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B4W W6C

(56) Documents Cited
GB 2032830 A GB 0849882 A EP 0241024 A2
US 4618178 A US 3843183 A

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(54) Hand held pick-up tool

(57) Plastic handle 2A houses a venturi type vacuum pump 21. The tool is used to pick up dental items. Nozzle 23 is releasably connected to a releasable tube 22 both of which can be disposable or autoclavable. A different configuration is shown in Fig 1.

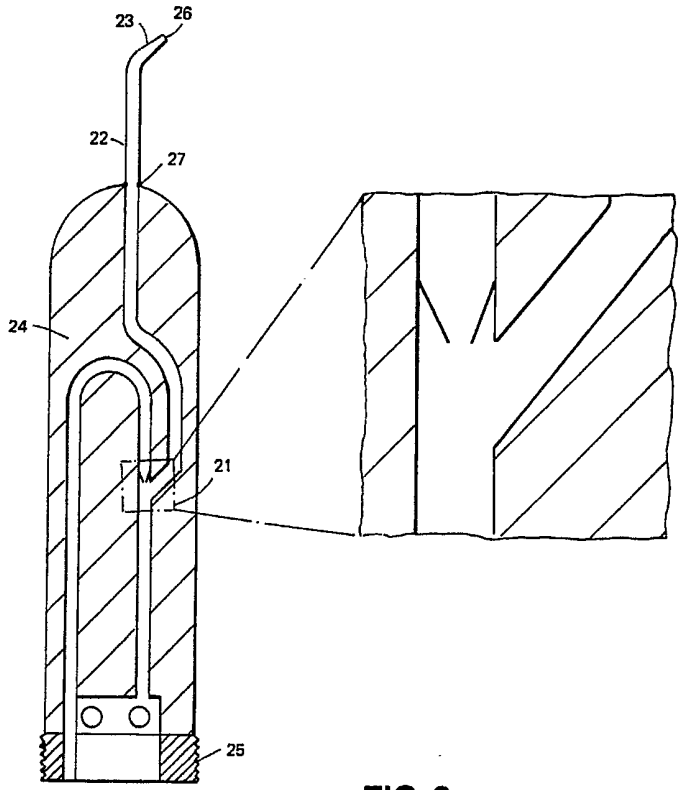

FIG. 2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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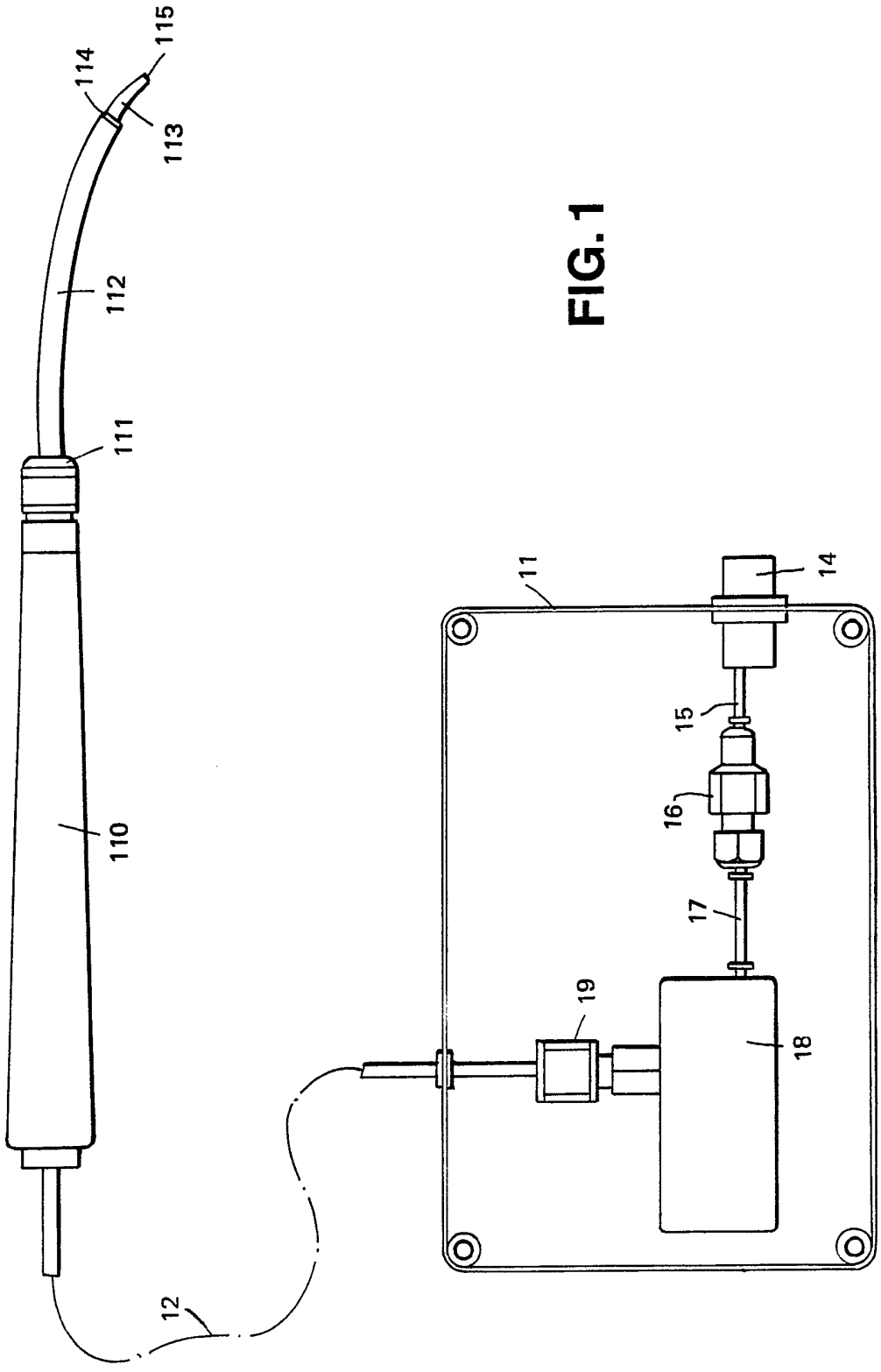

FIG. 1

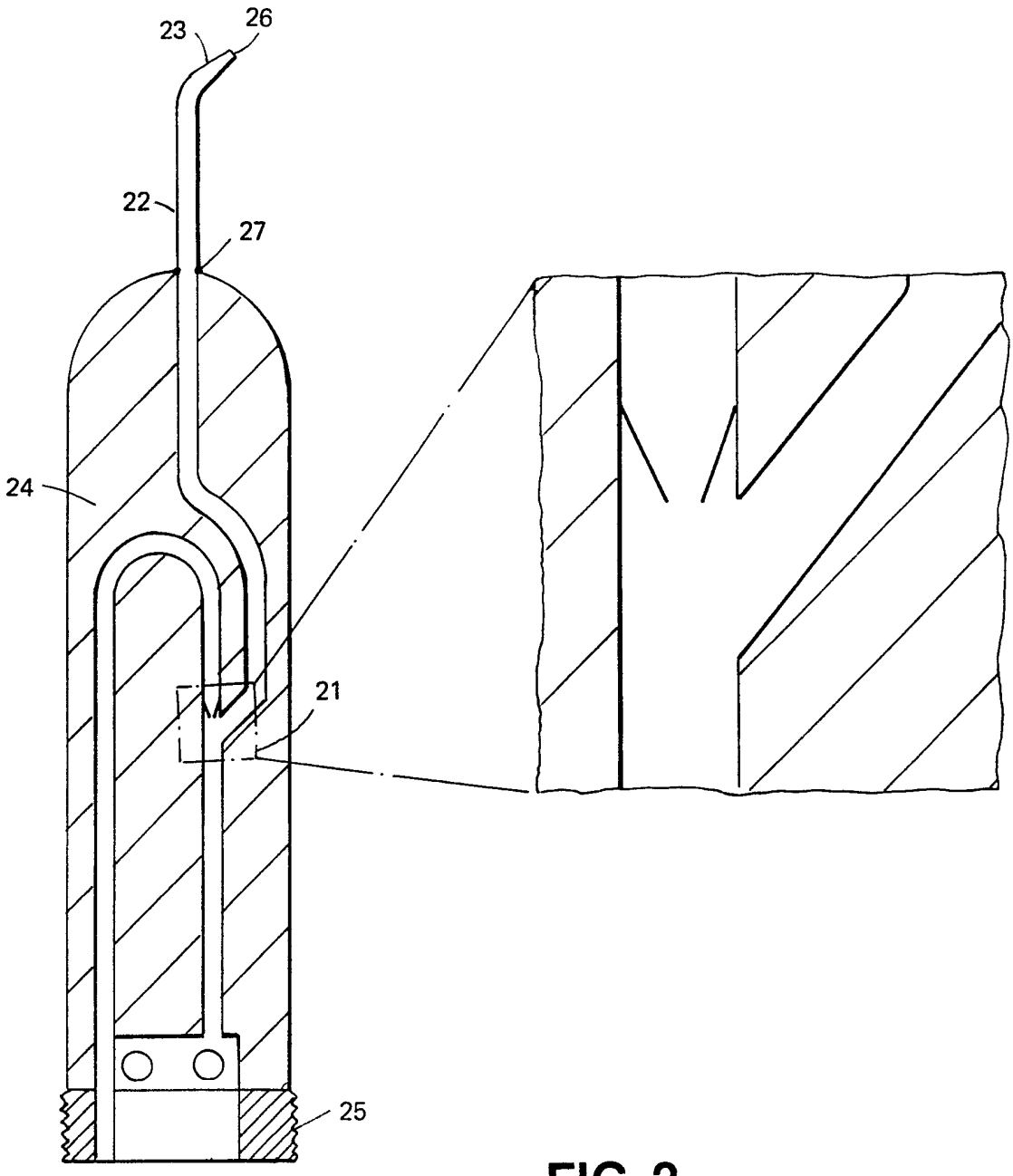

FIG. 2

MANIPULATOR APPARATUS

The present invention relates to a manipulator apparatus, and in particular to apparatus for aiding manipulation of a small object.

The problem of manipulating objects which are too small or too delicate to be handled manually easily occurs in many fields, such as watchmaking, jewellery, electronics and medical fields such as surgery and dentistry.

With reference to the field of dentistry in particular, a dentist is often required to pick-up very small objects such as implant screws, inlays and veneers. Such items by their nature are small and delicate and must be positioned with precision in sometimes awkwardly accessible locations. It is desired to place such small objects in their desired position with the minimum of fuss and delay. Prior art solutions to this problem include the use of tweezers, sticky wax and sticky sticks. It is difficult to pick up a small object such as an inlay or an implant screw with these relatively primitive devices and implements. It is also difficult to position the object in the desired location and then remove the implement or device leaving the small object in place.

It is therefore desired to provide an apparatus for aiding manipulation, in particular for picking up and manipulating small objects. It is further desired to seek to provide apparatus for use with fragile or delicate objects, for manipulating such without damage.

According to the present invention there is provided an apparatus for aiding manipulation, comprising: vacuum generating means; a tube or conduit connectable to the vacuum generating means; said tube having, in use, at least a slight vacuum generated therein; said tube or conduit being attached to or provided with attachment means

for enabling attachment, in use, to an object by a suction force caused by said vacuum.

The apparatus of the present invention preferably further comprises a housing of such size and shape as may be suitable and convenient for use as a hand held device, i.e. a handle.

The vacuum generating means is preferably of such size and weight so as to allow convenient location of such within said housing and is ideally in the form of a venturi type vacuum pump. In any case, the vacuum generating means is preferably operable from a compressed gas supply, ideally a compressed air supply. The compressed gas supply may be delivered to the venturi type vacuum pump by means of a flexible supply line. The compressed gas supply is preferably of the switchable type normally present in a dentist's surgery and normally used for driving drills and other equipment.

The connection of the tube to the vacuum generating means may be located, for example, either inside the handle or at the surface thereof. This connection may be readily releasable in order that one of a variety of tubes may be connected. The tube may be made from a rigid material, such as metal, or flexible, for example a plastics material.

The attachment means may simply be an opening in the tube, e.g. the open end of such. However, the attachment means is preferably in the form of a nozzle attached to one end of the tube, the nozzle having a hole in a tip portion thereof. Preferably, the nozzle, or at least the tip portion thereof, may be readily disengaged from the tube or conduit to allow the nozzle or tip portion to be replaced, for example when worn out or for cross-infection control.

For illustration, two preferred embodiments of the

present invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a schematic plan view of a first embodiment including a handle and separate vacuum generating means; and

Fig. 2 is a sectional view through a handle used in is second embodiment wherein vacuum generating means is mounted within the handle.

Both embodiments of the present invention are particularly designed and arranged for use in the field of dentistry. Almost all dental surgeons have available in their surgery a compressed air supply which is normally used for driving drills and other equipment. This compressed air supply is switchable, usually by means of a foot switch, and both embodiments are designed for use in connection with such a compressed air supply.

Turning now to the embodiment of Fig. 1, a manipulator apparatus is shown which comprises vacuum generating means 11, a flexible tube 12 and attachment means, i.e. a nozzle for enabling attachment by suction to a small object (not shown).

The vacuum generating means 11 comprises a connector 14, for supplying compressed air via airpipe 15 through valve reducer 16 and airpipe 17 to venturi 18. Connector 14 allows vacuum generator means 11 to be connected to a separate compressed air supply (not shown). Venturi 18 uses compressed air to produce a low vacuum in flexible tube 12 through non-return valve 19. Tube 12 runs through handle 110 and is connected via a screw joint 111 to a disposable plastic end tube 112. A further disposable tip portion 113 is connected to tube 112 by means of a joint 114. Tip portion 113 has a hole 115 in one end thereof which, by action of the vacuum, may be used to pick-up small and delicate objects, such as an inlay or a veneer. In use, the tip is placed adjacent the small

object, which will cover hole 115 and be held in place by the vacuum suction force.

All the while that compressed air is supplied to vacuum generating means 11, suction force is created at tip portion 113 and outlet 115. Since the compressed air supply commonly available in a dentist's surgery is switchable, i.e. to allow or prevent compressed air from reaching vacuum generating means 11, no further valve or other control means is required.

With reference now to Fig. 2, a second preferred embodiment of the present invention comprises a venturi type vacuum pump 21, a tube 22 and means for enabling attachment by suction to a small object, i.e. a cupped nozzle 23; the vacuum pump 21 being housed within a handle 24.

Handle 24 is formed, for example from plastics material, so as to construct a venturi type vacuum pump as shown in the figure as an integral part thereof. Alternatively the handle may simply contain a separately manufactured vacuum pump.

The handle 24 is further provided with a connector 25, which allows a supply line (not shown) carrying compressed air to be connected to the handle 24 and thus also to the vacuum pump 21. The connector and supply line are of the type commonly used in a dentist's compressed air system.

The venturi type vacuum pump 21 uses compressed air to produce a low vacuum in tube 22. Tube 22 is releasably connected to handle 24 via joint 27, which also allows tube 22 to be rotated relative to handle 24.

Nozzle 23 is in turn releasably connected to tube 22. The cupped tip of nozzle 23 has an outlet 26 which, by

action of the vacuum, may be used to pick-up small and delicate objects, such as an inlay or a veneer. In use, the tip is placed adjacent the small object, which will cover outlet 26 and be held in place by the vacuum suction force.

By use of suction force and a soft plastics material tip or nozzle portion there is minimal physical contact with a small or delicate object to be picked-up and moved. Further, the suction force may easily be removed so that the object is readily released, which is obviously an advantage over the prior art arrangement of sticky wax on a stick. Further, plastic tube sections 112 and 113 of Fig. 1 and 22 and 23 of Fig. 2 may be adapted to the use required. For use in dentistry, these sections are an inexpensive and disposable plastics material. Further, the apparatus is preferably autoclavable, i.e. able to withstand high temperature and pressure steam for sterilization. Further, since a readily available compressed air supply is used, both the preferred embodiments are relatively inexpensive and simple to install and maintain.

CLAIMS

1. An apparatus for aiding manipulation, comprising: vacuum generating means; a tube or conduit connectable to the vacuum generating means; said tube having, in use, at least a slight vacuum generated therein; said tube or conduit being attached to or provided with attachment means for enabling attachment, in use, to an object by a suction force caused by said vacuum.

2. A manipulator apparatus as claimed in claim 1, further comprising a switchable compressed gas source; said vacuum generating means being operatively coupled to and driven by compressed gas from said compressed gas source.

3. A manipulator apparatus as claimed in claim 2, wherein said vacuum generating means is a venturi type vacuum pump.

4. A manipulator apparatus as claimed in claim 3, further comprising a handle of such size and shape as may be suitable and convenient for use as a hand held device.

5. A manipulator apparatus as claimed in claim 4, wherein said venturi type vacuum pump is mountable within said handle.

6. A manipulator apparatus as claimed in claim 5, said tube being releasably connected to said vacuum generating means.

7. A manipulator apparatus as claimed in claim 6, wherein said attachment means is a nozzle, said attachment means being releaseably connected to said tube.

8. A manipulator apparatus substantially as hereinbefore described with reference to the accompanying drawings.

Pa...nts Act 1977
Examiner's report to the Comptroller under Section 17 (The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.5) B25B 11/00, B25J 1/00,/02,15/00,/04,/04,B66C 1/02

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner
R D CAVILL

Date of completion of Search
29 NOVEMBER 93

Documents considered relevant following a search in respect of Claims :-
1 TO 8

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X,Y	GB 2032830 A	(SECRETARY OF STATE FOR DEFENCE) see whole document	X 1 to 6 Y 7
X,Y	GB 849882	(MULLARD) see Figures 2 and abs	X 1 to 6 Y 7
X,Y	EP 0241024 A2	(SEDLBAUER) see figures	X 1 Y 7
X,Y	US 4618178	(HUTSON) see figures	X 1 Y 7
X,Y	US 3843183	(HUTSON) see figures and abs	X 1 Y 7
	The above citations are examples only of a larger number of documents considered relevant to Claim 1 at least		

Databases:The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).