

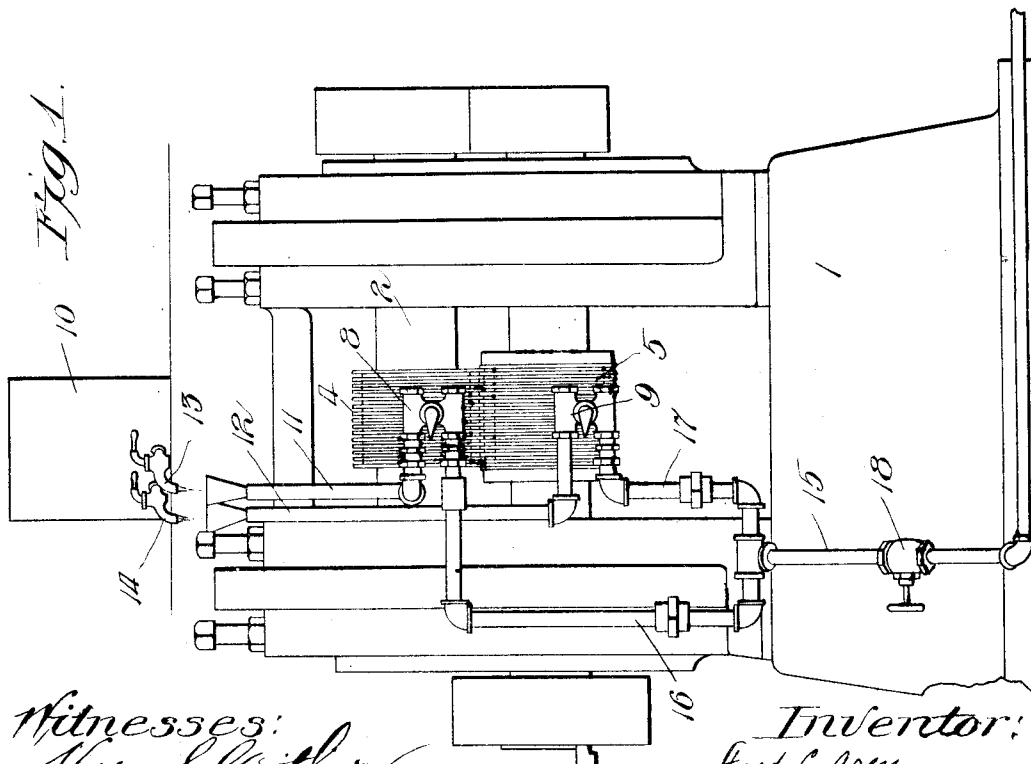
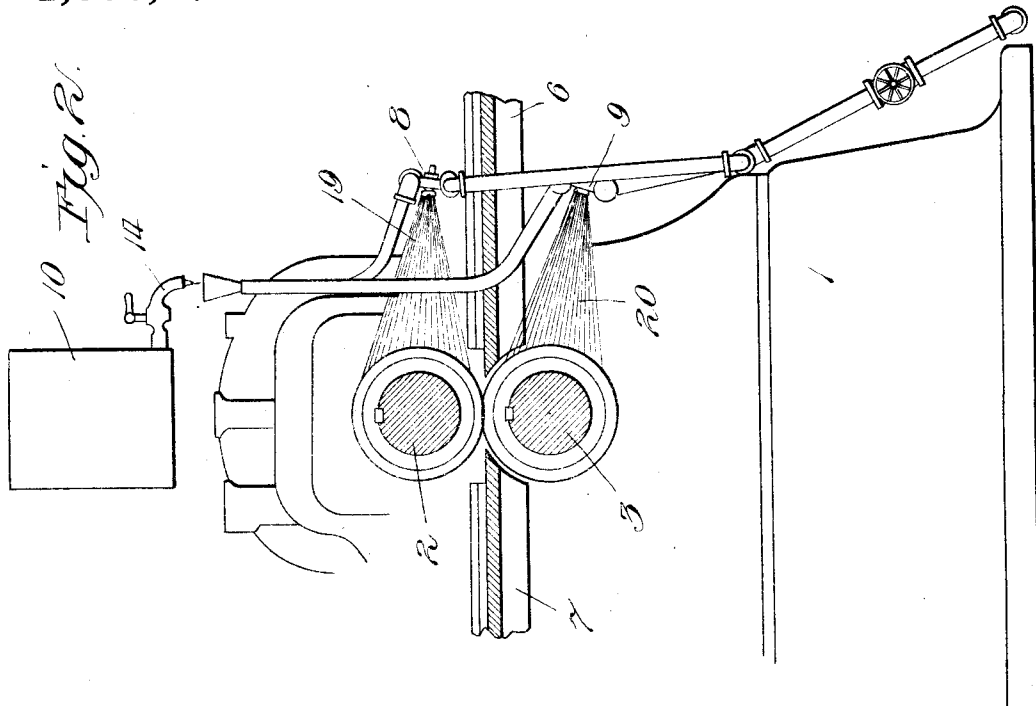
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COOLING AND LUBRICATING APPARATUS FOR DIES AND METAL WORKING MACHINES.

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1,036,173.



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UNITED STATES PATENT OFFICE.

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COOLING AND LUBRICATING APPARATUS FOR DIES AND METAL-WORKING MACHINES.

1,036,173.

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To all whom it may concern:

Be it known that I, FRED C. AREY, a citizen of the United States, residing at Oak Park, county of Cook, State of Illinois, have
5 invented a certain new and useful Improvement in Cooling and Lubricating Apparatus for Dies and Metal-Working Machines, and declare the following to be a full, clear, and exact description of the same, such as
10 will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

One of the problems in the manufacture
15 of expanded sheet metal work, wherein the sheet metal is fed through slitting dies to prepare it for the expanding operation, is the lubrication and the cooling of the slitting dies. Heretofore the common practice
20 has been to drip upon the dies oil, or an oil emulsion. The difficulty of distributing the lubricant evenly over the dies and of regulating the flow of the lubricant during the operation of the machine has always made it
25 necessary to use much more oil or other lubricating material than is necessary for mere lubrication and therefore there has always been a waste of lubricating material and a collection of the same in globules or
30 masses upon the sheets passing through the machine. Where the product of the machine is to be painted after its completion it has heretofore been necessary to treat it prior to the painting operation so as to clean
35 it of the oil thereon. Where the product is to be shipped in an unpainted condition the lubricant, particularly where it is an emulsion of oil, has had the disadvantage of causing rust, so that often it has been necessary
40 to clean the product and paint it in order to make it salable. Not only has the lubricating operation heretofore been costly and inefficient, but even with the excess of lubricating material employed it has been
45 found impossible to keep the temperature of the slitting dies within safe working limits after a predetermined peripheral speed has been reached and therefore the capacity of machines has been kept down by the temperature factor.
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The object of my invention is to produce a simple and novel expedient by which metal working dies, such as slitting dies, may
55 be lubricated efficiently with a minimum amount of lubricant, in such a way that the

lubricant cannot collect upon the work in globules or masses of any appreciable size but will be caused to evaporate almost as soon as the work has left the machine, and in such a way that the dies are cooled sufficiently to permit the capacity of a machine to be increased greatly beyond that which has heretofore been practicable.

The various features of novelty whereby my invention is characterized will be hereinafter pointed out with particularity in the claims; but, for a full understanding of my invention and of its object and advantages, reference may be had to the following detailed description taken in connection with
70 the accompanying drawing, wherein:

Figure 1 is a front elevation of a machine for slitting sheet metal, the work-receiving table being omitted; and Fig. 2 is a view
75 partly in side elevation and partly in section, only enough of the framework being indicated to show the relation of the dies to the rest of the machine.

Referring to the drawing, 1 represents a suitable framework on which are mounted
80 two horizontal parallel shafts 2 and 3, one above the other. On the shafts are coöperating disk-like cutters 4 and 5 which form the male and female members of coöperating slitting dies. In front of the dies is a
85 work-receiving table 6 and behind the dies is another table, 7, for receiving the slitted sheets. The tables are located midway between the axes of the dies so that the work on the table 6 lies in position to enter between the dies when it is pushed forward,
90 and the table 7 lies in position to receive the work as it leaves the dies. Above the table, directly in front of the upper die, is an atomizer 8 of any suitable construction. Below the table and directly in front of the lower die is a similar atomizer 9. Above the machine is supported a receptacle 10 for
95 containing a suitable lubricant, either oil or an emulsion of oil. From the atomizers two pipes 11 and 12 extend into proximity to the lower end of the receptacle from which they receive lubricating material in any suitable manner, conveniently by providing the receptacle with two cocks or faucets 13 and 14,
100 the mouths of which lie above the upper ends of the pipes 11 and 12, respectively. A pipe 15, having branches 16 and 17 leading to the two atomizers, is adapted to supply air under pressure to the atomizers. In the
110

pipe 15 is a valve 18 which may be opened and closed so as to control the flow of air.

The compressed air may be obtained from any suitable source, not shown. I desire to have the air, when it leaves the atomizers and strikes the dies, to be below the ordinary atmospheric temperature in order that it will cool the dies more rapidly than if it were warmer. The air could, of course, be cooled in any suitable way, but I have found that preliminary cooling below the temperature of the atmosphere is unnecessary where the pressure is great enough to cause a considerable reduction in temperature through the adiabatic expansion of the air as it passes through and out of the atomizers; a sufficient pressure for this purpose being about fifteen pounds above atmospheric pressure.

Assuming that the machine is in operation, the dies revolving and drawing in work from the receiving table, and the valve 18 and the cocks 13 and 14 being open: the lubricating material flows into the atomizers and is there picked up by the incoming air so that each atomizer directs against one of the dies a conical current of air, as indicated at 19 and 20, respectively, impregnated with minute particles of lubricating material or, in other words, with atomized lubricating material. By regulating the flow of lubricating material, the amount which is supplied to the dies can be limited to that which is just sufficient for lubricating purposes, being supplied uniformly over the dies in the form of a fine mist. As the work passes through the dies, on which there is only this fine mist of lubricating material, there are no globules or masses of lubricating material to collect on the work, and therefore the work leaves the dies in a clean condition except that it may have collected a very fine misty coating which will be evaporated by the surrounding air almost instantaneously.

It will thus be seen that I have produced a simple and efficient means for lubricating dies without permitting an accumulation of lubricating material to collect upon or be taken up by the work; at the same time effectively cooling the dies so that their speed and consequently the capacity of the machine may be greatly increased.

In order to explain fully the principle of my invention I have illustrated it as applied to a well known form of metal lath machine, but I do not desire to be limited to this particular application of my invention. Neither do I desire to be limited to any particular mechanical or structural details of the atomizers, since my invention may be carried out by using any well known type of atomizer which will break up globules of lubricating material into finely divided particles and eject them in the form of a mist carried by the atomizing current of air.

I claim—

1. In combination, coöperating rotary slitting dies arranged one above the other, a work-receiving table lying in advance of the dies to support the work in position to be fed between the dies, an atomizer arranged above the table in position to direct a current against the upper die, a second atomizer located below the table in position to direct a current against the lower die, means for delivering a lubricating material to said atomizers, and means for supplying the atomizers with air under sufficient pressure to cause a considerable lowering in the temperature of the air through adiabatic expansion.

2. The combination with high speed rotary slitting dies, of atomizing apparatus located in proximity to the dies for enveloping them in a cold mist containing an atomized lubricating element, means for supplying to said apparatus a lubricating material, and means for supplying to said apparatus air under pressure.

3. The combination with coöperating rotary slitting dies, of an atomizer located in proximity to each of the dies and adapted to direct against the same a fluid in the form of a conical spray, means for supplying to each of the atomizers a lubricating material, and means for supplying to each of the atomizers air under sufficient pressure to cause the dies to be enveloped in a fine mist.

In testimony whereof, I, sign this specification in the presence of two witnesses.

FRED C. AREY.

Witnesses:

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