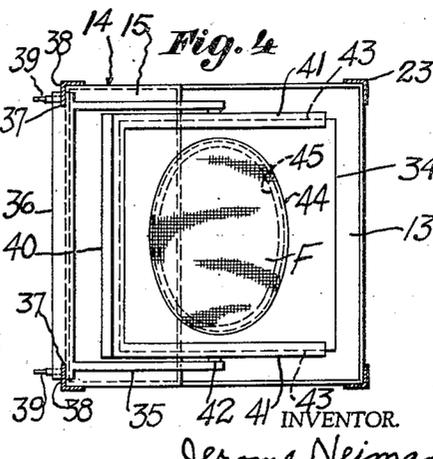
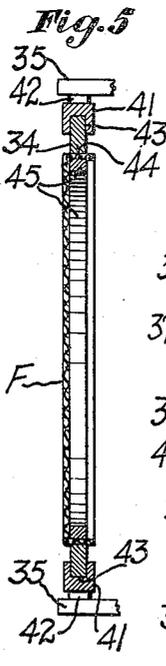
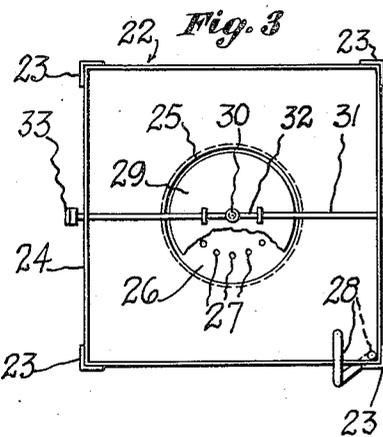
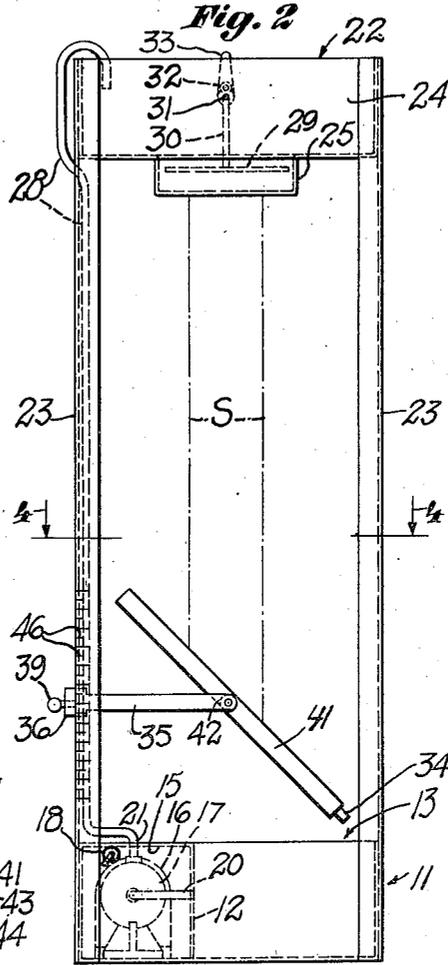
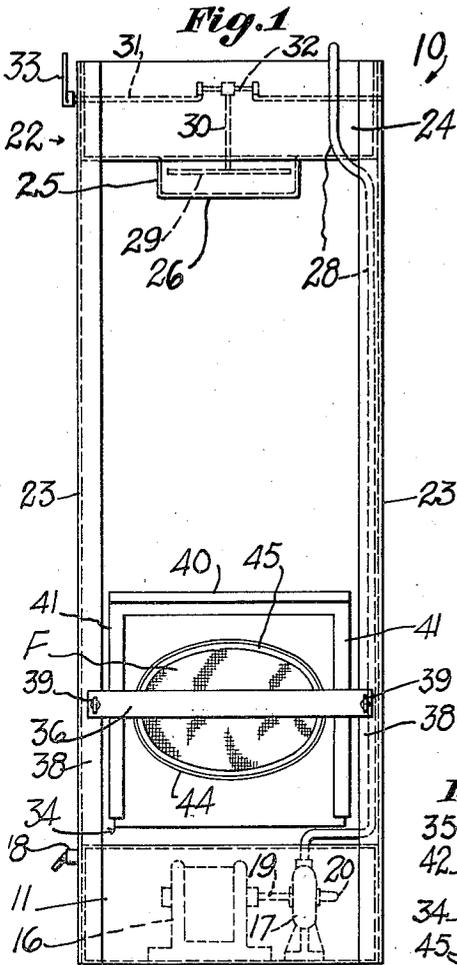


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APPARATUS FOR DETERMINING WATERPROOF AND WATER REPELLENT  
QUALITIES OF FABRICS  
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## APPARATUS FOR DETERMINING WATER-PROOF AND WATER REPELLENT QUALITIES OF FABRICS

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5 Claims. (Cl. 73-51)

This invention relates to apparatus for readily ascertaining whether fabrics, such as textiles, are waterproof or water repellent.

One object of the invention is to provide an apparatus of the character described having improved means adapted to readily demonstrate the waterproof and waterrepellent qualities of fabrics.

Another object of the invention is to furnish an apparatus of the nature set forth which can be manipulated by any one and which is simple, compact, portable, and cheap so that it can be widely distributed to retailers and other dealers in textiles for the easy ascertainment of waterproof and waterrepellent qualities, for assistance in purchasing such fabrics and for window displays to the consuming public to thus educate purchasers in a field in which much misrepresentation occurs.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a view in front elevation during an apparatus embodying the invention.

Fig. 2 is a view in side elevation thereof.

Fig. 3 is a top plan view of Fig. 1.

Fig. 4 is a horizontal sectional view on line 4-4 of Fig. 2.

Fig. 5 is a transverse and longitudinal sectional view of the removable fabric holding frame with a piece of fabric that is being tested secured thereto.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Generally described, this invention resides in apparatus for demonstrating the waterproof or waterrepellent qualities of textile fabrics. Such fabrics are generally treated with a suitable composition which provides the above mentioned qualities without detracting from the color and natural appearance of the fabrics. This treatment of such a fabric presents many difficulties.

Thus it is extremely difficult to provide a fabric which shall not even wet, and hence be truly waterproof. The usual condition is that the surface which is in contact with water becomes wet, but penetration of water through the fabric is prevented or reduced in varying degrees. Such a fabric is called waterrepellent. Generally, the waterrepellent condition lacks uniformity and is spotty in character, hence a sufficient area of the fabric must be tested. For a test to be adequate, the water should strike the fabric in a manner to simulate rain; air should be freely entrained by the water to aid in opening any porous spots; and preferably the impact of the water should be at an angle to the fabric with the water being rapidly drained off from the fabric to avoid cushioning the impact. After careful study, I perceived all of these factors, and determined that a cheap, easily operated compact device was essential to indicate to the public the quality of material that it was purchasing and to tend to raise the standard for such materials. My invention accordingly comprises a frame for holding a piece of fabric, a skeletonized support for holding the frame in downwardly inclined position, a combined water reservoir and perforated spray head on the support located at a suitable elevation above the frame, a base for the support comprising a tank to receive the flow from the fabric, a rotary pump and motor unit in the base connected to the reservoir for continuous flow thereto, and a valve for quickly shutting the reservoir outlet which forms the perforated spray head while maintaining the reserve of liquid. Easy inspection of the fabric is permitted through the support, the fabric and frame may be removed at any time without waiting for the water in the reservoir to be depleted, and all operations can be accomplished without objectionable wetting of one's hands. The motor may be shut off by a switch, but the apparatus may provide for a drop in liquid level in the tank such that water shall cease to flow with the pump running idle when the said valve is closed.

Referring in detail to the drawing, 10 denotes an apparatus embodying the invention. The same may include a base 11 which may be made as a casing fully closed at its bottom and sides. Separating this casing into sections is a partition 12 forming compartments 13 and 14. The former compartment may be open at the top and may constitute a water tank. The compartment 14 may have a top closure wall 15, and may house an electric motor 16 and a rotary pump 17. For energizing the motor there is a device 18 which may be considered a combined switch and connector for an electrical circuit to the motor. Directly interconnecting the motor and pump is a drive shaft 19. Thus the pump is driven at high

speed, but as its capacity is very small, it is adapted for continuous operation in the apparatus 10. Likewise the motor is very small, and may have a rating of only 0.1 horsepower or much less, thus consuming little current. This motor and pump unit is fully enclosed within the compartment 14 so that the motor and its electrical connections are protected from water. However, the pump 17 communicates with the tank compartment 13 by an inlet tube 20 which leads to an opening in the wall 12 and is soldered to the latter at said opening to avoid any leakage of water into the motor compartment. An outlet pipe 21 extends upward from the pump through the top wall 15 and thence upward to the combined reservoir and spray head 22, hereinafter described.

Carried by the base 11 is a skeletonized support which may comprise a plurality of standards 23, desirably made of angle iron, and secured to the corners of the base 11. Mounted on said standards is a casing forming the combined reservoir and spray head 22, and secured at its corners to the standards. The reservoir per se is indicated at 24, the same having a central circular extension 25 at its bottom. This extension is formed with a bottom wall 26 formed with perforations 27 for ejecting a uniform spray under gravity feed. The required head of liquid in the reservoir is supplied by a leader 28 extending up from the pipe 21 along one of the standards 23 within the angle thereof and connected over the top of the reservoir.

For closing the spray head 25 including all the perforations thereof, a valve means may include a rubber disc 29 vertically movable within the cylindrical head 25 and adapted to seat on the bottom wall 26 thereof to thus close all the perforations 27 therein. Any suitable means for manipulating the valve 29 may include a central stem 30 fixedly connected thereto and pivotally suspended from a rock shaft 31 at the crank or offset portion 32 thereof. This shaft 31 may be journaled in opposed side walls of the reservoir, and at one end may have a handle 33. When moved to upward dead center position, the valve is fully open, and when moved downward, the valve comes to rest on the bottom wall 26 which may serve as a stop. Since the valve is smaller in diameter than the cylindrical spray head, it will not interfere with the flow of water to the perforations 27 when the valve is in raised position.

At 34 is indicated a holder for a piece of fabric F that is to be tested. This holder forms a frame and is mounted for settable pivotal and vertical movement. The mounting means may comprise a U-shaped structure having arms 35 extending from a cross bar 36 which is formed with oppositely extending end slots 37 to slidably receive the flanges 38 of the rear standards 23. Clamping or thumb screws 39 on the bar 36 bear on the flanges 38 within the slots to thus settablely mount the arms 35 at a desired elevation. Carried by the arms 35 is an inner generally U-shaped member 40, the arms 41 of which are pivotally mounted at 42 on the arms 35. At least one of the pivot members 42 may be regarded as including a clamping means or set screw to hold the U-member 40 constantly at a required angle which is preferably about 45 degrees. Extending along the arms 41 are the confronting grooves 43 which slidably removably receive the holder 34. The latter may consist of a plate having a central circular opening 44 to removably

fittingly receive a hoop 45 over which the fabric F is stretched, and whereby the latter is secured taut. When thus positioned, the fabric F lies always above the top opening of the tank compartment 13, which is sufficiently large to assure full drainage of water thereinto. It will be appreciated that several frames 34 may be furnished with each apparatus 10 for testing different fabrics, or that one frame may be interchangeably used for different fabrics.

The operation of the apparatus 10 will now be described. First, the fabric F is selected and cut to proper size and secured on the frame 34 as already described. Then the frame is passed into the skeletonized support 23 and mounted as shown. The tank compartment 13 is filled with water to a suitable level and the motor 16 is started to operate the pump 17. As the latter is rather small, no priming thereof is necessary, and the air therein is rapidly expelled by the pumping action. This pump 17 is nevertheless capable of affording a head of about 30 inches of water, so that it can readily fulfill the requirements of this apparatus. From the tank compartment 13 the water tends to gravitationally flow into the pump through the inlet or suction tube 20. From the pump outlet, the water flows through pipe 28 into the reservoir casing 24. With the valve 29 in open position as shown, the water is adapted to flow through the perforations 27 to form a spray. By carefully forming the size of the perforations, the spray volume is made substantially less than the capacity of the pump 17. Thus a head of water rapidly builds up in the reservoir 24. This head of water becomes stabilized because the water level drops in the tank compartment 13, the relation being such that no water enters the pump any faster than the spray returns it to the tank compartment. The spray indicated by the dot-dash lines S impinges on the fabric F and drains off downward into the tank compartment 13 through the open top thereof. No water can affect the motor 16 which is enclosed in the base compartment 14. No water will splash off on the top of the base because of the side ridges or guides of the longitudinal bars 35 and because the lower edge portion of the fabric F lies above the open tank compartment. Thus the clerk in a store can operate the apparatus without objectionable wetting of his hands. Due to the skeletonized nature of the support 23, there is easy observation of the underside of the fabric F while the apparatus 10 is in use. Moreover, a person can run his hand back and forth on the underside of the fabric to obtain the "feel" of it, while the spray impinges on the upper side, and to make certain that the pressure and manipulation of the hand does not cause water to pass through the fabric that is being tested. While the test is in progress, it may be desirable to shut off and turn on the spray in a rapid manner. This is readily done by turning the handle 33 downward to lower the valve 29 to close all the perforations 27 while retaining the water in the reservoir 24. If desired, the motor can also be stopped. If the spray is again required, the supply of liquid is already present in the reservoir so that it can instantly be obtained by raising the valve 29. When the test is completed, the frame 34 may be readily removed.

By disposing the frame 34 for the fabric F at an angle, which is preferably 45 degrees, it has been discovered that certain important advan-

tages are obtained, in addition to those above mentioned. The spray strikes the fabric in a manner simulating rain, and of course entrains air which is propelled by the water and aids in opening up any pores in the fabric. The angle of impact approaches a natural condition, and drives the water laterally of the fabric, at high velocity to aid the water to lodge in any porous spots in the fabric; at the same time, the water is rapidly drained off to avoid cushioning the impact of the spray. If the angle is made more steep, a reliable test is not assured; if the slope is reduced, the drainage is diminished and thus the effect of the impact of the water is diminished to the same extent as if the height of the spray were substantially reduced. These considerations are further enhanced by the provision of the scale markings 46, whereby tests can be made with varying spray impact, although the spray head itself is constant for accuracy. Thus a rating may be given a fabric according to the height at which water wets through the fabric at any point in the area of the fabric. In this way, a classification of different fabrics is possible to fill a long felt need in the industry. The best results may be obtained by lowering the elevation of the fabric F during the test, while constantly observing the rear or underside of the fabric, until the water succeeds in penetrating through the fabric at some point. This operation is slowly effected, and it will be understood that it is not necessary that the water shall positively flow through the fabric, it being sufficient that the wetness shows up at the rear or underside of the fabric. The reading is taken on the scale markings and becomes the classification number for the particular fabric.

I claim:

1. An apparatus of the character described, comprising a base consisting of a casing having a partition dividing the casing into two compartments, one of the latter being a water tank fully open at the top, a motor and pump unit, at least the motor being located in the other compartment which is closed at the top, the pump part communicating with said tank, a support comprising standards connected to said base, a combined reservoir and spray head mounted on the support at an elevation above the base, a pipe communicating the pump outlet with the reservoir, the spray head forming a bottom extension of the reservoir, the spray head having a perforated bottom wall, a disc valve adapted to seat on the bottom wall to close said perforations, a frame adapted to hold a piece of fabric that is to be tested, and means for mounting said frame along a downwardly inclined plane and in such relation that the fabric on the frame will directly receive the spray from the spray head and discharge the water into the tank through the open top of the latter, said support being skeletonized to permit observation of the underside of the inclined piece of fabric while the spray impinges thereon.

2. An apparatus including means for determining the waterproof and waterrepellent qualities of fabrics, including a pump, a reservoir having a spray head formed with a series of perforations, a tank spaced below the spray head, means for supporting in taut condition a piece of fabric intermediate of the spray head and tank to re-

ceive the spray and to discharge the liquid into the tank, said spray head operating gravitationally under a relatively fixed head of liquid in the reservoir, the size and area of the perforations being such that the flow capacity of the spray head is substantially less than that of the pump, to cause the required head of liquid to be built up in said reservoir, and the pump inlet being so related to the tank that no further liquid will enter the pump when the required head of liquid in the reservoir is attained, the supporting means for the fabric comprising a skeletonized frame, clamping means for adjustably slidably engaging the frame with said standard to permit change in the elevation of the frame, and means for maintaining the frame at a downward inclination to facilitate drainage into the tank and to permit inspection of the underside of the fabric during operation of the spray head.

3. An apparatus of the character described, comprising a base consisting of a casing having a partition dividing the casing into two compartments, one of the latter being a water tank fully open at the top, a motor and pump unit, at least the motor being located in the other compartment which is closed at the top, the pump part communicating with said tank, a support comprising standards connected to said base, a combined reservoir and spray head mounted on the support at an elevation above the base, a pipe communicating the pump outlet with the reservoir, the spray head forming a bottom extension of the reservoir, the spray head having a perforated bottom wall, a frame adapted to hold a piece of fabric that is to be tested, and means for mounting said frame along a downwardly inclined plane and in such relation that the fabric on the frame will directly receive the spray from the spray head and discharge the water into the tank through the open top of the latter, said support being skeletonized to permit observation of the underside of the inclined piece of fabric while the spray impinges thereon.

4. An apparatus according to claim 3, wherein the means for mounting the frame includes means for vertical adjustment of the frame in its downwardly inclined position, and means having indicia to indicate the adjusted elevation of the frame.

5. An apparatus including means for determining the waterproof and waterrepellent qualities of fabrics, including a pump, a reservoir having a spray head formed with a series of perforations, a tank spaced below the spray head, means for supporting in taut condition a piece of fabric intermediate of the spray head and tank to receive the spray and to discharge the liquid into the tank, said spray head operating gravitationally under a relatively fixed head of liquid in the reservoir, the supporting means for the fabric comprising a skeletonized frame for the fabric, a standard interconnecting the tank and reservoir, clamping means for adjustably slidably engaging the frame with said standard to permit change in the elevation of the frame, and means for maintaining the frame at a downward inclination to facilitate drainage into the tank and to permit inspection of the underside of the fabric during operation of the spray head.

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