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N. A. SHORE

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AUTOMATIC WATER TUMBLER FILLING
APPARATUS FOR DENTAL UNITS
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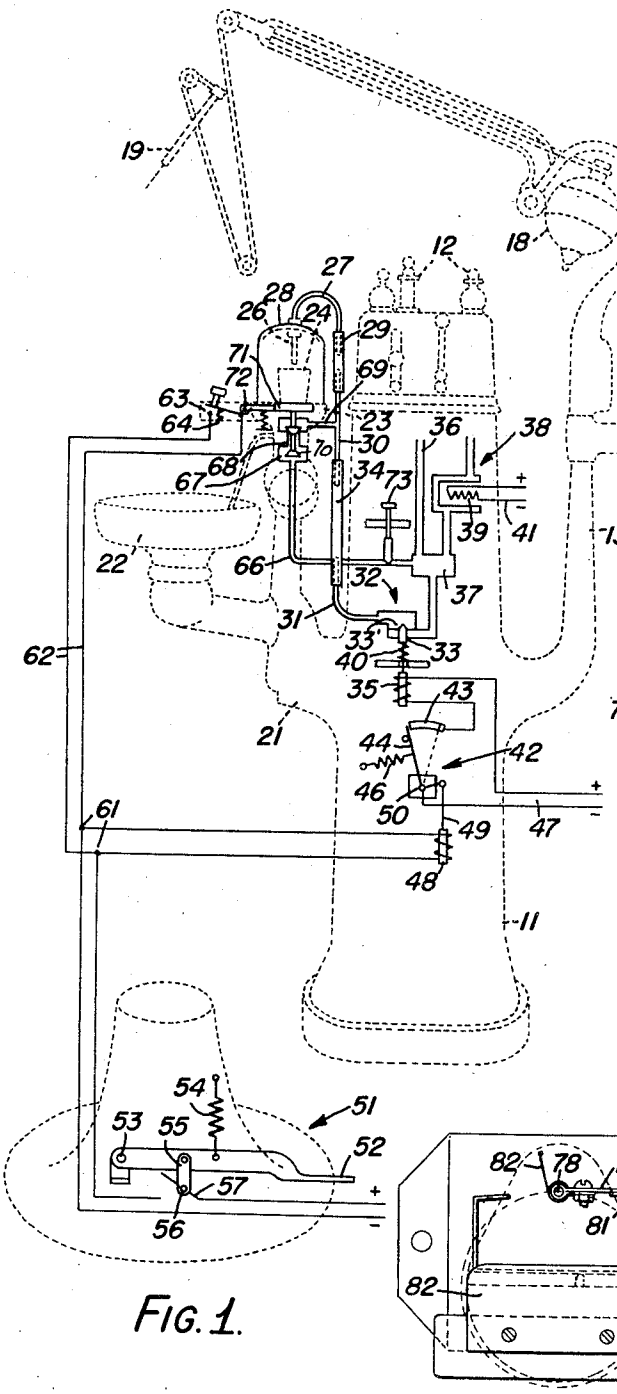



FIG. 1.

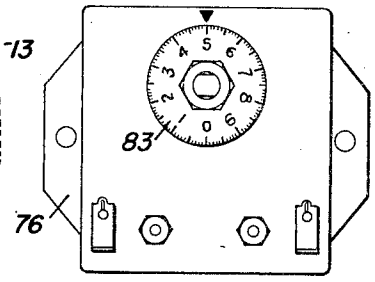



FIG. 2.

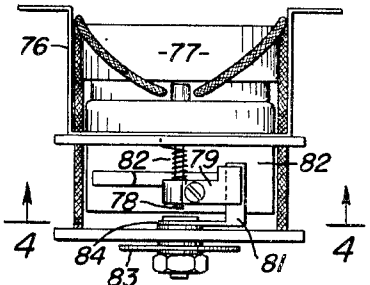



FIG. 3.




FIG. 4.

INVENTOR.
NATHAN A. SHORE

BY

ATTORNEY

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# AUTOMATIC WATER TUMBLER FILLING APPARATUS FOR DENTAL UNITS

Nathan A. Shore, New York, N. Y., assignor to Ritter Company, Inc., Rochester, N. Y., a corporation of Delaware

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2 Claims. (Cl. 226—126)

My invention relates to apparatus for automatically filling a tumbler with water, particularly for use in connection with dental operating units.

The present equipment normally used by dentists comprises a dental chair in which the patent is seated in at least a partly reclining position and a so-called dental unit which carries the numerous instruments a dentist frequently requires in his practice such as a diagnostic lamp, a warm air syringe, a pulp tester and a cautery; a movable table for carrying small hand tools, drills, cotton rolls and other materials and equipment; and drilling mechanism including a motor therefor mounted on a bracket which may be swung into and out of operating position. In addition, the dentist's major pieces of equipment include a dental operating lamp and a cuspidor adjacent which is mounted a pedestal for supporting a tumbler or water glass. Some dentists prefer to have the dental unit on the right of the chair and employ a separate pedestal for carrying the cuspidor and the support for the tumbler mounted at the left of the dental chair.

In employing all of the above apparatus and instruments, together with obtaining materials and hand tools from his tray, the dentist must use his hands. Moreover, in filling a tumbler with water for use by the patient to rinse his mouth the dentist must reach across the patient, open a valve and wait until the tumbler has been filled before he can close the valve again. The necessity of filling a tumbler with water for use by the patient is a frequent occurrence and results not only in a loss of time to the dentist but also is a source of annoyance to the patient. Frequently the tumbler is empty when the patient feels the need of a drink of water because the dentist has been busy performing other requirements of his profession and has neglected to fill the tumbler.

A further factor is that many dentists are now becoming accustomed to operating while in a seated position. It then becomes more difficult to reach across the patient for the purpose of opening and closing the water supply valve to provide water for the patient. Moreover, a dentist frequently becomes engrossed in his work and fails to fill the tumbler. In such case the patient must either do without water or interrupt the dentist to ask for a drink of water. It therefore is desirable to provide the dental unit either with an automatic means of filling the tumbler with water or provide means readily available to the patient for filling the tumbler so that the patient need not interrupt the dentist.

An object of my invention is to provide a simple, efficient mechanism which when actuated will automatically fill a tumbler or other container with water to the proper level for use by the patient.

Another object of my invention is to provide an automatic water filling device for use in connection with a dental unit in which the filling operation may be initiated by pressing a foot pedal located within easy reach of the dentist either when standing or seated adjacent the dental chair.



A further object of my invention is to provide in connection with a dental unit, alternate means of filling the water tumbler associated with the unit with water, one a means by which the weight of the tumbler initiates the operation of the filling means upon placing it on a balance platform to the end that the tumbler is always maintained filled so long as it is returned to the platform after each use; and the second a time controlled means which may be initiated either by the dentist or the patient to fill the tumbler with water in case the automatic means fails to function or in the alternative to enable the dentist to cut off the automatic means and employ the second means.

My invention further contemplates the provision of the combination of a water supply, a time controlled valve for controlling the flow of water to the water tumbler of a dental unit together with a foot pedal located in a convenient position for actuation by the dentist as for example, carried by the base of the dental chair whereby the dentist upon actuating the foot pedal may immediately release the same to thereby initiate the actuation of the timing mechanism, the valve being automatically closed at the termination of the timing cycle to thereby fill a tumbler with water to the proper level with the least interruption of the dentist in the performance of his normal functions in operating upon a patient; the system further including means incorporated therein whereby the patient may readily initiate the filling of the tumbler without interrupting the dentist.

Other objects and advantages of my invention will be set forth in the claims and will appear from the following description, when taken in connection with the accompanying drawings, in which:

Fig. 1 shows in solid lines diagrammatically the apparatus for enabling the automatic filling of a tumbler with water either by employing the weight of the tumbler or a time controlled relay to initiate the filling of the tumbler, the apparatus being shown as mounted in or on a dental operating unit, the unit carrying the tumbler to be filled; and the drawing further showing one possible location of the foot pedal for use by the dentist and one possible location of the hand control for use by the patient for initiating the operation of the timing mechanism.

Fig. 2 shows a face view of a timer suitable for use in the automatic tumbler filling system of my invention;

Fig. 3 is a top plan view of the timer; and

Fig. 4 is a view taken substantially on the line 4—4 of Fig. 3 in the direction indicated by the arrows.

The dental unit in which the tumbler filling apparatus of my invention is incorporated or upon which such apparatus may be mounted in any suitable manner comprises a vertically extending pedestal **11**, the upper end of which carries suitable sockets or supports for the reception of dental instruments indicated by the numeral **12** which may include an air syringe, a diagnostic lamp, a pulp tester, a cautery and such other major instruments as the dentist uses frequently in the practice of his profession.

The dental unit also includes a support arm **13** carried by the pedestal which carries a swinging bracket **14** upon which a dental tray assembly generally indicated by the numeral **16** is mounted. The support arm also carries an engine arm **17** which carries an electric motor **18** which drives a drill **19** by suitable mechanism well known in the art.

The pedestal **11** also carries an arm **21** which supports a dental cuspidor **22** and a basin **23** for the support of a tumbler or water glass **24**.

The dental equipment as thus far described is substantially standard and in the practice of his profession the dentist must use his hands in employing the instru-

ments 12, the drill 19 and in standard practice must manually open and close a valve to fill the tumbler 24 with water. In addition, as part of his equipment the dentist employs an operating lamp which must be manually focused on the patient's mouth and must use his hands to obtain various small instruments and materials located on the tray 16. The glass is filled frequently and this operation interrupts the dentist in the performance of other manual operations. Moreover, in the normal dental equipment arrangement, the dentist must reach across the patient to turn the valve on and off in order to fill the tumbler 24.

The automatic glass filling apparatus of my invention which may be incorporated in or mounted on the dental unit comprises a nozzle 26 located above the position of the glass. A rigid piece of tubing 27 connects with the nozzle and both are carried by a tumbler shield 28 supported from the basin 23. A flexible hose 29 is secured to the tubing 27 and to a tubing 30. A metal tube 31 extends from a valve assembly, generally indicated by the numeral 32 and is connected to the tubing 30 through a flexible hose 34.

The valve assembly has been shown diagrammatically and comprises a valve 33 adapted to cooperate with a valve seat 33'. Water from a source of supply such as a municipal service system is carried to a pipe 36 which extends into the unit in any desired position. This water flows to a mixing chamber 37 to which warm water is fed as indicated generally by the numeral 38. The warm water supply may include a heating coil 39 connected to a source of electric current as indicated at 41. By suitable valves (not shown) the temperature of the water in the mixing chamber 37 may be controlled to insure that the water is at the proper temperature for use by the patient whose teeth are usually sensitive to cold water after a drilling operation has been performed.

The valve 33—33' is opened when a solenoid diagrammatically illustrated by the numeral 35 is energized and is closed by a spring 40 when the solenoid 35 is deenergized. The solenoid is in circuit with a timer generally indicated by the numeral 42. The timing mechanism has been indicated only diagrammatically in Fig. 1 but may include a contact segment 43 over which a contact arm 44 frictionally passes. When engagement between the contact segment 43 and the contact arm 44 is broken as by means of a spring 46, the solenoid 35 is deenergized to enable the spring 40 to close the valve 33—33'. The timer and solenoid 35 are connected to a source of electrical energy as indicated at 47. No particular type of timing mechanism is essential, various types being suitable for my purpose. The timer may take the form of a dashpot arrangement if desired.

A timer which represents one commercial type suitable for use in the system of my invention has been shown in Figs. 2, 3 and 4 and will be later briefly described.

The contact arm 44 is moved into engagement with the segment 43 when a solenoid 48 is energized. The solenoid 48 is connected to the contact arm 44 by means of a rigid arm, the arm being pivoted at 50. When the bore 49 of the solenoid is pulled downward, the contact arm is moved clockwise as viewed in the drawing and placed in engagement with the segment 43.

It will be understood that timers of the type suitable for my use can be regulated to increase or decrease the time interval during which the valve 33—33' is maintained open. Moreover, it is possible to regulate the amount of water supplied to the tumbler 24 by maintaining the timer set for a definite interval of time and regulating the pressure of water flowing through the system or regulating valve 33—33' to regulate the volume of water which may flow to the tumbler in a fixed period of time.



In the drawing I have illustrated a dental unit adapted for use by a dentist who operates when standing or seated on the right of the dental chair, the base of which has been indicated diagrammatically by the numeral 51. With the particular arrangement shown and the dentist located at the right side of the dental chair, the electrical leads from the solenoid 48 are brought over to the base of the chair and a foot pedal 52 is mounted on the base. The foot pedal is pivoted on the base as shown at 53. A spring 54 restores the foot pedal to its normal upper position, the position shown in Fig. 1 when the dentist releases the foot pedal. The foot pedal carries an arm 55 rigidly secured thereto which is pivoted as shown at 56 to a pivoted contact arm 57. As shown in Fig. 1, the solenoid 48 is connected to a source of electrical energy whereby upon depressing the foot pedal 52 to close the circuit to the solenoid 48 the solenoid is energized to swing the contact arm 44 and initiate the action of the timing mechanism.

One of the important aspects of my invention is that the foot pedal may be mounted in any convenient location accessible to the dentist. In the particular illustration the foot pedal has been mounted on the dental chair base. However, this is optional and will depend upon the type of equipment employed. For example, the dentist even though he operates on the right hand side of his chair may employ a right hand dental unit and a separate pedestal located on the left hand side of the dental chair for the cuspidor, the basin 23 and the tumbler 24. In such case the apparatus for automatically filling the tumbler may be entirely mounted in or on the dental unit including the foot pedal 52 and the connections 31 and 29 may extend from the dental unit over to the pedestal which carries the cuspidor and the support 23 for the glass.

Another important aspect of my invention is that the dentist may fill the tumbler with little or no interruption of his normal functions in performing operations on the patient. Whenever he notices that the tumbler 24 is empty he may touch the foot pedal 52 and depress the same, immediately releasing it without interrupting operations which he may be performing with his hands. Depression and immediate release of the foot pedal 52 initiates the timing cycle to fill the tumbler with water so that a fresh tumbler of water is always available to the patient for the purpose of rinsing his mouth.

At times the dentist becomes preoccupied with the work he is doing and fails to step on the push pedal 52 to initiate the action of the timer and thereby the filling of the tumbler. In such case the patient must either be without water or must interrupt the dentist in the work he is performing to ask him for a drink of water. This is undesirable and in the system of my invention means are provided whereby the patient may initiate the operation of the time controlled cycle by closing a switch within his easy reach.

As shown in Fig. 1, in the circuit previously described as at 61, wires 62 are connected which terminate in a switch 63. A spring 64 corresponds to the spring 54 previously described. The switch 63 may be placed in any location convenient for use by the patient. For example, it may be placed on an arm constituting part of the basin 23 as shown in the drawings. In the alternative, it may be placed on the pedestal or as a further alternative, it may be placed on the left arm of the dental chair itself. In the latter position the patient may fill the tumbler with water even while the dentist is performing operations within the mouth of the patient. It will be understood that actuation of the switch 63 performs the same function as the pressing of the foot pedal 52.

Some dentists prefer to employ a system wherein the basin carries a balance platform which upon placing an empty tumbler on the platform the weight thereof initiates a filling cycle. Such a system is shown in Lauter-

bach Patent No. 2,395,674 entitled "Automatic Container Filler."

A system in which the weight of the tumbler initiates its filling upon being placed on the balance platform has been only diagrammatically illustrated in Fig. 1. For illustrative purpose, it may include a water line **66** extending from the mixing chamber **37** to a member **67** which has valve seats **63** formed therein. A branch line **69** connects with the line **30**. In the drawings, I have also diagrammatically illustrated a spring platform balance **71**, the fulcrum of which is shown at **72**.

In the diagrammatic illustration I have shown the double valve **70** in the position which it occupies when the tumbler is filled with water. Upon reference to the above mentioned patent, it will be clear that the placing of a tumbler upon the platform balance **71** opens the double valve **70** to the line **66** initiating the flow of water through the connections to the tube **27**. When the tumbler has been substantially filled, the weight of the water plus the weight of the tumbler depresses the spring platform balance **71** and closes the valve **68**. When the filled glass of water is removed for use, the platform balance **71** rises but the flow of water through the tube **27** is not initiated until the tumbler is redeposited on the platform balance **71**.

A manually controlled valve indicated at **73** is provided to enable the dentist to cut off the tumbler weight filling system if desired. However, the tumbler weight filling system may be employed in connection with the time control system to distinct advantage. Systems employing the weight of the tumbler to initiate the tumbler filling action are sensitive and may, for example, be upset by the dentist using a tumbler of improper weight. In such case the weight of the tumbler may not initiate the tumbler filling action. In that event the dentist or the patient by the time controlled mechanism previously described may fill the tumbler by depressing the foot pedal **52** or actuating the switch **63**. If the time controlled mechanism is initiated by pressing the foot pedal **52** or actuating the switch **63** accidentally when the tumbler is filled with water, no harm is occasioned thereby. The water merely overflows the tumbler and flows into the basin **23**.

In Figs. 2, 3 and 4, I have illustrated a commercial timer suitable for use in the system of my invention. The timer will be but briefly described since its function and operation are well understood. In brief, the timer includes a mounting plate **76** which partly encloses a small electric motor **77**. The motor drives a shaft **78** which carries an arm **79** which is normally held in engagement with a stop **81** by a spring **82**. The position of the stop **81** is controlled by the position of a timing dial **83**. The timing dial is rotated to a position to give the timing cycle desired through connections, as indicated at **84**, which determines the position of the stop **81**. The arm **79** corresponds in general to the arm **44** of Fig. 1 and the spring **82** corresponds to the spring **46**.

Of course as soon as the timer is started, the solenoid **35** is energized to initiate the filling of the tumbler. When the solenoid **48** of Fig. 1 is energized, the motor **77** is set into operation to rotate shaft **78** and swing arm **79** away from the stop **81**. Rotation of the arm **79** brings it to a position where it engages a micro switch **82** which cuts off the motor. The spring **82** restores the arm **79** to a position in engagement with the stop **81**. The tumbler filling cycle is then completed and the solenoid deenergized and the valve **33** closed.

While I have shown and described the preferred form of my invention, it will be apparent that various changes and modifications may be made therein, particularly in the form and relation of parts, without departing from the spirit of my invention as set forth in the appended claims.

I claim:

1. In a dental unit having a pedestal and a support for a water container, in combination, a water supply connection extending to a position above said water container, a valve in said connection, means for opening and closing said valve including automatic timing mechanism which may be set to cause a flow of water sufficient to approximately fill the water container, a foot pedal, means between the foot pedal and the timing mechanism for initiating the action of the timing mechanism when the foot pedal is depressed, means for automatically closing said valve when the timing mechanism completes the filling cycle for which it has been set, said foot pedal being located close to the position which the dentist normally occupies in operating upon a patient so that he may depress the pedal to initiate the water container filling cycle whenever he notices that the water container is empty and without interrupting his normal work on the patient, and means for returning the foot pedal from the depressed position upon release of the foot pedal by the dentist.

2. Apparatus in accordance with claim 1 wherein a control element is located in a position convenient to a patient seated in the dental chair so that the patient may initiate the container filling cycle.

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