United States Patent [19]

Koppel

[11] **3,909,055**

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[54] **DEVICE FOR RETRIEVING SMALL SHEETS SUCH AS RADIOGRAPHS FROM A TANK**

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[52] **U.S. Cl.** ..... **294/64 R;** 294/19 R; 403/157

[51] **Int. Cl.²** **B25J 1/02**

[58] **Field of Search** ..... 294/19 R, 20, 22, 53.5, 294/64 R, 65; 248/362, 363; 269/21; 279/3; 403/79, 87, 97, 152, 157, 159, 163

[56] **References Cited**

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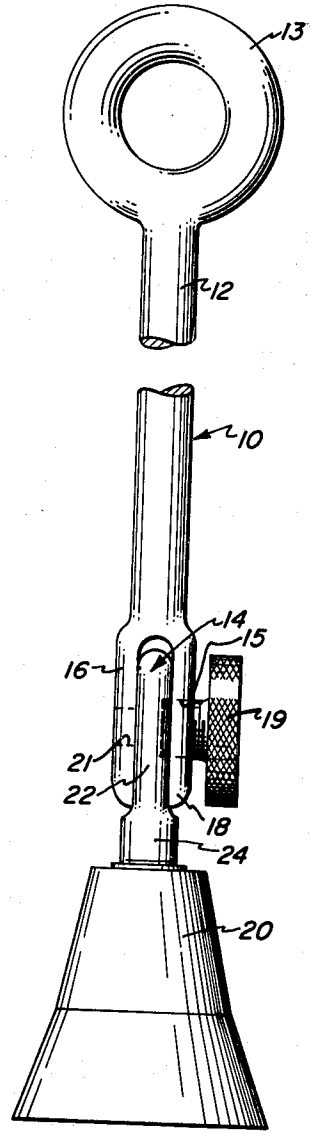
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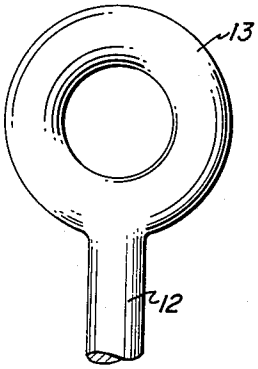
Primary Examiner—Evon C. Blunk
Assistant Examiner—Johnny D. Cherry
Attorney, Agent, or Firm—Samuelson & Jacob

[57] **ABSTRACT**

A device for retrieving small sheets such as radiographs from a tank having a handle and a suction cup pivotally affixed to one end thereof to permit the suction cup to be applied to a radiograph which is resting against either the bottom or the side of a photographic tank.

3 Claims, 8 Drawing Figures





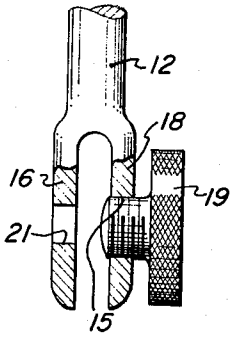


FIG. 2

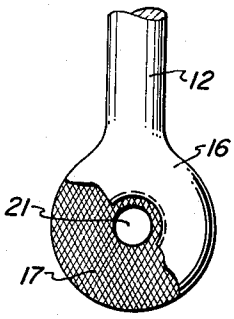


FIG. 3

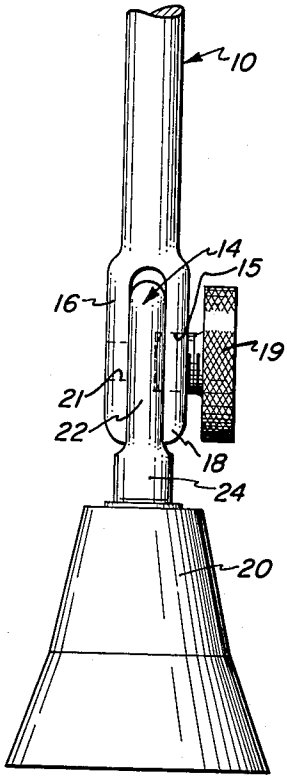


FIG. 1

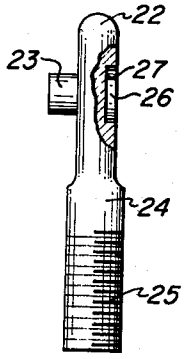


FIG. 4

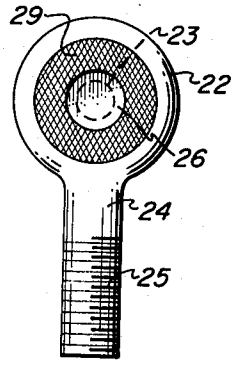


FIG. 5

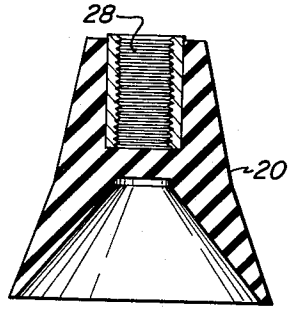


FIG. 6

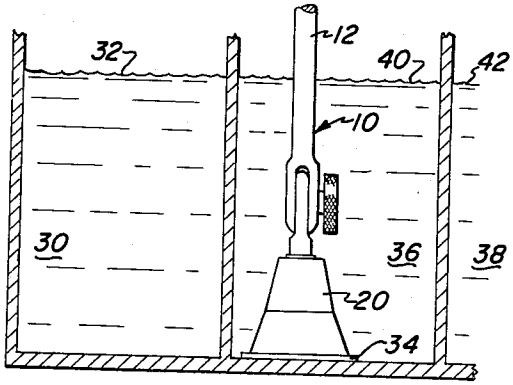


FIG. 7

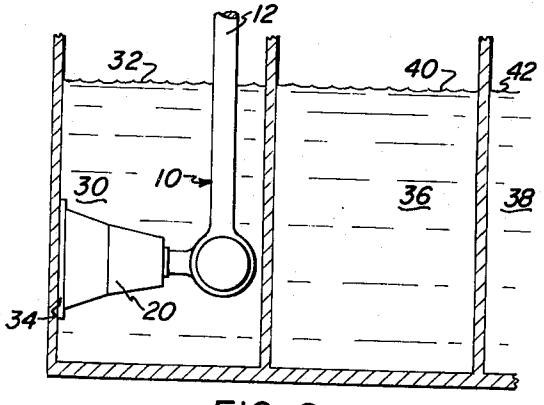


FIG. 8

DEVICE FOR RETRIEVING SMALL SHEETS SUCH AS RADIOGRAPHS FROM A TANK

The invention relates to a device for retrieving small sheets such as radiographs from a tank containing liquid such as a caustic photographic solution. More particularly, it relates to such a device having a handle and a suction cup mounted at the end of the handle to engage and seize the sheet so that the sheet can be removed from the tank without danger or inconvenience to the user. Without a device of the invention, the user must either insert his hands in the tank or empty the tank of the liquid. These procedures can result in caustic burns to the person or his clothing or the splashing liquid might damage equipment and/or mutilate the radiograph.

Small radiographs are commonly used by dentists in diagnosing cavities, tooth and root positions, or pathology, etc. These radiographs are also used by other professionals in the healing arts for various purposes. A group of exposed radiographs is mounted to a frame or rod containing a plurality of clips and a radiograph is held in position in a clip. The radiographs in the group are put through the developing, washing and fixing processes as quickly as possible to permit the doctor to examine the result before the patient leaves the office.

If one or more of the radiographs is unsatisfactory, additional X-ray exposures of the area in question are made. Sometimes, a radiograph drops off its clip and is deposited on the bottom or side of one of the tanks. Since it is not wise to insert one's hand in the caustic photographic solution, the doctor generally takes another X-ray to replace the dropped one. This procedure presents four disadvantages: first, the cost of the dropped radiograph is a total loss and a waste; second, the patient is subjected to unnecessary X-ray exposure; third, time is lost; and fourth, during surgery, the delay may be hazardous to health.

Some prior art photographic tanks, which are used for the processing of radiographs, are provided with a mesh container. The mesh container is inserted in the tank and any radiographs, which fall off their clips, drop into the mesh container which is removed from the tank to permit retrieval of the radiograph. This technique has certain disadvantages: first, caustic material may drip or spatter clothing, eyes, equipment, etc.; and second, the film may be scratched in the container.

Broadly, the invention comprises a handle and a suction cup pivotally mounted at one end of the handle. Means are provided for locking the suction cup in position relative to the handle to permit retrieval of the radiographs from the bottom or from the side of the tank.

Accordingly, it is an important object of the invention to provide a device for retrieving radiographs from tanks which is economical to manufacture and simple to use.

It is a further object of the invention to provide such a device having a handle and a suction cup affixed to an end of the handle and having means for adjusting the position of the suction cup relative to the handle.

These and other objects, advantages, features and uses will be apparent during the course of the following description, when taken in connection with the accompanying drawing, wherein:

FIG. 1 is an elevational view of a preferred embodiment of the invention;

FIG. 2 is a front elevational view of the yoke at one end of the handle;

FIG. 3 is a side elevational view showing the knurled inner surface of one of the flat plates of the yoke;

FIG. 4 is a view similar to FIG. 2 of the eye which is threaded into a threaded opening in the suction cup;

FIG. 5 is a view similar to that of FIG. 3 showing the knurled surface of the eye which mates with the knurled surface of the flat plate;

FIG. 6 is a sectional view of the suction cup of the invention;

FIG. 7 is an elevational view, partly in section, showing the device of the invention in position for retrieving a radiograph at the bottom of a typical, dental, radiograph tank; and

FIG. 8 is a view, similar to that of FIG. 7, showing the device of the invention in position for retrieving a radiograph at the side of the tank of FIG. 7.

In the drawing, wherein, for the purpose of illustration, there is shown a preferred embodiment of the invention and wherein like numerals designate like parts throughout the same, the numeral **10** designates a device of the invention generally.

Retriever **10** comprises an elongated handle **12** of either solid or tubular noncorrosive metal, plastic or similar material, and a suction cup **20** of flexible resilient material such as rubber or plastic. One end of the handle terminates in a yoke **14** and the other end is usually provided with a toroid **13** to permit the retriever to be hung on a peg or a hook.

Yoke **14** comprises a pair of depending annular plates **16** and **18.** Plate **18** is provided with a threaded hole **15** and plate **16** is provided with a hole **21.** Suction cup **20** is provided with a tapped hole **28** which receives a threaded end **25** of a shank **24.** Shank **24** is affixed to an eye **22** which is provided with an opening **26** and a protuberance **23.**

The retriever **10** is assembled by threading shank **24** into opening **28,** inserting eye **22** between plates **14** and **16** so that protuberance **23** fits in opening **21,** set screw **19** is threaded into hole **15** and is tightened so that its end bears against the bottom **27** of hole **26.** As the screw **19** is tightened, the knurled surfaces **17** and **29** contact each other to aid in keeping the suction cup in position relative to the handle. It can readily be seen that the suction cup can easily take any position from being aligned with the longitudinal dimension of the handle to being about perpendicular thereto. In fact, the suction cup can even be aligned so that it is at an obtuse angle with respect to the downwardly extended axis of the handle.

FIG. 7 illustrates the position of a retriever **10** in a dental radiograph tank having compartments **30, 36** and **38** having liquid levels **32, 40** and **42** respectively. A radiograph **34** is on the bottom of the compartment **36.** The retriever **10** is inserted in the tank **36** so that the suction cup **20** overlies the radiograph **34.** Sufficient pressure is applied so that the vacuum holds the radiograph to the suction cup. Then, the retriever is removed from the tank and brings the radiograph with it.

FIG. 8 illustrates the position of retriever **10** in compartment **30** when radiograph **34** is against the side of the tank. The suction cup **20** is locked in the proper position relative to the handle and the retriever is inserted in the tank so that the suction cup overlies the radiograph. Now, vacuum holding contact is made and the retriever and radiograph are removed from the tank.

It can readily be seen that the retriever of the invention can be used on tanks with sloping sides since the position of the suction cup relative to the handle is readily adjustable. The device can also be used to retrieve radiographs which are resting partially against the side and partially on the bottom of a tank or compartment.

While a particular embodiment of the invention has been shown and described, it is apparent to those skilled in the art that modifications may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A device for retrieving small sheets, such as radiographs, from a tank, said device comprising:

a handle;

a pair of opposed, spaced flat plates at the end of the handle to form a yoke;

an eye having a body portion and a threaded shank;

a suction cup having a threaded opening within which the threaded shank is engaged;

a protuberance extending from the eye toward one of the flat plates and normal to the surface of the body portion of the eye;

an opening in each of the pair of flat plates of the yoke;

the protuberance fitting in one of said openings to pivotally affix the suction cup to said end of the handle;

the other of said openings being threaded; and

screw means threaded into the other of said openings and juxtaposed with the eye such that as the screw means is tightened, the eye is urged against a flat plate of the yoke to thereby hold the suction cup in a fixed position relative to the handle.

2. The invention of claim **1** wherein the protuberance is affixed to the body portion of the eye.

3. The invention of claim **2** wherein:

the surface of the body portion of the eye to which the protuberance is affixed is knurled; and

the surface of the flat plate adjacent thereto is similarly knurled to preclude movement of the suction cup relative to the handle when the screw is tightened.

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