Feb. 14, 1933. M. VITOUX 1,897,452

MACHINE FOR OPERATING RELOOPING TOOLS

Filed Jan. 29, 1932

Fig. 1

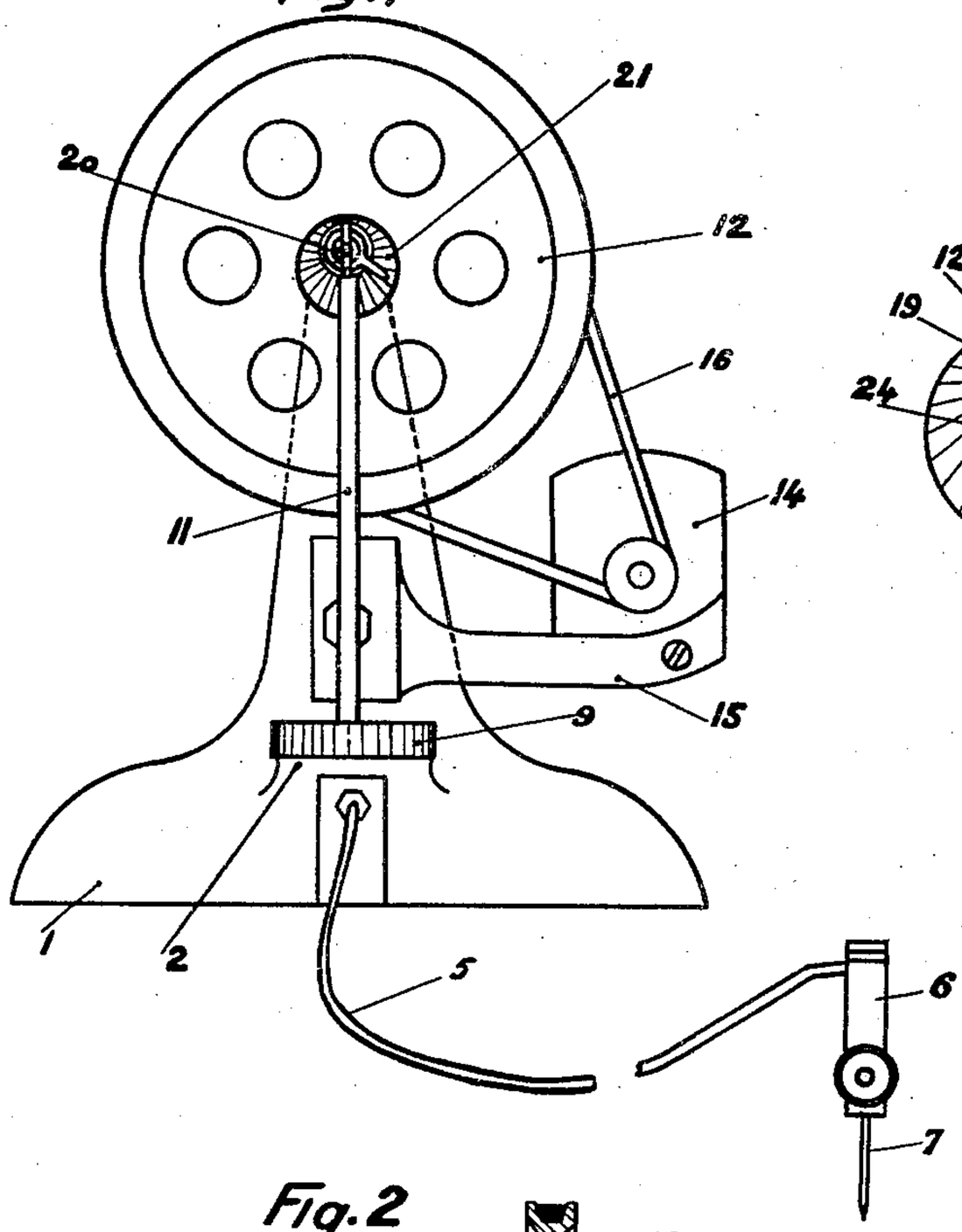


Fig. 3

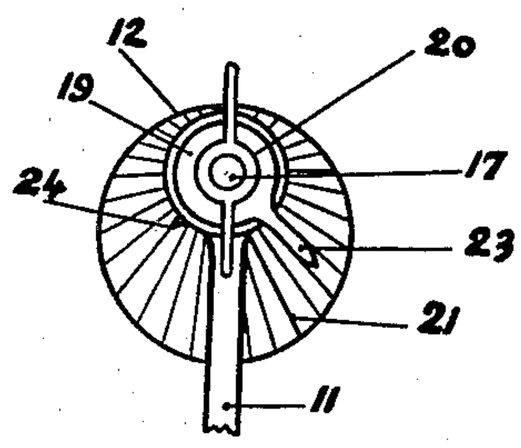


Fig. 2

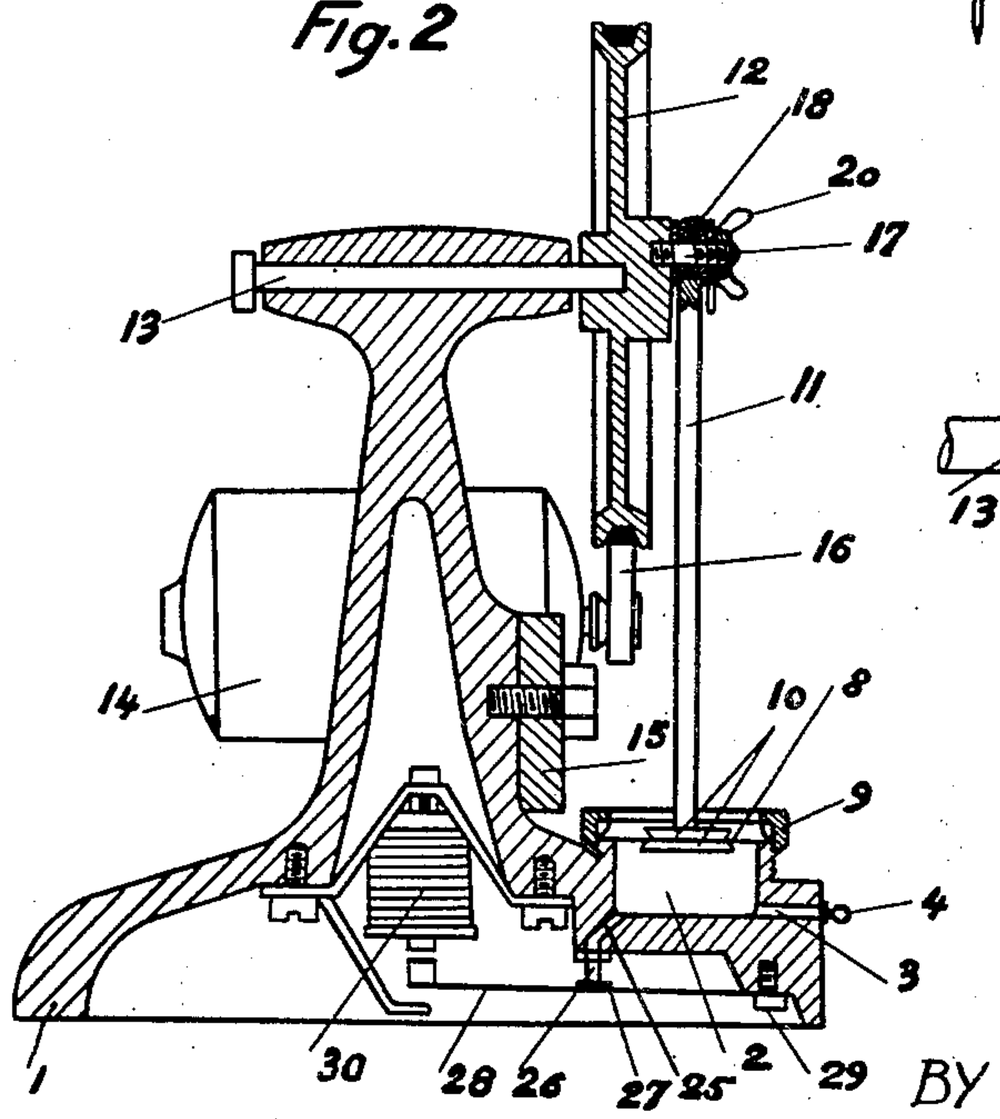
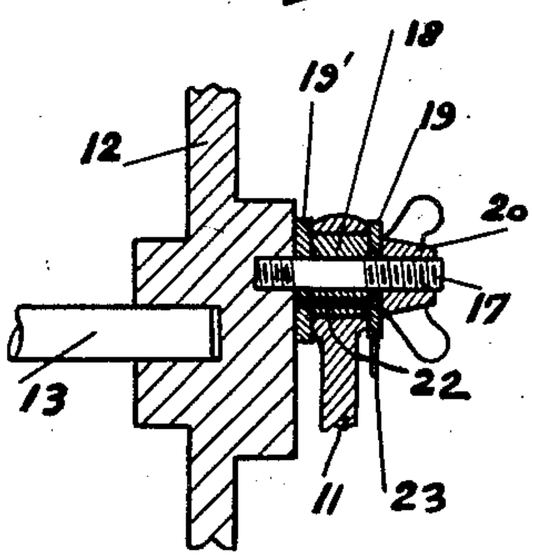


Fig. 4



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UNITED STATES PATENT OFFICE

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MACHINE FOR OPERATING RELOOPING TOOLS

Application filed January 29, 1932. Serial No. 589,593.

This invention relates to improvements in machines for pneumatically operating tools or needles used for relooping runs in stockings and other knitted articles. The invention refers more particularly to a machine of this kind generating impulses of compressed air which are utilized to actuate the holder of the relooping tool or needle. The handle used in this machine is of well known construction and consists of a hand-held cylinder containing a reciprocating piston constituting the tool holder.

An object of this invention is to provide a machine by means of which the power of the air impulses supplied within the handle containing the sliding needle-holding piston can be easily and accurately adjusted, so that pulsations of a varying intensity may be transmitted to said piston and the same needle may be used for relooping all the different knitting patterns, irrespective of the nature of the thread, i. e. whether it is made of flax, cotton, wool, silk, artificial silk, or other fibres, and of the texture of the knitted pattern, i. e. whether it is thick and tight, or thin and loose.

Another object of this invention is to provide a machine by means of which the needle may be stopped instantaneously although the motor continues to run, thus eliminating all chances of a flaw showing in the fabric as well as any chance of damage done to the needle by impact with the frame onto which the fabric, i. e. the article to be relooped, is stretched.

The invention will appear more clearly from the following detailed description, when taken in connection with accompanying drawing which illustrates a preferred embodiment of the inventive idea.

In the drawing:

Fig. 1 is a side elevation of a compressed air machine, together with a handle and its needle, and the pipe connecting the latter with the machine.

Fig. 2 is a vertical section through this machine some parts being shown in side-elevation.

Figs. 3 and 4 are detail views on a larger scale, showing the mounting of the connecting rod on the machine in side-elevation and in cross-section respectively.

This machine comprises a stand 1 surrounding cylindrical chamber 2 (Fig. 2) communicating through a duct 3 with a nozzle or fitting 4 arranged outside the stand, and which may be connected by a flexible pipe 5 (Fig. 1) to a passage communicating with the top portion of a cylindrical handle 6 of the type described in my co-pending patent application Ser. No. 371,997, filed June 19, 1929. The handle 6 is provided with a sliding member carrying a relooping tool or needle 7, said member being moved downwardly by the air impulses generated by the machine and conveyed through the pipe 5, and being moved back to its original position in the cylinder by a return spring, not shown in the drawing.

The top of cylindrical space 2 is completely shut off by means of resilient diaphragm 8 stopped round the periphery thereof by threaded cap 9 which is screwed on a threaded part of the casing surrounding the chamber 2.

The resilient diaphragm 8 is held tight between two flanges 10 fixed to a connecting rod 11 reciprocated by a pulley 12, said pulley being carried by a shaft 13 fitted to the stand 1, and being driven by an electro-motor 14 carried on a bracket 15 mounted on the stand 1; a belt 16 is used to transmit the motion of the motor 14 to the pulley 12.

The rod 11 is held on the hub of the pulley 12 by means of a stud or knob 17 with threaded ends, one end being screwed into the hub at a point which is excentrical with respect to the shaft 13. A cylindrical bush 18 fits loosely over stud 17 and its periphery is out of centre with its bore; the ends of the bush 18 are provided with flanges 19 and 19′ which are held tightly on the bush 18, by means of a pin 22. The rod 11 fits loosely over bush 18, and due to this arrangement the movements of the connecting rod are regulated by the rotation of the bush 18 which is held by a butterfly nut 20 screwed over the end of the stud 17.

Due to the rotation of the pulley 12, the connecting rod 11 is reciprocated up and down so that the resilient diaphragm 8 is

made to undergo alternative downward and upward deformations resulting in the transmission of air impulses within the handle 6, said air causing the needle to move outwards. The backward movement of the needle is produced by a return spring not shown in the drawing. During the suction stroke of the diaphragm a piece of stamped leather on the piston sliding in handle 6 allows a free passage of air, the needle 7 being forced outwards only on recurrence of the compression stroke, with the result that, irrespective of the position of the machine on starting, the needle always starts from the same rest position on the compression stroke. By means of this feature the operation of the machine is considerably improved.

The regulation of air pressure for the impulses, which is required to carry out work on knitted articles of varied fabrics with one and the same needle is carried out by the regulating fitting on the head of the connecting rod 11. In order to regulate the travel of the connecting rod and consequently, the pressure, it is only necessary to loosen the nut 20 and to rotate the excentered bush 18, the latter being operated by means of a finger 23 carried by the flange 19. This adjustment may be recorded by providing the hub of pulley 12 with a quadrant 21 over which a pointer 24 arranged on the flange 19′ may be deflected.

The electric motor 14 may be controlled in any known manner by means of foot controlled starting rheostat.

In order to insure an instantaneous stoppage of needle 7 as soon as the current is cut off and while the motor still continues to run, means are provided to effect an immediate communication between the chamber 2 and the outside air. For this purpose said chamber 2 is connected by a duct 25 to a fitting 26 controlled by a shutter 27 made, for example, of rubber, and carried on a flexible metal blade 28, one end of which is fastened at 29 underneath the stand 1, while its other end faces on electro-magnet 30 through which flows the exciting current of the motor, and which is connected with the armature thereof either in series or in shunt.

It will be readily understood from the foregoing that, as long as the current flows through the electro-magnet 30, the blade 28 will be drawn and the shutter 27 will close the fitting 26. On the other hand, as soon as the current is cut off, the blade 28 is released and the shutter 27 will leave the fitting 26, allowing the air to escape through said fitting, so that the piston in the handle 6 stops instantaneously although the machine still continues to run for a while.

I claim:

1. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber with said member, a diaphragm forming a wall of said chamber, a rod connected with said diaphragm, means for reciprocating said rod, and means for adjusting the position of said rod for varying its length of travel.

2. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber, with said member, a diaphragm forming a wall of said chamber, a rod connected with said diaphragm, a pulley mounted on said stand, a stud carried by said pulley, a bush mounted on said stud, said bush being excentrical with respect to said stud and carrying one end of said rod, and means for turning said bush for the purpose of adjusting the position of said rod.

3. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber with said member, a diaphragm forming a wall of said chamber, a rod connected with said diaphragm, a pulley mounted on said stand, a stud carried by said pulley, said stud being eccentrical with respect to said pulley, a bush mounted on said stud, said bush being excentric with respect to said stud and carrying one end of said rod, a flange on said bush, a pin holding said flange, a finger on said flange for adjusting said bush, and means for recording the position of said bush.

4. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber, with said member, a diaphragm forming a wall of said chamber, a rod connected with said diaphragm, means for reciprocating said rod, and means connecting said chamber with outside air, the last-mentioned means being operable to effect an instantaneous stopping of said working tool.

5. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber with said member, a diaphragm forming a wall of said chamber, a rod connected with said diaphragm, a pulley mounted on said stand and reciprocating said rod, an electromotor for rotating said pulley, a shutter adapted to cover a duct leading from said chamber to the outside air, a blade carrying said shutter, an electro-magnet influencing

the position of said blade, and means for electrically connecting said electro-magnet with said motor, the exciting current of the motor flowing through said electro-magnet.

6. The machine for operating relooping tools, comprising in combination, a relooping tool having a pneumatically actuated member, a stand comprising a chamber containing a working fluid, means connecting said chamber with said member, a diaphragm forming a wall of said chamber, a cap screwed on a part of said stand, a flange holding said diaphragm, a rod connected with said flange.

In testimony whereof I have affixed my signature.

MARCEL VITOUX.