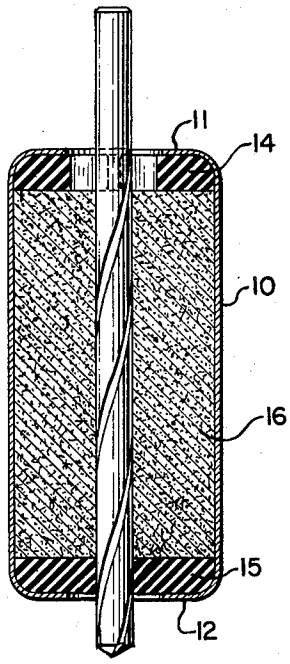
Aug. 19, 1958 C. E. NEIDIG 2,847,880

CUTTING TOOL LUBRICATORS AND CLEANERS

Filed June 29, 1953

FIG. 1.



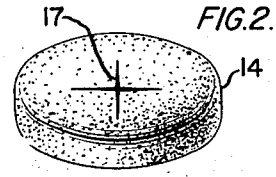


FIG. 2.

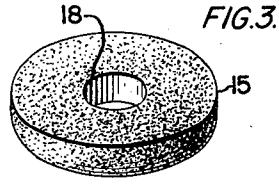


FIG. 3.

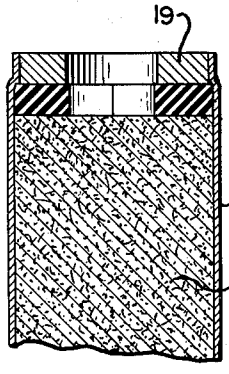


FIG. 4.

CLAUDE E. NEIDIG,
INVENTOR.

BY W. Glenn Jones

United States Patent Office 2,847,880 Patented Aug. 19, 1958

2,847,880

CUTTING TOOL LUBRICATORS AND CLEANERS

Claude E. Neidig, Van Nuys, Calif.

Application June 29, 1953, Serial No. 364,889

1 Claim. (Cl. 77—55)

This invention relates to a novel means for lubricating drills, small end mills, engraving cutters, and the like, when used in drill presses, portable hand and electric drills, milling machines, duplicators, engraving machines, jig borers and similar machine tools designed for working in and on any such comparatively hard material that requires the application of a lubricant or coolant to the cutting tool.

The necessity of lubricating and cooling the cutting tool when it is operated at high speeds and in cutting or drilling metal, in particular, is universally recognized. Such lubricating and cooling means usually require pumps, tanks, hoses and nozzles and means attached to or incorporated into the machine to catch and drain away the customary flood of cutting compound. Where no such complicated apparatus is furnished, it is customary for the operator to apply the cutting oil to the tool by means of a brush or swab. This manual procedure is accompanied by a certain amount of danger and requires the operator to take his attention from the work in hand. Such manual procedure further consumes time and curtails production.

Another concomitant of prior art and present drill and cutter lubricant means is the spattering and throwing of the lubricant from the cutter or drill. In certain types of high speed machines, elaborate shields are provided to prevent and control such spattering and throwing of the cutting compound, thus conserving the compound and protecting the operator.

The primary object of this invention, therefore, is to supply a cooling and/or lubricating material to the point of the cutting tool or drill in such measured quantity as may be best required and in the most economical manner.

Another object of this invention is to accomplish the aforesaid lubrication and cooling in such manner as to prevent, or at least minimize, spattering, throwing, and wasting of the cutting compound.

A further object of this invention is to enable the operator to clean the cutter or drill with facility, ease, and dispatch.

Further aims, objects, and advantages of the invention will appear from a consideration of the description which follows in connection with the accompanying drawing in which:

Figure 1 is a sectional elevation of my invention as applied to a drill.

Figure 2 is a perspective view of one of the diaphragms used in the invention,

Figure 3 is a perspective view of the other of the two diaphragms, and

Figure 4 is a part sectional elevation illustrating another type of end construction of the shell of my invention.

Referring to the drawings, Figure 1 illustrates one embodiment of my invention wherein the shell **10** may be made of metal, plastic, or other durable material adapted to retain its shape when subjected to the centrifugal forces set up during its high speed rotation with the drill or

cutter. The ends **11** and **12** of the shell **10** may be spun over, formed or molded, as shown, so as to retain the parts and materials carried therein. Diaphragms **14** and **15** are inserted into the shell **10**, adjacent the ends **11** and **12**, prior to the spinning over or molding process. These diaphragms **14** and **15** are made of a resilient material such as rubber, neoprene, rubber-like compound, felt, leather, or such similar material. The only requirements are the diaphragm material must not only be resistant to the cutting or lubricating compound but must be sufficiently flexible as to admit different sizes of drills and cutters and yet retain close contact therewith.

Shell **10** is filled with a lubricating compound **16** which is semi-solid or solid at ambient temperature and which will slowly melt under the influence of the increasing temperature of the drill or cutter as it commences and continues its cutting operation. A number of such compounds are now on the market and well-known to the trade.

With reference to Figure 2, it will be observed that diaphragm **14** is provided with a cruciform slit **17**. This opening is thus constructed so that it may cling to the flutes of the drill or cutter for a purpose hereinafter explained.

As shown in Figure 3, the lower diaphragm **15** is formed with a circular orifice **18** which is of such size as to conform with the diameter of the smallest drill or cutter which may be inserted therein. The orifice **18** is made circular so as not to impede the flow of lubricant or cutting compound through the flutes of the drill or cutter.

In operation, the drill or cutter is placed in the chuck or other holding device. My invention is then placed at the cutting end with the upper or slitted diaphragm **14** first contacting the drill or cutter. The device is then pushed on the drill or cutter until the cutting end protrudes slightly through the lower diaphragm **18**. The cutting operation may then commence.

As the drill or cutter contacts the work, it becomes heated. This heat is transferred by conduction to the mass of the solid or semi-sold lubricant. As the latter heats up, its viscosity is lowered and it starts flowing down the flutes to the cutting edges. If the drill or cutter continues to heat, the lubricant will follow suit and a greater flow thereof will result. Thus, the quantity of lubricant or cutting compound is automatically controlled by the heat developed in the cutting operation.

As the drill or cutter penetrates further into the work, the lubricator **10** is forced upwards. However, it always remains more or less in contact with the work and thus covers that portion of the drill or cutter receiving the lubricant. This provision effectually prevents the spattering or throwing of oil or cutting compound particles as previously mentioned.

Upon the completion of the drilling or cutting operation, the drill or spindle head is retracted, thus drawing the drill or cutter away from the work. As the drill or cutter is being retracted, the operator grasps the lubricator **10** and by a downward or outward movement removes it from the tool. The points made by the cruciform slit in the upper diaphragm **14** then ride down the flutes and the drill or cutter is automatically cleaned for the next operation.

It is to be understood that these lubricators will be made in various sizes as may be necessary to efficiently co-operate with the sizes of the drills or cutters to be used. Thus, as an example, three sizes of lubricators will effectively cover the letter size drills, A to Z. Four sizes would probably be necessary for the number drills, 1 to 60.

Figure 4 illustrates a different type of end construc-

tion of the shell **10**. Instead of spinning or forming the ends **11** and **12** as shown in Figure 1, inserts **19** may be soldered or crimped or otherwise secured to the unformed ends of shell **10**. These inserts could be used when it might not be desirable to form the ends as shown in Figure 1 due to lack of the necessary facilities or for other good economical reasons. Also, in certain high speed operations, it might be necessary to use inserts **19** of a hardened or refractory material.

It should be understood that while the embodiments of my invention have been shown with a shell and diaphragms of generally circular cross-sections, these parts may be of square or polygonal cross-section. Also, while the slit in upper diaphragm **17** has been shown of a generally cruciform construction, three or more slits could be used, thus resulting in more points which might be necessary when working with reamers or other multi-fluted cutting tools.

While I have shown and described the preferred form of my invention, I wish it to be understood that I am aware of the fact that the construction and arrangements of parts may be changed by those skilled in the art without departing from the spirit of the invention as indicated by the appended claim.

I claim:

In combination with a fluted cutting tool and a work piece, a lubricating and cleaning member comprising a hollow cylindrical shell having a first or upper and second or lower resilient diaphragms closing the ends of said shell, said first diaphragm having an orifice in the form of a cruciform slit whereby the resilient points

formed by the said slit in the said first diaphragm enter the flutes of said cutting tool and said second diaphragm having a circular orifice closely engaging the lands of said fluted cutting tool, said shell and resilient diaphragms being adapted to rotatably engage a working portion of said cutting tool, to rotate therewith, and to be rotatably disengaged from said cutting tool, said rotatable disengagement effecting the cleaning action of said first slitted diaphragm on said cutting tool, and a quantity of thermoplastic lubrication contained within said shell, said lubricating compound being adapted to flow downwardly along the flutes of said cutting tool through said second resilient diaphragm when said cutting tool is heated by rotary contact with said work piece and to cease flowing when said cutting tool is removed from contact with said work piece.

References Cited in the file of this patent

UNITED STATES PATENTS

296,645	Stubbe	Apr. 8, 1884
612,075	Webendorfer	Oct. 11, 1898
1,404,016	Engelbrekt	Jan. 17, 1922
2,409,525	Andreasson	Oct. 15, 1946
2,435,120	Baker	Jan. 27, 1948
2,441,642	McDaniel	May 18, 1948
2,478,846	Smith	Aug. 9, 1949
2,548,314	Kinney	Apr. 10, 1951
2,582,667	Allen	Jan. 15, 1952
2,665,773	Osmun	Jan. 12, 1954