(No Model.)

P. VANDEN KERCHOVE.

DEVICE FOR COOLING MACHINE TOOLS.

No. 354,498. Patented Dec. 14, 1886.

Fig. 1.

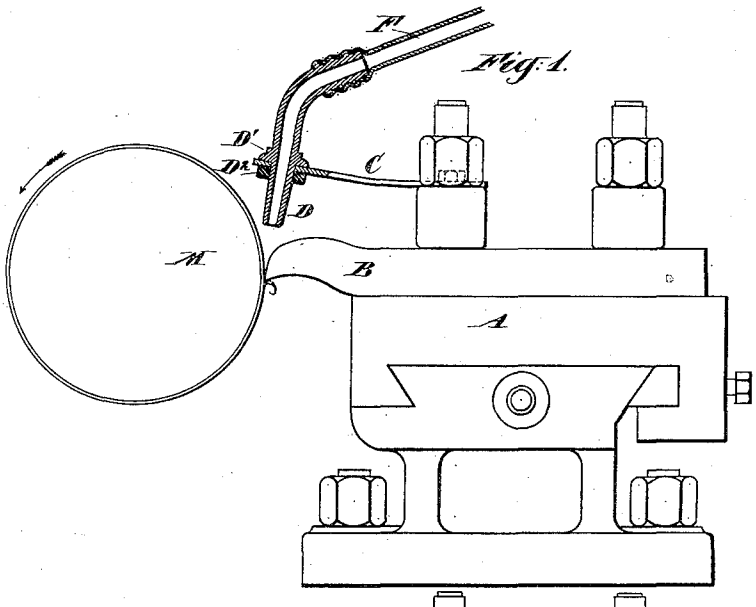


Fig. 2.

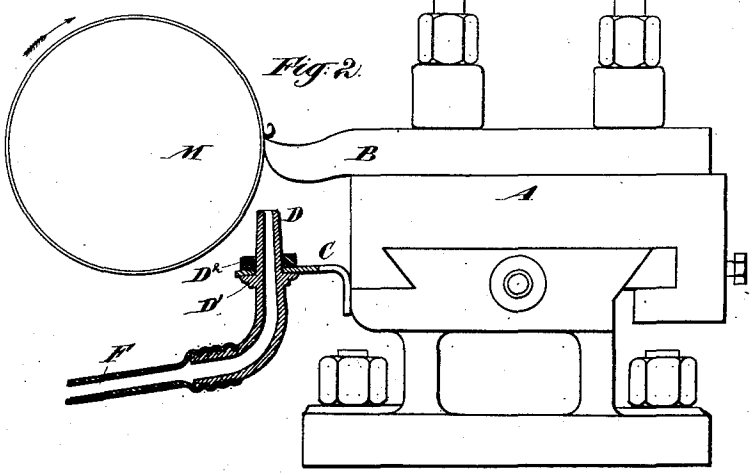
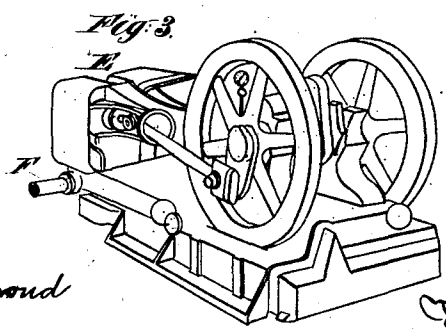


Fig. 3.



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UNITED STATES PATENT OFFICE.

PROSPER VAN DEN KERCHOVE, OF GHENT, BELGIUM.

DEVICE FOR COOLING MACHINE-TOOLS.

SPECIFICATION forming part of Letters Patent No. 354,498, dated December 14, 1886.

Application filed July 22, 1886. Serial No. 208,609. (No model.) Patented in Belgium January 13, 1886, No. 71,601.

To all whom it may concern:

Be it known that I, PROSPER VAN DEN KERCHOVE, of Ghent, in the Province of East Flanders, in the Kingdom of Belgium, have invented a certain new and useful Improvement in Means for Cooling Machine-Tools, of which the following is a specification.

In the working of all drilling, planing, boring, milling, turning, and other machine-tools there is danger of the cutting-edge of the tool proper becoming heated, so as to lose its temper, especially if it is attempted to increase the speed of the machine beyond certain limits. I have devised simple and efficient means for keeping the cutter cool, so that it is possible to drive machine-tools at higher rates of speed, and thereby materially increase the "yield" of work accomplished. I artificially cool air or other fluid and deliver it in one or more streams upon the cutter near the cutting-edge by a tube equipped with a suitable nozzle.

The accompanying drawings form a part of this specification. Each represents a longitudinal section through the delivering-nozzle, with an elevation of the lathe-tool and the rest therefor in the act of turning a "chip" from wrought-iron.

Figure 1 shows the tool with its cutting-edge directed downward. Fig. 2 shows the same or a corresponding tool mounted with its cutting-edge presented upward. In this figure the shaft or other article to be turned is revolved in the opposite direction to that in Fig. 1. Fig. 3 is a perspective view of a machine for compressing air with a view to obtaining cold by its subsequent expansion.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the tool-rest, of an ordinary construction, and B is the tool or cutter, firmly held to the tool-rest by ordinary or suitable means.

C is a support for the nozzle, engaged to the tool-rest so as to move therewith.

D is the nozzle for delivering cold air. It is equipped with a collar, D', and with a nut, D^2, which latter applies on the nozzle.

E is a machine for compressing, cooling, and expanding air. I prefer what are known as "H ll's Cold-Air Machines;" but any apparatus which will deliver a constant stream of air at a low temperature may be used instead.

F is a rubber hose connecting the cold-air machine E with the discharge-nozzle D. The arrangement allows the tool-rest A, and consequently the tool B, to traverse backward and forward along the shaft M, and also to be adjusted forward and backward without disturbing the connection. In all the movements the nozzle D delivers a jet of cold air constantly on the same point on the cutter B—a point close to or at the cutting-point.

In the ordinary working of the apparatus cold dry air will be delivered through the nozzle D, and by rapidly abstracting heat from the tool B near the cutting-edge will maintain the low temperature desired at the cutting point.

The apparatus may be varied in its action by delivering a small quantity of water with the air.

Inasmuch as the quality of the work accomplished by the cutter remains substantially the same, my invention, by allowing a marked increase in the speed, secures a net increase in the amount of work accomplished by the tool. This is important in saving the time of the attendant, and in shops which are greatly driven in saving time in the employment of the machine. These constitute important factors in the profitable working of machine-tools.

I can eject artificially-cooled water instead of air, the water being either pure or more or less saturated with bicarbonate of soda or other suitable ingredient to lubricate and prevent rusting, in addition to the principal function of cooling.

My invention differs materially from the ordinary plans of presenting water, oil, or other fluid to a small jet at ordinary temperatures. My invention abstracts the heat so rapidly and holds the metal close to the cutting-edge at so low a temperature that the cutter may serve perfectly with a much higher speed of rotation of the article being turned than can be employed with any means previously known to me.

The invention may apply to planers and to the whole line of cutting-tools employed in a machine-shop, taking care to employ in each case a sufficiently-long flexible hose, and in the case of quickly-working planers to properly suspend the hose. It is especially valuable with milling-tools, and in treating by cold

dry air alone material in which the use of water, oil, and other ordinary cooling agents is not permissible.

I claim as my invention—

The apparatus E, for delivering fluid at a low temperature, the flexible hose F, nozzle D, and holding means, as D' D', in combination with each other and with the cutter of a lathe or other machine tool, and with a connection, as C, for supporting the nozzle on the tool-rest so as to be carried therewith, substantially as herein specified.

In testimony whereof I have hereunto set my hand, at Ghent, Belgium, this 9th day of June, 1886, in the presence of two subscribing witnesses.

P. VAN DEN KERCHOVE.

Witnesses:

C. DE CUYPER,

G. WESTERLINCK.