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APPARATUS FOR RECORDING THE SHRINKAGE TEMPERATURE
OF LEATHER, HIDES, SKINS, AND THE LIKE

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2 Sheets-Sheet 1

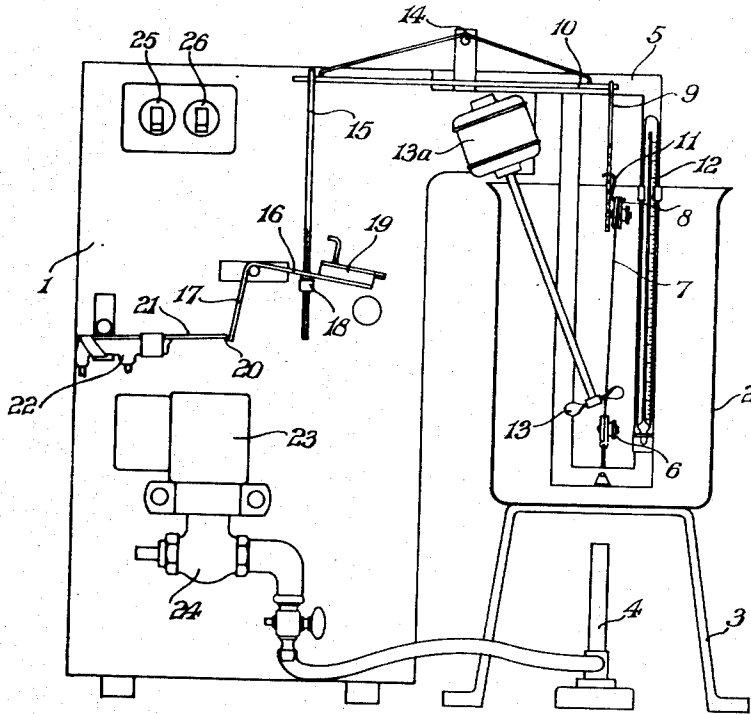


Fig. 1.

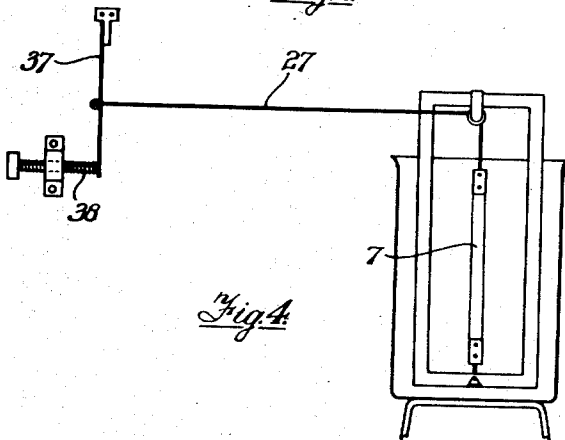


Fig. 4.

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2 Sheets-Sheet 2

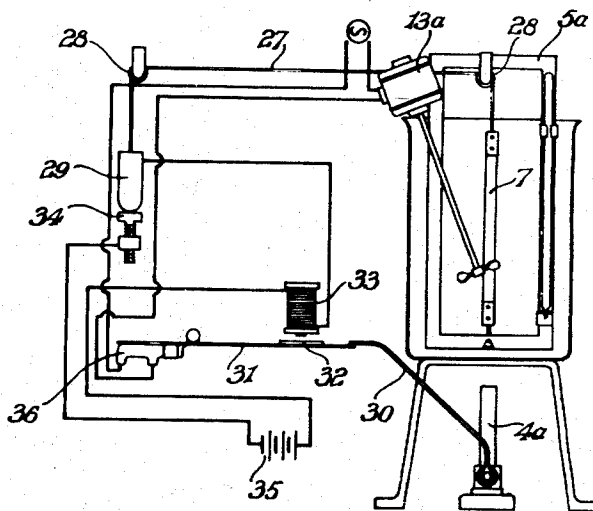


Fig. 2.

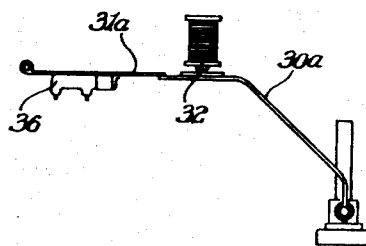


Fig. 3.

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APPARATUS FOR RECORDING THE SHRINK-
AGE TEMPERATURE OF LEATHER, HIDES,
SKINS, AND THE LIKE

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7 Claims. (Cl. 73-16)

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As leather, hides and like materials shrink when heated beyond a critical temperature, which temperature varies with the nature of the leather and the processing or tanning treatments to which it has been subjected, it is necessary for leather manufacturers to know the shrinkage temperature of a hide, that is the temperature at which the hide commences to shrink, before the hide is used. The present day practice in the industry is to take one or more samples from a bale of hides, immerse it in water and raise the temperature slowly until initial signs of shrinkage are observed when the temperature of the water is taken. Such a procedure is not very reliable and is wasteful of the operator's time, and it is the object of the invention to provide an apparatus which, once set into operation, can be left unattended if desired and will automatically cut off the heat supply when the leather sample commences to shrink whilst at the same time registering or recording the shrinkage temperature.

According to the invention apparatus for the purpose mentioned comprises means for supporting a specimen strip of leather or like material under slight tension within a body of liquid, means for heating the liquid, a maximum thermometer or the equivalent responsive to the temperature of the liquid, a solenoid-operated valve or switch for controlling the heating means and means operatively associated with the specimen strip and adapted, immediately said strip commences to shrink, to break the control circuit of the solenoid and thereby cut off the supply of heat to the liquid.

In order that the invention may be more fully understood reference will now be made to the accompanying drawings, wherein

Fig. 1 shows more or less diagrammatically a first embodiment of the invention,

Fig. 2 is a similar view of a second embodiment, and

Figs. 3 and 4 are detail views showing two possible modifications of the arrangement shown in Fig. 2.

Referring first to Fig. 1, the apparatus shown comprises a vertically disposed panel 1 constituting a support for the control mechanism, a beaker or similar water vessel 2 adapted to be supported on a tripod or like stand 3 and a burner or similar gas burner 4 for heating the water in the vessel 2. Fixed to an extension of the panel 1 at the upper end thereof is a rigid metal frame 5 which is adapted to extend into the beaker and to the lower end of which is fitted a

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clip 6, a strip of leather 7 to be tested being attached at its lower end to said clip and at its upper end to a second clip 8 carried by a rod 9 suspended from one end of a beam 10. Preferably, an adjustable connection is provided between the clip 8 and rod 9, for example a hook 11 on the clip may engage selectively a number of spaced holes in the rod, to accommodate specimen strips of slightly different lengths. A maximum thermometer 12 is clipped to the frame 5 and a motor driven paddle or agitator 13 may be employed to circulate the water within the beaker and ensure that during heating there is an even increase in temperature throughout the whole body of water. The beam 10 is supported on a fixed pivot 14 and from its other end is suspended a rod 15 which extends through an aperture in one arm 16 of a bell crank lever 16, 17 and is threaded to receive an adjustable sleeve-like abutment 18. The arm 16 of the bell crank is fitted with an adjustable weight 19 which in use applies the desired tension to the leather strip 7, whilst the other bell crank arm 17 is formed with a lip 20 at its extremity adapted to engage the end of a lever arm 21 to retain it in a horizontal position. Fixed to the lever arm 21 is a mercury switch 22 which is interposed in the supply circuit of a solenoid 23 controlling a valve 24 in the gas supply line to the burner 4, the solenoid being energised to hold the gas valve open when the mercury switch is in the horizontal position shown.

The apparatus operates as follows:

Having suspended a specimen leather strip between the clips 6 and 8, the abutment 18 is adjusted on the rod 15 until the lip 20 on bell crank 17 just engages the tip of lever arm 21 to hold it in the raised position and the weight 19 is also adjusted, if necessary, to apply a light tension on the strip. With the current switched on and the gas valve 24 open, the burner is ignited and the temperature of the water rises, the apparatus if desired being left unattended. Immediately the strip 7 commences to shrink the beam 10 is rocked so rocking the bell crank 16, 17 and releasing the lever arm 21. The latter falls by gravity or under the action of a light spring, the solenoid circuit is broken at the switch 22 and the gas supply valve closes. Thus further heating of the water is stopped, the thermometer providing a record of the shrinkage temperature for immediate or future use.

Preferably, the motor 13a driving the paddle 13 is also controlled by the arm 21, as for example, by a further switch carried on the arm,

such that the motor is stopped when the gas supply is shut off. One or more master control switches may also be mounted on the panel 1 at any convenient point. In the drawing two such switches are shown, a master switch 25 for disconnecting the apparatus from the mains or other source of current and a second switch 26 for cutting out the paddle motor 13a if desired. As the wiring of the electrical control mechanism will be readily understood from the foregoing description it has been omitted from the drawing for clarity.

Fig. 2 illustrates an alternative arrangement utilizing a different method of controlling the gas supply. The specimen strip 7 is suspended within a beaker of water with the aid of a frame 5a and the beaker is heated by a bunsen burner 4a as in the form previously described but in this instance the upper end of the strip 7 is attached to a cable 27 which passes around fixed pulleys 28 and is attached to a weight 29. The weight serves the dual function of applying the desired tension to the strip 7 and of forming part of a control switch as will now be explained. The burner 4a is fitted with a rotary control valve or tap provided with an elongated actuating arm 30 so arranged that when unobstructed it falls by gravity to the valve closing position. The arm 30 is adapted to be latched in the raised or valve open position shown on the drawing by a lever arm 31, the latter carrying or embodying the armature 32 of a solenoid 33. The control circuit of the solenoid includes a switch constituted by the weight 29 and a cooperating stationary but adjustable contact 34 and it will be seen that immediately the strip 7 commences to shrink the weight 29 is lifted so breaking the solenoid circuit. Thereupon lever arm 31 falls releasing the actuating arm 30 which in turn falls and closes the burner valve. The solenoid circuit is preferably operated by a battery 35 or other low voltage source to avoid sparking at the switch 29, 34 but as the paddle motor 13a is mains-operated a separate switch 36 for controlling its operation is attached to an extension of the lever arm 31 such that the motor is stopped when the lever arm falls.

A small modification of the above described arrangement is shown in Fig. 3 wherein the armature 32 is mounted on the valve actuating arm 30a, a shorter lever arm 31a carrying the mercury switch 36 being latched in its operative position by the arm 30a. The manner of operation will be apparent from the drawing. A second modification of the lever control system is to secure a double-armed lever to the spindle of the burner valve or tap, one arm of the lever carrying the armature and the other arm carrying the paddle motor control switch. With this arrangement the solenoid when energised holds the lever in a horizontal position with the valve or tap open and the control switch closed, deenergising of the solenoid permitting the lever to rotate under the action of gravity or of a biasing spring to a position to close the valve and open said control switch.

Fig. 4 shows a further variation of the arrangement illustrated in Fig. 2 wherein the weight 29 is dispensed with, the cable 27 being attached to a spring blade 37 which normally bears against a stationary but adjustable contact 38, the spring blade applying the desired tension to the strip 7. The elements 37, 38 are connected into the solenoid circuit so as to constitute a switch, equivalent to the switch 29, 34 of Fig. 2, and it will be seen

that by proper adjustment of the contact 38 it is possible to obtain a breaking of the solenoid circuit immediately the strip 7 commences to shrink.

It is to be understood that the embodiments described are given by way of example only and many other variations are possible. Thus the falling movement of the lever arm 21, 31 or 31a may be used to close a switch to actuate a bell or other aural or visual signalling device and so indicate the completion of the test. Again, although a gas burner is particularly suitable for use in this apparatus in that the generation of heat ceases immediately the gas supply is cut, immersion and other electrical heaters having this property are now obtainable and may be used if desired. Other forms of recording thermometers may also be used in the place of the maximum thermometer.

Finally, it may be mentioned that whilst most leathers have a shrinkage temperature within the range of 30°-80° C. in some cases it exceeds the boiling point of water and in such instances the water is substituted by a higher boiling point liquid.

I claim:

1. Apparatus for the purpose mentioned comprising means for supporting a specimen strip of leather or like material under slight tension within a body of liquid, means for heating the liquid, a maximum thermometer or the equivalent responsive to the temperature of the liquid, a solenoid-operated valve or switch for controlling the heating means and means operatively associated with the specimen strip and adapted, immediately said strip commences to shrink, to break the control circuit of the solenoid and thereby cut off the supply of heat to the liquid.

2. Apparatus as claimed in claim 1, wherein the specimen strip is suspended between a fixed frame and one end of an oscillatable beam, the other end of said beam having an operative connection with a lever system which applies the desired tension to the strip and which, when the beam is rocked by shrinkage of the specimen strip, trips a switch to break the solenoid circuit.

3. Apparatus as claimed in claim 2, wherein a rod is attached to said other end of the beam and has an adjustable abutment thereon engaging one arm of a weighted bell crank lever which through said rod and beam tensions the specimen strip, the solenoid being controlled by a mercury switch which is carried by a lever arm latched in its operative position by the other arm of said bell crank and adapted when released to fall and open said switch.

4. Apparatus as claimed in claim 1, wherein the specimen strip is suspended between a fixed frame and a cable attached to a weight operable to tension the strip, said weight co-acting with a fixed contact to form a switch in the solenoid circuit such that shrinkage of said strip lifts the weight to open the solenoid circuit.

5. Apparatus as claimed in claim 4 and wherein the body of liquid is heated by a gas burner, including an elongated actuating arm on the valve or tap of said burner and a pivoted lever arm which carries or embodies the armature of the solenoid device and which, when the solenoid is energised, latches the actuating arm in the valve open position, said actuating arm being released when the solenoid circuit is broken and falling automatically to a position to shut off the gas supply to the burner.

6. Apparatus as claimed in claim 4 and wherein the body of liquid is heated by a gas burner, in-

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cluding an elongated actuating arm on the valve or tap of said burner which arm carries or embodies the armature of the solenoid device, the arrangement being such that when energised the solenoid holds said arm in the valve open position but when the solenoid circuit is broken the arm falls or moves automatically to a position to shut off the gas supply to the burner.

7. Apparatus as defined in claim 1, wherein said means operatively associated with the specimen strip to break the control circuit of said solenoid comprises a cable connected to the specimen strip, a resilient spring blade which is connected to said cable and applies the tension to the specimen strip, and a fixed contact co-acting

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with said spring blade to form a switch in said solenoid circuit and operable to break said circuit upon shrinkage of the specimen strip.

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