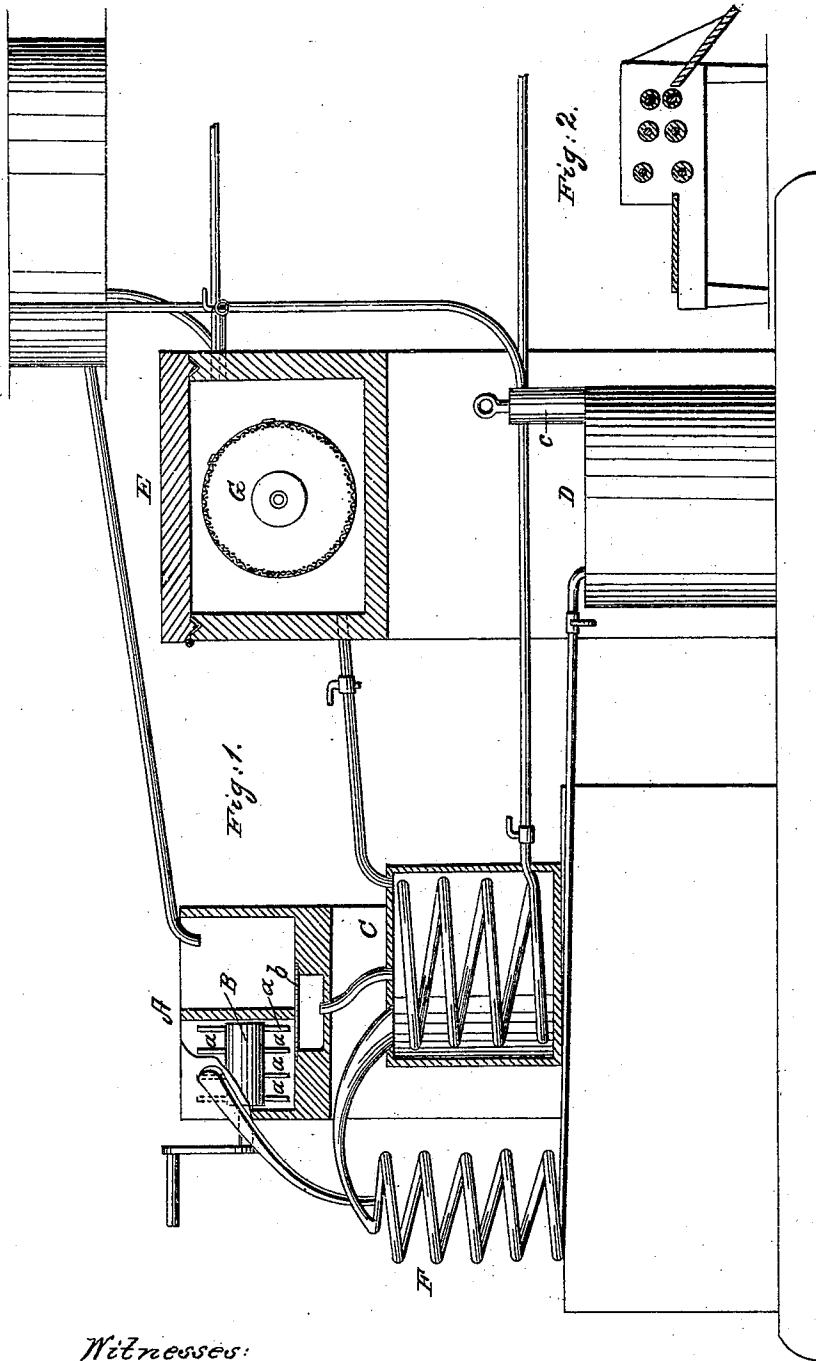


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Process of Scouring and Cleaning Wool and Woolen Fabrics.

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Witnesses:

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UNITED STATES PATENT OFFICE.

OSBORNE MACDANIEL, OF NEW YORK, N. Y.

IMPROVED PROCESS OF SCOURING AND CLEANSING WOOL AND WOOLEN FABRICS.

Specification forming part of Letters Patent No. **71,191**, dated November 19, 1867.

To all whom it may concern:

Be it known that I, OSBORNE MACDANIEL, of New York, in the county and State of New York, have invented a new and Improved Process for Scouring and Cleansing Wool and Woolen Fabrics, and extracting the oil therefrom; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to understand and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 represents a side elevation of the apparatus employed in my improved process for scouring wool and woolen fabrics, and extracting the oil therefrom, partly in section, and partly exposed by the removal of portions of the exterior. Fig. 2 represents a set of rollers for crushing the tag-locks and dirt-balls on wool.

This invention or discovery relates to an improved process for scouring wool, and extracting the oil therefrom, and also washing and extracting the oil from woolen fabrics, which improvement consists in employing benzine or naphtha, the product of petroleum, or natural rock-oil, so called, for the purpose of washing and cleansing raw wool and woolen fabrics of the oil, dirt, and other impurities adhering to them, and separating the naphtha therefrom, after their separation from the wool and woolen fabrics, by distillation, for the purpose of saving and utilizing the oil and dirt.

I am aware that the bisulphide of carbon, chloroform, ether, and benzole, or naphtha, the product of coal-tar, have been employed previously for the purpose of extracting oils from wool, seeds, and other substances; but these chemical agents have all proved objectionable for general practical use, on account of the waste and loss attendant on their use, from their highly volatile nature, and their great cost.

Benzine, or the naphtha of petroleum is, however, free from these objections to its practical application to this purpose on a large scale, for the reason that it is produced in enormous quantities at the oil-distilleries established so extensively since the recent discovery of petroleum in this country, and is sold at so cheap a price. Benzine, or the naph-

tha of petroleum, is also a different substance from benzole or the naphtha of coal-tar; and this chemical product, of recent discovery, has not been applied to the purpose of scouring wool, for which it is better adapted than any chemical agent hitherto known and employed. The difference in the chemical composition of coal-tar benzole and petroleum benzine is well known to chemists, as distinguished in elementary composition by the formulæ, coal-tar benzole= $C_{12}H_6$, petroleum benzine= $C_{12}H_{14}$.

I have found by experiment that benzine is a better agent for cleansing wool and woolen fabrics of oil and other adhering impurities than benzole, while it is free from a peculiarly unpleasant odor possessed by benzole, which is objectionable on account of its tenacious character. But the great advantage possessed by benzine or petroleum naphtha over benzole and all other chemical agents for scouring wool, is its great abundance and exceeding cheapness, and this new application of it will extend vastly a market for a product now in limited demand, the supply of which can be increased to any amount required, and thus promote a great national interest.

The apparatus employed by me for the purpose of scouring wool with naphtha, and utilizing the oil contained therein and in woolen fabrics, consists in machinery for washing and distilling.

A represents a scouring or washing tub, similar in its general construction to the tub of a paper engine. B is a horizontal shaft, hung on one side of the tub, to be operated by a pulley with steam-power. A series of radial arms or spokes, *a a*, of iron or wood, project from the shaft B, reaching nearly to the bottom of the tub. A doffer may be added to strip the arms of the wool catching on them. The bottom and sides of the tub are made of sheet metal, and double-walled or jacketed for the admission of steam, and in the bottom is a grated opening, *b*, to allow the discharge of the wash through a pipe to a still, C. The tub A is supplied with naphtha from a tank placed above, as shown in red in the drawing, or directly from a tank, D, below, by a force-pump, *c*, which lifts the naphtha into the tub or elevated tank, as required.

The first operation necessary in the treat-

ment of the wool, to cleanse it completely, is crushing the tag-locks or hard lumps of dirt and excrement adhering thereto. This operation is performed readily by passing the wool between rollers, as shown in Fig. 2, or a succession of rollers. The wool must be saturated with naphtha when passing through the rollers, to prevent staining by the coloring matter of the dirt entering the fiber, as it will do when crushed dry, or wet with water. By this operation the tag-locks, which are now cut off as waste, making a loss of three per cent. in some fine wools, will be saved. The wool is then introduced into the washer with naphtha, and the action of the arms *a a* in their revolution will beat and thoroughly discharge the oil and dirt from the fiber. When sheep have been tarred or marked with paint, it is necessary to heat the naphtha with steam, in order to soften the refractory resinous substances, and separate them from the wool. This may be done with direct steam, or by admitting steam into the jacket of the wash-tub or coils of pipe within it. The operation of washing is to be continued, and fresh naphtha added until it passes off quite clean. Some portion of the dirt or excrement of the sheep still remaining in the wool after washing in the naphtha, will dissolve in water, and may be entirely removed by washing in pure water, if desired. When the wool has thus been perfectly cleansed, and the naphtha drawn off with the dirt and oil into the still, steam is admitted into the jacket of the wash-tub for the purpose of distilling the adhering naphtha, and thus drying the wool. The tub *A* is provided with a cover, which sets, with a lip, in a groove around the upper edge of the tub filled with water, that serves as a packing to prevent evaporation during the whole of the operation, as shown in the tub *E*, Fig. 1. The still *C* is provided with a suitable coil, or is made with a jacket for the admission of steam,

by which the naphtha, mixed with the oil and dirt, is distilled over into the condenser *F*, and thence returned in a pure state to the receiving-tank *D* to be employed over again. A continuous circuit of operations is thus maintained.

For the purpose of extracting the oil from woolen fabrics, they may be put into a revolving perforated cylinder, *G*, in the tub *E*, and there washed with naphtha, and dried in the same manner as the wool before described. Other apparatus may be employed for this purpose.

After the naphtha has been all distilled from the grease and dirt in the still *C*, the residuum is drawn off into a tub, where the grease is separated from the dirt to be purified for various profitable uses, while the dirt becomes valuable as a manure.

By this process wool and woolen fabrics are thoroughly scoured and cleansed of oil and dirt without the application of water in any stage of the operation, and with great facility, dispatch, and economy.

Having described my improved process of scouring wool and extracting the oil therefrom, what I claim, and desire to secure by Letters Patent, is—

1. An improved process of scouring wool and woolen fabrics, and removing the oil therefrom, substantially as herein described.
2. An apparatus, employing steam indirectly, for scouring and drying wool, combined with a still, substantially as and for the purpose herein described.
3. Crushing the tag-locks and lumps of dirt when saturated with naphtha, preparatory to scouring the wool, substantially as and for the purpose described.

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Witnesses:

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