Nov. 5, 1940. E. COWLES 2,220,677

MACHINE FOR REFINING PAPER STOCK

Filed Sept. 16, 1937

Fig. 1.

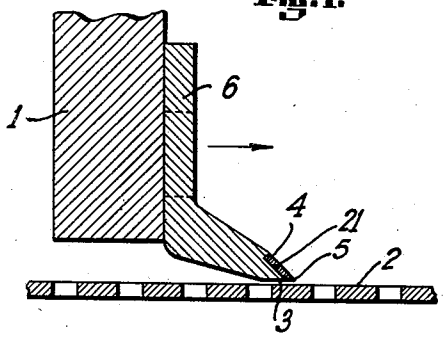


Fig. 2.

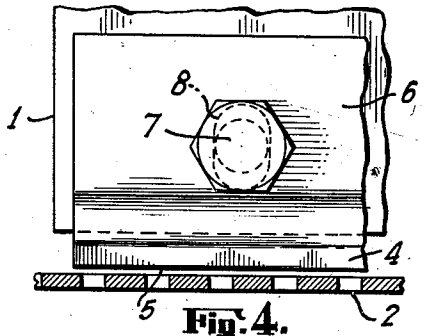


Fig. 3.

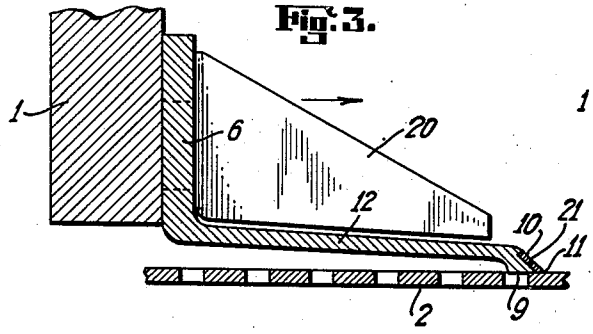


Fig. 4.

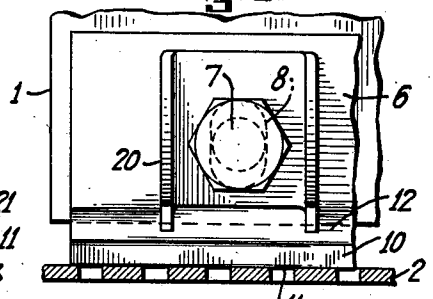


Fig. 5.

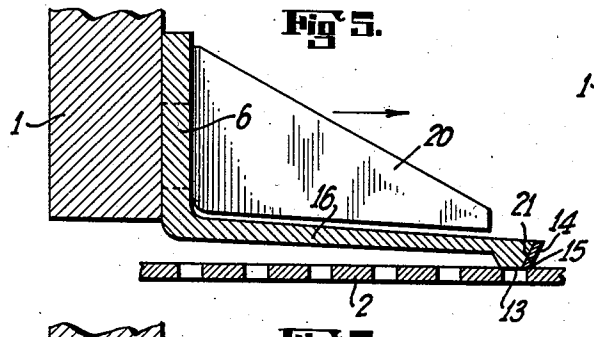


Fig. 6.

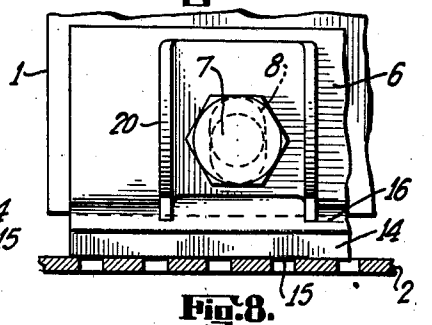


Fig. 7.

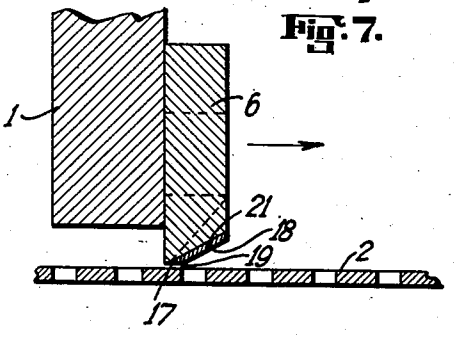
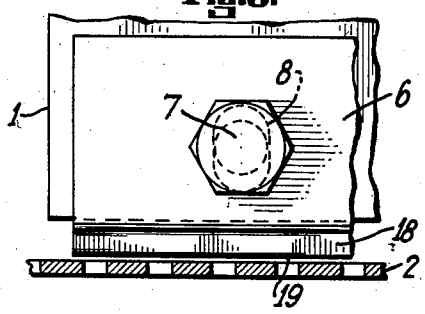


Fig. 8.



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MACHINE FOR REFINING PAPER STOCK

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Application September 16, 1937, Serial No. 164,104

1 Claim. (Cl. 92—26)

This invention relates to machines for refining paper stock and pertains more particularly to machines of the type disclosed in my United States Patent Nos. 2,033,123 and 2,180,080 and my copending application Serial No. 121,837, filed January 22, 1937.

It is an object of the present invention to provide improved scrapers for attachment to the impeller vanes of such machines to improve the refining action thereof, and to enable the various types of refining action required in the treatment of various types of stock to be performed most efficiently.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawing, in which,

Figure 1 is a vertical cross section through one form of scraper embodying my invention.

Figure 2 is a front elevation of the same.

Figure 3 is a vertical cross section through a modified form of scraper.

Figure 4 is a front elevation of the same.

Figure 5 is a vertical cross section through another modified form of scraper.

Figure 6 is a front elevation of the same.

Figure 7 is a vertical cross section through another modified form of scraper.

Figure 8 is a front elevation of the same.

Inasmuch as the patent and applications above referred to provide disclosures of the machines as a whole, the drawing herein is limited to the details of the scrapers forming the subject matter of the invention. Referring to the drawing, the impeller vane is indicated by the numeral 1 and the perforated screen is indicated by the numeral 2.

Referring now to Figures 1 and 2, a scraper is illustrated having a surface 3 extending substantially parallel to the screen 2 and having another surface 4 inclined with respect to the screen, said surfaces intersecting at an acute angle to form a fiber engaging edge 5 extending parallel to the screen. The said scraper is provided with an upstanding flange 6 for attachment to the impeller vane as by means of bolt 7. The aperture 8 through which the bolt passes is elongated vertically in order to permit the scraper to be adjusted with respect to the screen. Thus the scraper may be adjusted to contact with the screen, or it may be adjusted to move a short distance above the screen.

In Figures 3 and 4, a similar type of scraper is illustrated, in that the surface 9 and the surface 10 intersect at an acute angle to form a fiber engaging edge 11, but in this case, the foot of the scraper is connected to the flange 6 by means of a yielding web 12 which acts as a spring to hold the foot in contact with the screen 2. The tension exerted by the yielding web may be adjusted, of course, by adjusting the position of the flange 6 with respect to the impeller vane.

While the scraper illustrated in Figures 1 and 2 is generally similar to that illustrated in Figures 3 and 4, the refining action obtained is considerably different, for whereas the action in the former is mainly a rubbing action on the fibers, due to their tendency to staple over the advancing edge of the scraper, thus forming a pad, the action in the latter is mainly a cutting action. However, the results obtained depend somewhat on the adjustment of the scrapers on the vanes. For example, the closer the scraper of Figures 1 and 2 is adjusted to the screen the more cutting and the less rubbing will result. Likewise, the greater the tension exerted by the web 12 in the scraper of Figures 3 and 4 the more cutting and the less rubbing will result; but if the tension is relaxed the cutting decreases and the rubbing increases.

In Figures 5 and 6 a somewhat different type of scraper is illustrated in which the surface 13 and the surface 14 intersect at an obtuse angle to form the fiber engaging edge 15. In this form of scraper the foot is also connected to the flange by means of a yielding web 16. With this type of scraper the predominant result is a bruising action on the fibers due to the impact of the scraper against fibers which may be lodged in the screen perforations, but in some cases, a rubbing action and a cutting action may also be observed.

In Figures 7 and 8, the scraper illustrated is generally similar to that of Figures 5 and 6, except that it is rigidly secured to the impeller vane. Here again the surface 17 and the surface 18 intersect at an obtuse angle to form the fiber engaging edge 19, but this angle is somewhat greater than before. With this form of scraper a crushing action is the predominating result.

In connection with the scrapers illustrated in Figures 3, 4, 5 and 6 employing the yielding web, it may be advisable to provide the abutments 20 which serve to prevent breakage of the scrapers in case they tend to be forced upwardly by accumulations of fibers or trash which may be present in the machine.

Each of the scrapers is preferably provided

with an inlay 21 of extremely hard metal lying immediately adjacent the inclined surface of the scraper and extending to the fiber engaging edge. The said inlay may be formed of any suitable high carbon or alloy steel, as for example, that known to the trade as Stellite. The said inlay may be welded or otherwise secured to the body of the scraper.

The said hardened metal, located in the position shown, wears much more slowly than the softer metal of which the remainder of the scraper is formed, so that in use, the softer metal opposite the screen is worn away by abrasion, leaving a relatively small area of hardened metal opposite the screen for work against the fibers. Due to the relatively small area of hardened metal working against the fibers, the effectiveness of the scrapers is greatly increased. Furthermore, the scrapers are self-sharpening, in effect, and maintain sharp edges for long periods of time.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claim.

I claim as my invention:

In a machine for refining paper stock having a perforated screen and an impeller adapted to move along said screen, a metal scraper mounted on said impeller, said scraper having a surface extending substantially parallel to said screen, and a surface inclined with respect to the screen, said surfaces intersecting at an acute angle to form a fiber engaging edge, said scraper having a portion formed of hardened metal lying adjacent said inclined surface and extending to said fiber engaging edge, said parallel surface being composed partially of said hardened metal and partially of softer metal.

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