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PILE FABRIC CUTTER

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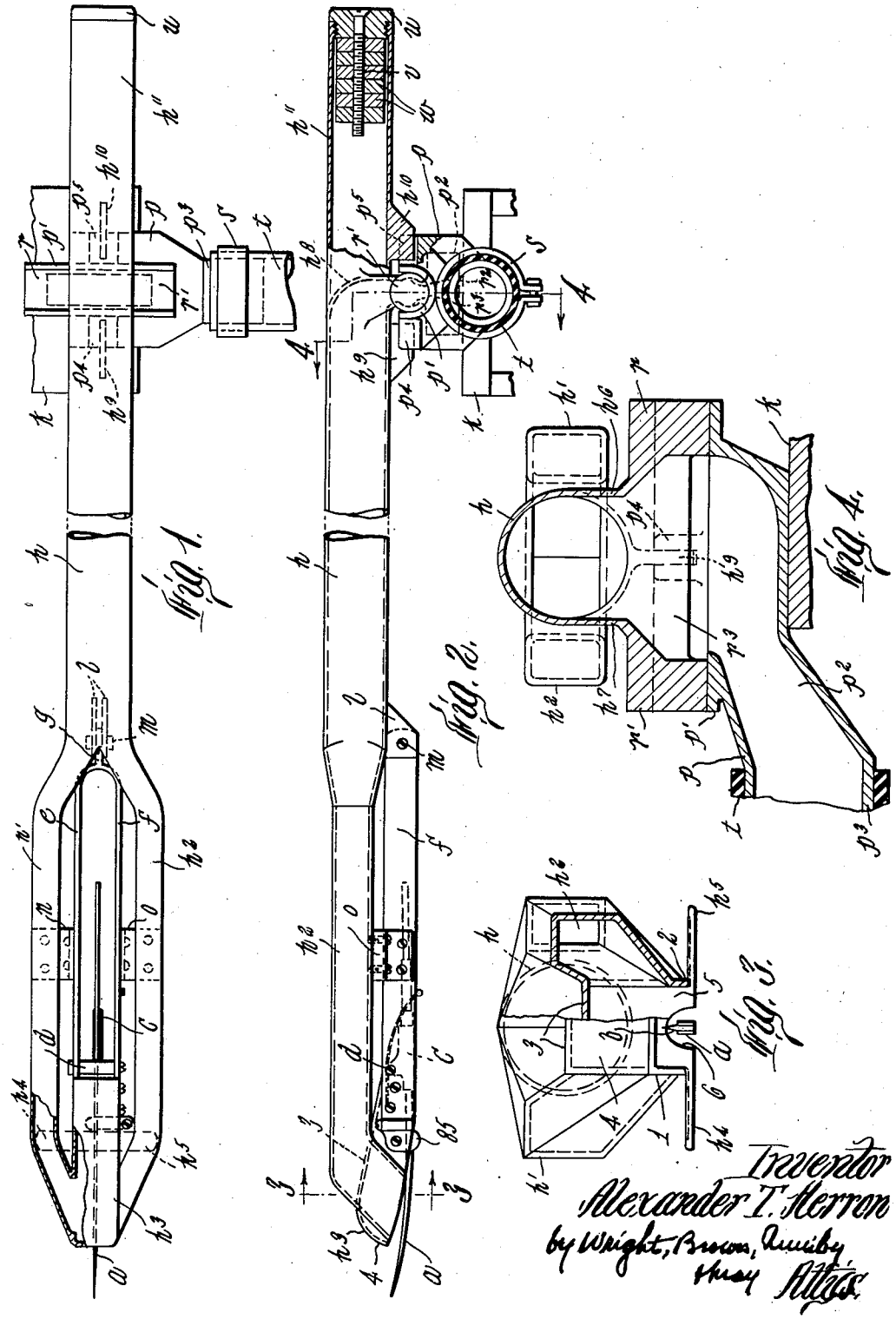


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

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PILE FABRIC CUTTER

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The present invention relates to means for cutting filling yarns of cloth in the manufacture of pile fabrics.

In the procedure of thus making pile fabrics, the cloth travels over a frame, and a long, thin, narrow blade encased, except as to its cutting edge, in a pointed guide is inserted into the weave parallel to the warp. The edge of the blade is exposed at the top side of the guide and, as the cloth is driven toward it, the filling yarn passing over the blade is cut, creating a pile. This process is repeated across the width of the cloth piece.

It has been customary heretofore, in machines of known character employed for doing this work, to mount the knife in a holder carried by an arm which is connected by suitable means to the frame of the machine. This arrangement does not provide for cooling of the cutting blade, which becomes heated by the rapid cutting of fibers, and consequently needs to be frequently resharpened; and it does not provide for the removal of the lint and dust which are produced by the operation.

A principal object of the invention is to provide means for drawing air over the cutting blade at and near the contact of its cutting edge with the fibers of the cloth, and thus maintaining the blade at a low temperature, decreasing the number of times the cutting machine must be stopped to permit resharpening of the blade, and removing lint and dust. Another object is to provide means whereby the blade supporting arm may move as required during the operation and an unobstructed passage continuously maintained for flow of air and dust. A further object is to provide means for counterbalancing the knife-carrying arm and adjusting the riding pressure of the arm on the cloth piece.

These and other related objects are accomplished by a combination of cutting knife, knife holder, and supporting arm therefor which is also a conduit for air, of which an illustrative embodiment is described in the following specification and illustrated in the accompanying drawings.

In the drawings,

Fig. 1 is a plan view, partly broken away and shown in section, of a combination embodying the principles of the invention in their presently preferred form;

Fig. 2 is a side elevation, also partly broken away, of the same combination;

Fig. 3 is in part a front elevation and in part a section taken on line 3—3 of Fig. 2 of the said combination;

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Fig. 4 is a cross section taken on line 4—4 of Fig. 2;

Figs. 3 and 4 are drawn to a larger scale than that of Figs. 1 and 2.

Like reference characters designate the same parts wherever they occur in all the figures.

The long and narrow knife guide a and knife blade b (Fig. 3), tapering to a point at the forward end, are of a common character and form and are secured in a holder c which is pivotally connected at d to, and between, the branches e and f of a forked frame, which is formed with a tongue g at its rear end.

A tubular arm h carries the frame e, f, g and is in turn connected with a suitable supporting structure k. The major part of the arm h extends forwardly from the supporting structure k and near its forward end it is divided to form two ducts h' and h^2 extending parallel to one another, with a space between them.

The cutting blade and its supporting frame are secured to the arm beneath the space between said ducts, the tongue g of the frame being contained between lugs l and secured by a bolt m, and the arms e and f of the frame being secured to the ducts h' and h^2, respectively, by brackets n and o. This arrangement enables the rear part of the blade and its guide to swing upward about the pivot d when the point becomes caught in the cloth, as occasionally happens.

The forward ends of the ducts h' and h^2 are inclined downwardly and inwardly and are joined to the sides of a nozzle or intake member h^3. Such intake member is made with side walls 1 and 2, to which the ducts are joined and through which are openings in register with the passageways through the ducts, a top wall 3 merging with a front wall 4 and extending rearwardly nearly as far as the pivotal connection of the blade holder, and a rear wall 5; these walls being joined together to form a box structure which is open at the under side. The nozzle is located with its side walls at opposite sides of the blade and in substantially the same plane therewith. A notch 6 is provided in the rear wall through which the blade passes, as shown by Fig. 3. Preferably the intake member is of such dimensions that it covers substantially so much of the blade as is in frictional contact with the cloth, and its bounding walls are disposed to cause flow of outer air along both sides of the blade and upwardly therefrom when a vacuum effect is produced in the tubular arm. Such flow of air, of course, cools the blade and carries away loose fibers, lint and dust which are produced by the cutting action of the blade.

Laterally extending feet h^4 and h^5 are connected with the side walls of the intake member to rest on the cloth.

The air conducting arm h is mounted on the support k in a manner which permits free flow of air through it and also permits it to swing about a horizontal axis transverse to its length. For this purpose a fitting p is bolted or otherwise suitably secured to the support k and is formed with a cylindrically curved concave saddle or bearing p' in its top side. The arm is provided with laterally extending trunnions r and r' which are joined to it by webs h^6 and h^7, and the axis of which is below the under side of the arm. These trunnions are of suitable radius to fit closely but rotatably in the saddle p'. Extending from one trunnion to the other, and having the same external radius, are webs r^2 and r^3 (shown dotted in Fig. 2), which provide continuation walls of an air passage from the under side of the arm h. The web r^2 is joined to a rear partition h^8 which extends across the interior of the arm, and the web r^3 is joined at its upper edge to the under side of the arm.

The fitting p is formed with an internal passageway p^2 having a port extending through the saddle p' which registers with the passageway between the webs r^2 and r^3. The fitting is also formed with a laterally extending cylindrical terminal p^3, the bore of which forms an extension of the passageway p^2, over which is secured, by a clamp s, a hose t which is connected with a vacuum pump.

It will be understood from the foregoing that the suction effect created by such a vacuum pump causes flow of air into the intake element h^3 and thence through the ducts h' and h^2 and the main portion of arm h, and thence through the passageway between the trunnion webs r^2 and r^3 to the passage p^2 of the fitting.

It may be noted that the port between the lower edges of the webs r^2 and r^3, and that in the saddle p' which communicates with the passageway p^2, are wide and in register when the arm occupies its normally prescribed position. The width of these ports and the extent to which the saddle p' embraces the trunnions and their webs are great enough to permit a considerable range of angular movement of the arm about the trunnion axis without obstructing the ports appreciably or admitting outside air to the passageway p^2.

Fins h^9 and h^{10} project downward from the under side of the arm h in alinement at opposite sides of the trunnion axis into slotted lugs p^4 and p^5 of the fitting p, to prevent displacement of the arm laterally. By means of these fins and the trunnion, the arm is retained in a prescribed position with respect to the supporting structure, while being free to oscillate to the degree necessitated by the conditions of its use.

A counterbalance arm h^{11} extends from the arm h in alinement therewith to the opposite side of the trunnion axis. This counterbalance arm is adapted to hold varying numbers of weights whereby to counterbalance in greater or less degree the weight of the arm h and the cutting means secured thereto. As a convenient means of varying the weight of the counterbalance arm, I have provided a cap u which is screw threaded into the end of the arm h^{11} and carries a screw v on which are threaded any desired number of weight-disks w.

While the construction and arrangement of parts herein described and illustrated is at present preferred to others, it is to be understood that various modifications may be made and equivalent structures substituted for parts thereof without departing from the spirit and scope of the invention.

What I claim is:

1. A blade cooling pile cutter comprising a tubular arm having a pivotal mounting with an axis transverse to its length, an intake member at a distance from said pivotal mounting, and an outflow passage through the pivotal mounting, combined with a pile cutting blade secured to the arm in a position to extend across the orifice of said intake member.

2. A blade cooling pile cutter comprising a tubular arm having spaced apart parallel ducts and an intake member between the corresponding ends of said ducts and to which the ducts are joined in air flow connection, combined with a frame secured to said arm extending lengthwise of the space between the ducts and a cutting blade guide and blade combination pivoted to said frame and having an operative portion extending across the orifice of said intake member and a rear portion extending from its pivot in register with the space between said ducts; the arrangement being such that said rear portion is adapted to swing upward through said space when the operative portion, under conditions of use, becomes caught in the cloth.

3. A blade cooling pile cutter comprising in combination with a support, a tubular arm having pivotal engagement with said support on an axis transverse to its length, said arm having an intake member at its extremity and an outlet passage through said pivotal connection, a pile cutting blade connected with the arm to be carried thereby in a position wherein its active portion extends across the orifice of said intake member, and a counterbalance arm connected with said tubular arm and extending away therefrom at the opposite side of the pivot axis.

4. A blade cooling pile cutter comprising a tubular arm having an intake member at its extremity, a transverse trunnion structure connected to said arm at a distance from the intake member having a through passage communicating with the interior of the arm, a pile cutting blade secured to the arm and carried thereby in a position such that its active portion extends across the orifice of said intake member, and a vacuum connection in communication with the passage through said trunnion structure.

5. A blade cooling pile cutter comprising a tubular arm having an intake member at its extremity, a transverse trunnion structure connected to said arm at a distance from the intake member having a through passage communicating with the interior of the arm, a pile cutting blade secured to the arm and carried thereby in a position such that its active portion extends across the orifice of said intake member, a vacuum connection in communication with the passage through said trunnion structure, and a counterbalance arm connected with the tubular arm and extending therefrom at the opposite side of the axis of said trunnion structure.

6. A blade cooling and lint removing pile cutting means comprising a supporting structure, a fitting secured to said supporting structure having a cylindrically concave saddle in its upper side, an outlet connection with vacuum means, and an internal passage between a port in said saddle and said outlet connection, a tubular arm having a transverse trunnion extending across

one side rotatably seated in said saddle, there being a passage through said trunnion in communication with the interior of the tubular arm and with said port, the tubular arm having an intake member at its extremity, and a pile cutting knife secured to said arm with its active portion extending across the orifice of said intake member.

7. A blade cooling and lint removing pile cutting means comprising a supporting structure, a fitting secured to said supporting structure having a cylindrically concave saddle in its upper side, an outlet connection with vacuum means, and an internal passage between a port in said saddle and said outlet connection, a tubular arm having a transverse trunnion extending across one side rotatably seated in said saddle, there being a passage through said trunnion in communication with the interior of the tubular arm and with said port, the tubular arm having an intake member at its extremity, a pile cutting knife secured to said arm with its active portion extending across the orifice of said intake member, a counterbalance arm connected with the tubular arm extending therefrom at the opposite side of the trunnion axis, and removable weights carried by said counterbalance arm.

8. The combination of a connected suction arm and counterbalance arm extending to relatively opposite sides of a fulcrum point, the suction arm having an intake member at its outer end, the counterbalance arm being tubular and having means for containing a variable number of

weights in its interior, and a pile cutting knife secured to said suction arm with its operative portion extending across the orifice of said intake member.

9. In a blade cooling pile cutter of the character described, a tubular counterbalance arm, a cap removably secured to the outer end of said arm, a screw connected to said cap extending into the interior of the arm, and weight disks threaded on said screw.

10. A blade cooling pile cutter comprising a tubular arm having a downwardly inclined air intake member at its forward end with an orifice at its under side, a long, slender pile cutting blade having a top cutting edge adapted to be passed through the loops of a pile fabric, carried by said arm and extending beneath and across the orifice of said intake member, and connections for exhausting air from the tubular arm at a point distant from the intake member and cutting blade.

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