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F. Hachmann & A. B. Miller

Apparatus for Extracting Oil from Waste

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Inventors
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By their attorneys

Williamson & Merchant
To all whom it may concern:

Be it known that we, FREDERICK HACHMANN and ANDREW B. MILLER, citizens of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Apparatus for Extracting Oil from Waste; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention has for its object to provide a simple and efficient machine for extracting oil from waste; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claim.

As is a well-known fact, worn-out and dirty waste which is removed from journal-boxes of cars contains a large amount of lubricating-oil. Hitherto it has been the usual custom to burn up or otherwise unprofitably dispose of this dirty waste without attempting to save therefrom the oil with which the waste is heavily saturated. In this way hundreds of tons of waste and thousands of gallons of lubricating-oil are annually thrown away by railway companies.

By our invention we are enabled to extract the oil from the dirty waste and in this way save both lubricating-oil and the waste itself.

The present invention is particularly directed to improved means for extracting or squeezing the lubricating-oil from the waste, although in practice the extracted oil is purified and the waste further cleaned by auxiliary devices.

The improved machine is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a vertical longitudinal section through the complete machine on the line x' x' of Fig. 2. Fig. 2 is a plan view of the machine with some parts broken away. Fig. 3 is a transverse vertical section on the line x' x' of Fig. 2 with some parts shown in full, and Fig. 4 is a detail in side elevation with some parts sectioned on the line a' a' of Fig. 3 and with parts broken away.

The numeral 1 indicates a heavy skeleton framework, shown as constructed of timbers. On the top of the frame 1 is secured an oil-receiving hopper or basin 2 and a drip-hopper 3, the latter of which has a horizontal table extension 4. From the bottom of the hopper 3 a drip-pipe 5 leads to a suitable point of discharge. Extending transversely across the hopper 3 some little distance above its lower portion is a perforate false bottom 6, preferably afforded by a section of wire screen. From the bottom of the hopper 2 a discharge-pipe 7 leads laterally from the said hopper to a suitable receptacle (not shown) for the oil squeezed from the waste.

The numerals 8 and 9 indicate a pair of cooperating wringing or squeezing rollers rigidly secured on the shafts 10 and 11, respectively. The shaft 10 projects at both ends and is journaled in suitable fixed bearings 12 on the frame 1. The shaft 11 likewise projects at both ends, but is journaled in floating bearings 13, guided for vertical movements between parallel guide-brackets 14, rigidly secured on top of the frame 1. Hand-screws 15 work with threaded engagement through the top of the brackets 14 and impinge upon the transverse presser-bar 16, the ends of which press upon the upper ends of compression-springs 17, the lower ends of which in turn yieldingly press down upon the floating bearings 13. The ends of the rollers 8 and 9 are reduced at 18 for an important purpose, which will presently appear. On one end of the shaft 11 is a pulley 19 and 85 a long-toothed sprocket 20, the latter of which meshes with a similar long-toothed gear 21, secured on the adjacent end of the shaft 10.

By the gears 20 and 21 the rollers 8 and 9 are caused to rotate in opposite directions, as indicated by the arrows marked on Fig. 4, and at the same time the long teeth of the said gears permit the rollers to approach and recede from each other to a considerable extent.

Idle guide-rollers 22, 23, and 24 cooperate
with the lower squeezing-belt 28 and are suitably mounted in the frame 1. Other idle guide-rollers 25 and 26 cooperate with the upper squeezing-belt 29 and are suitably journaled in vertical projections 1' of the frame 1. The ends of the rollers 22, 23, 24, 25, and 26 are reduced at 27 in the same manner as are the rollers 8 and 9.

A wide-faced endless squeezing-belt 28, of woven wire, runs over the lower squeezing-roller 8 and over the idle guide-rollers 22, 23, and 24. A similar but shorter endless woven-wire belt 29 runs under the upper squeezing-roller 9 and over the idle guide-rollers 25 and 26. Belts of this character having the proper flexibility just stated are inclined to be too flexible transversely, and hence the said belts are provided at their edges with reinforcing-strips 30, preferably of heavy leather, but of any suitable or flexible material. These reinforcing or retaining strips 30 work on the reduced ends 27 of the idle guide-rollers and on the reduced ends 18 of the squeezing-rollers, and thus keep the said belts drawn out laterally or transversely of the machine to their maximum width. This feature is of course important.

The numeral 31 indicates a power-driven belt which runs over the pulley 19 on the roller-shaft 11 to impart positive movements to the two cooperating squeezing-rollers 8 and 9. The character 2 indicates waste. (Shown in Fig. 1.)

It will be noted that the lower squeezing-belt 30 runs close to the inner edge of the table 4, from whence it travels on an incline up to and over the roller 23, from thence in a horizontal direction over the rollers 8 and 24, and from thence under the hopper 2 back to the roller 22. The squeezing-rollers 8 and 9 both stand over the oil-receiving hopper or basin 2.

Operation: The oil-saturated waste as it is obtained from railway companies and elsewhere is usually very dry and quite hard, and hence it is our practice to first boil the same in hot water to soften and loosen up the waste. This process, however, will carry away or remove from the waste but a very trifling amount of the oil; but it prepares the waste so that it may be more easily treated in the machine described. The boiled waste, containing, of course, some water, is thrown from a boiling-vat directly into the hopper 3, and whatever amount of water is carried thereby will be rapidly precipitated into the bottom of said hopper and carried off by the drip-pipe 5. By a suitable rake, fork, or other tool, or with the hands, for that matter, the oil-saturated waste is forced over the table 4 and onto the upwardly-moving inclined section of the belt 28.

By the belt 28 the waste is carried under the lower portion of the belt 30, and by the two belts 28 and 29 the waste is carried between the squeezing-rollers 8 and 9, and from thence the waste is carried off from the rear portion of the belt 28 and dropped into any suitable receptacle or onto the floor or ground. In passing between the squeezing-rollers 8 and 9 the waste is subjected to sufficient pressure to squeeze therefrom all of the lubricating oil contained therein, and this oil will of course readily run through the openings or meshes of the belt 28 and drop into the hopper 2, from which, as already stated, the oil is drawn off through the drip-pipe 7. The squeezing-rollers 8 and 9 will always press the reticulate belts 28 and 29 with sufficient friction to insure positive movements of the belt. The belts being perforate or reticular permit the oil to be squeezed from the waste and at the same time afford the most efficient kind of conveyors therefor—that is, for the waste—both before and after the oil has been pressed therefrom.

The oil extracted from the waste will contain considerable dirt, fine metal-dust, and other foreign matter, which are removed therefrom by means not herein necessary to consider.

It will of course be understood that the machine described is capable of many modifications as to details of construction within the scope of our invention as herein set forth and claimed.

What we claim, and desire to secure by Letters Patent of the United States, is as follows:

In a machine for extracting oil from waste, the combination with the squeezing-rollers 8 and 9, the latter of which is yielded up with respect to the former, upper idle guide-rollers 25 and 26, lower idle guide-rollers 22, 23, and 24 in the relative positions shown and described, the oil-receptacle 2 located below said squeezing-rollers with the lower squeezing-roller 8 interposed between the sides thereof, the upper endless woven-wire belt 29 running over said upper guide-rollers 25 and 26 and under said upper squeezing-roller 9, the relatively lower endless woven-wire belt 28 running over the lower squeezing-roller 8 and over said lower guide-rollers 22, 23, and 24, the said belt being thereby given an upward incline in passing from said roller 22 to said roller 23, and the supporting-table 4 lying in a horizontal plane approximately in line with the upper portion of said roller 22, said table 4 having a depressed pocket provided with a reticulate or perforate bottom for permitting water to drip from the waste preparatory to supplying the waste to the squeezing mechanism, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK HACHMANN.
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Witnnesses:
ANNA D. FREDERICKSON,
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