...
is positioned adjacent the upper end of knife side 12b and is spaced a short distance therefrom. To accommodate such positioning the sharpening mechanism latch 14a is made somewhat longer than it is in the conventional fabric cutter, thereby spacing the sharpening mechanism 14b somewhat below the drive means and providing access to the uppermost portion of the cutting blade. Wicking 19b extends outwardly from the tube end 19c and contacts the knife surface 12b, thereby allowing lubricant to pass from the wicking to the surface of the knife continuously.

In operation, the cutting machine is moved by the operator so as to press the knife edge 12a into the side of a pile of fabric. As cutting lubricant is provided on the cutting edge, the fabric will be cut with a relatively small amount of friction between the edge and the fabric. This allows a better cutting action as the knife does not tend to bind and heat generation is minimized. As the film of oil on the edge is withdrawn by absorption by the fabric, the wicking material in the tube and receptacle will allow a small quantity of lubricant to pass therethrough to replace that withdrawn. The action thus obtained is one primarily of capillarity so that a small quantity may be obtained. The lubricant withdrawn from the receptacle is replaced automatically by lubricant from the reservoir 18 with the drip means again controlling the flow therefrom.

The control of the fluid flow will generally prevent a superfluity of lubricant on the knife edge. To further preclude any staining effect, a non-staining low viscosity type of oil may be used although this has not been found to be necessary. Again, a lubricant having a high heat absorption and flash point offers advantage in respect to increased efficiency and safety although it has been found that an ordinary mineral lubricating oil produces satisfactory results. As knife blade life is an important consideration, a non-corrosive lubricant is desired and water containing emulsions are not generally desirable.

My invention provides means for improving the operation of fabric cutting machines and reducing the maintenance thereof. While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claim.

I claim:

A fabric cutting machine having a vertically reciprocable knife, means for operating the knife including a motor provided with a casing, knife sharpening means spaced below the motor, a cutting lubricant receptacle mounted on the motor and substantially filled with wick material, lubricant supply means mounted on the reservoir and having an adjustable discharge means adapted to allow dripping of lubricant therefrom into the receptacle, and a plurality of ducts each communicating with the wick material in the reservoir and extending to points adjacent the knife below the motor and above the sharpening means, said ducts having wick material contained therein throughout the entire length thereof and extending outwardly from the duct ends adjacent the knife and in contact with the knife, thereby to draw cutting lubricant from the reservoir through the ducts and on the knife primarily by capillary action.

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