June 19, 1934. W. E. MOORE 1,963,712

METHOD AND APPARATUS FOR TREATING SHOP TURNINGS

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Fig. 1

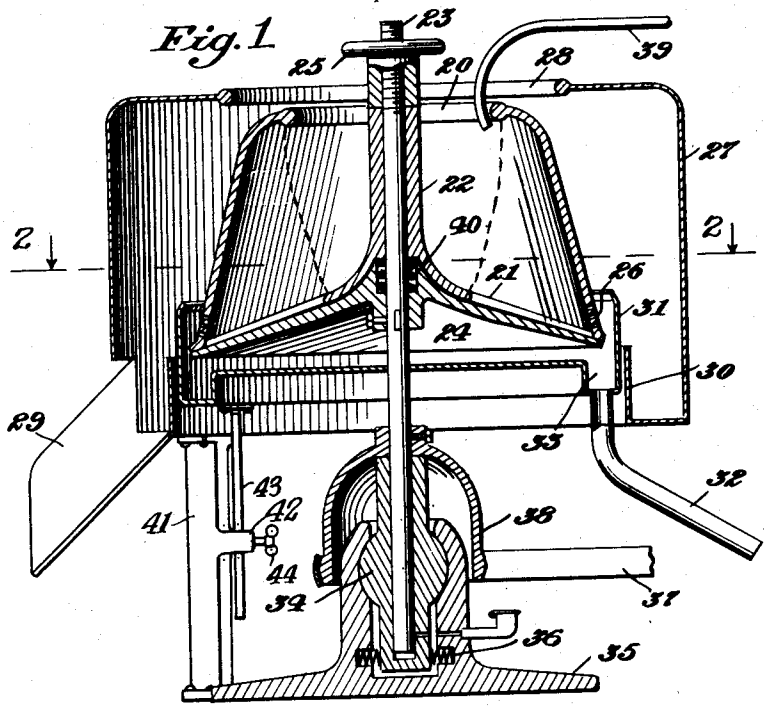
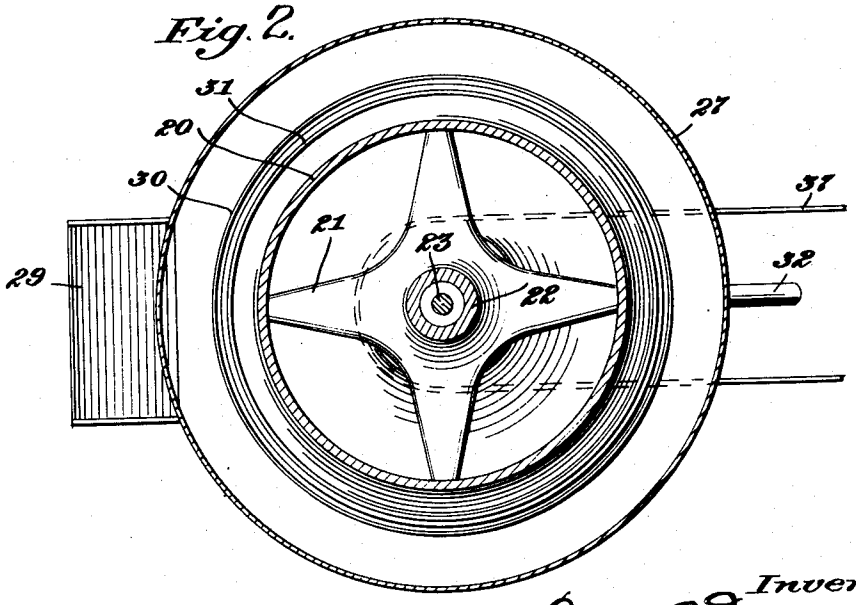


Fig. 2.



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METHOD AND APPARATUS FOR TREATING SHOP TURNINGS

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6 Claims. (Cl. 210—74)

My invention relates to a method of treating shop turnings and the like and to an apparatus for carrying out said method.

Machine shop scrap such as turnings, borings and the like is mixed with oil or other cutting fluid which has been applied to the tool producing the scrap. In many cases the cutting fluid is lard oil, mixed lard and mineral oil or sulphonated mineral oil or oily emulsions. The light scrap, being of high capillarity, absorbs and holds large amounts of the cutting fluid, and often holds as high as two or three per cent of the fluid.

Scrap having this fluid mixed therewith is not capable of being satisfactorily melted in an electric furnace due to the fact that the oil or other fluid builds up the carbon or sulphur content of the metal undesirably. The oil content of the scrap causes flames in the furnace, and absorbs a large amount of heat during volatilization. The cutting fluid or oil is also a valuable material and it is desirable to reclaim it for re-use.

An important object of my invention is to remove the oil or other fluid from the scrap to prepare the scrap for treatment in an electric furnace and to reclaim the oil for further use as a cutting fluid.

Another object of my invention is to provide an apparatus for treating the machine shop scrap to remove the cutting fluid therefrom.

Other objects of my invention will be apparent during the course of the following description.

In the accompanying drawing, which forms a part of this specification and wherein like characters of reference denote like or corresponding parts throughout the same,

Figure 1 is a vertical sectional view of a centrifugal extractor for removing the cutting fluid from the scrap, and,

Figure 2 is a horizontal sectional view on the line 2—2 of Figure 1.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention, I have shown apparatus which may be successfully used to carry out my method. The usual machine shop turnings and other scrap are long and bulky and are difficult to handle. These turnings being lumpy are not only hard to load into a centrifugal separator and remove therefrom, but they throw the separator out of balance. To overcome these difficulties I propose to grind and crush the scrap into small pieces which may be easily fed into the separator and removed therefrom.

The centrifugal extractor comprises a centrifugal basket 19 having a substantially frusto-conical shape with an inwardly extending flange at its upper end which defines a relatively large opening 20 at the top of the basket. A spider 21 has its arms secured to the lower end of the basket and is carried by a sleeve 22 slidably arranged on a vertical shaft 23 arranged centrally of the basket. A substantially conically shaped disc 24 is rigidly secured to the shaft 23 and supports the basket and spider, serving as a bottom for the basket. A nut 25 screw threadedly engages the upper end of the shaft 23 and engages the top of the sleeve 22, normally holding the sleeve in its lowermost position with the spider resting on the disc 24.

Openings 26 are arranged in the walls of the basket adjacent the lower end thereof.

A stationary casing or enclosure 27 is arranged about the basket and has an opening 28 in its top which is preferably larger than the opening 20 but corresponds therewith. A chute 29 is arranged at the lower end of the enclosure 27 for discharging the scrap.

The enclosure 27 has a large opening in its lower end, and the bottom of the enclosure is turned up to form a flange 30 which cooperates with the wall of the casing to form a channel about the interior of the casing.

A fluid receiving member 31 is slidably arranged on the shaft 23 and extends into the opening in the casing 27 and around the lower portion of the basket. A discharge pipe 32 communicates with a depressed channel 33 in the member 31 to carry away the fluid caught therein.

The shaft 23 is preferably provided with a ball and socket connection 34 with the shaft support 35. The shaft 23 is normally maintained in a vertical position by means of coil springs 36 arranged in the support 35 and centralizing the shaft therein. A belt 37 is shown as engaging a sheave 38 on the shaft 23, for rotating the shaft.

In operation, the short scrap discharged from the grinder is charged into the top of the basket which is rotated to extract the oil or other fluid from the scrap. The separator may be run dry, but it is preferred to blow a volume of steam into the basket through the pipe 39, and this steam tends to superheat the fluid and decrease its viscosity, thereby simplifying the removal of the fluid from the scrap. The steam is preferably superheated, to increase its efficiency and to further improve the speed of extraction of the cutting fluids. Instead of steam, however, hot air, hot water, lye water or other detergents may be used

to good effect, and if desired may be mixed with steam.

The oil or other fluid passes through the openings 26 in the basket to the member 31, the walls of which normally extend above the openings 26, and passes through the pipe 32 to a suitable container. When the oil has been completely extracted from the scrap, the member 31 is slid downwardly on the shaft 23, and the nut 25 loosened. Rotation of the basket acts through centrifugal force to throw the scrap outwardly against the walls of the basket, as seen in dotted lines in Figure 3, and when the nut 25 is loosened, this force acts upon the inclined walls of the basket to force the basket upwardly on the shaft 23 away from the disc 24. When the basket is in its raised position the scrap is free to pass radially outward between the bottom of the basket and the disc 24, and is caught by the enclosure 27 from which it may be discharged by way of the chute 29. The scrap is completely separated from the oil or other fluid, and is superheated to the point that after removal from the extractor it will rapidly dry without the tendency to rust.

When the scrap has been completely removed from the basket, the nut 25 is tightened to hold the basket against the disc 24, and the oil catching member 31 is moved upwardly into position around the lower end of the basket.

While the shaft 23 is normally centralized in the base 35, it will automatically adjust itself to its center of gyration if unbalanced by the irregular charge in the basket, due to the arrangement of the springs 36.

The oil taken from the pipe 32 may be reused for cutting purposes.

If desired the disc 24 may be provided with a depression arranged around the shaft 23 to receive a coil spring 40 which will engage the sleeve 22 and be compressed into the depression in the disc when the basket is tightened down onto the disc. When the nut 25 is loosened, the spring 40 will raise or assist in raising the basket. It is to be understood however that the basket can be raised by centrifugal action without the use of the spring 40. It is also to be understood that any other suitable means may be employed for raising the basket.

The casing 27 and member 31 may be supported in any suitable manner. For the purpose of illustration I have shown one possible means of support in Figure 1, although obviously any other type of supporting means may be as readily utilized. A vertical support or standard 41 engages the under side of the rim of casing 27 adjacent its periphery. A lateral projection 42 is formed on the standard 41 intermediate its ends and extends toward the shaft 23. A vertical guide rod 43 is secured to the underside of the member 31 adjacent its periphery and extends slidably through a vertical opening in the projection 42. A suitable thumbscrew 44 may be carried by the projection 42 to engage rod 43 and secure it against movement, or in place of the thumbscrew, the friction between rod 43 and projection 42 may be relied upon to produce this result.

Two of the standards 41 arranged at diametrically opposite points are sufficient to properly support casing 27 and member 31 although any desired number may be employed.

While I have shown and described the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In an apparatus of the character described, a rotatable shaft, a centrifugal basket secured thereto, a fluid receiving member slidably arranged on said shaft and normally surrounding a portion of the basket, and a casing surrounding the basket and having an opening to allow movement of the fluid receiving member on the shaft.

2. In an apparatus for treating machine shop scrap having fluid mixed therewith, a rotatable shaft, a centrifugal basket secured thereto, a fluid receiving member slidably arranged on said shaft and normally surrounding a portion of the basket, a casing surrounding the basket and having an opening to allow movement of the fluid receiving member on the shaft, and means to inject a heated fluid into said basket during the rotation thereof.

3. In a centrifugal extractor, a rotatable shaft, a disc secured thereto, a centrifugal basket slidably arranged on said shaft and normally engaging said disc, said basket having walls which converge away from said disc, and releasable means on said shaft engaging said basket, whereby when the basket is released the centrifugal force of the contents of the basket will act upon the converging walls thereof to move the basket away from the disc.

4. In a centrifugal extractor, a rotatable shaft, a disc secured thereto, a centrifugal basket slidably arranged on said shaft and normally engaging the disc, said basket having walls which converge away from the disc, said walls having openings therein, releasable holding means on the shaft engaging said basket, a fluid receiving member slidably arranged on the shaft and normally surrounding the lower portion of the basket, and a casing surrounding the basket, whereby when the basket holding means is released, the basket will move away from the disc under the centrifugal force of the contents of the basket against the converging walls thereof to allow the contents of the basket to discharge into said casing.

5. In an apparatus for treating machine shop scrap having fluid mixed therewith, a rotatable shaft, a disc secured thereto, a centrifugal basket slidably arranged on said shaft and normally engaging said disc, said basket having walls inclined inwardly away from said disc, means to release said basket to permit its movement away from the disc under centrifugal action, and means to inject steam in said basket.

6. An apparatus of the character described comprising a rotatable shaft, a centrifugal basket secured thereto and having a fluid exit portion, a fluid receiving member normally surrounding the fluid exit portion of the basket, and movably arranged to recede from its fluid receiving position to permit the discharge of material in the basket.

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