

UNCLASSIFIED

AD 285 544

*Reproduced
by the*

**ARMED SERVICES TECHNICAL INFORMATION AGENCY
ARLINGTON HALL STATION
ARLINGTON 12, VIRGINIA**



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

63-1-1

Technical Report No. 62..9

28 5544

285 544

ADAPTOR FOR RESUSCITATION APPARATUS

CATALOGED BY ASTIA
AS AD NO. _____

Reported by: Carl A. Nielson

September 1962

U.S. ARMY PROSTHETICS RESEARCH LABORATORY
WALTER REED ARMY MEDICAL CENTER
WASHINGTON 25, D. C.

ASTIA
RECEIVED
OCT 15 1962
ASTIA C

Project: 6X59-01-001-04

Date Started: August 1962

Date Completed: September 1962

Recommend Approval:

Fred Leonard

Scientific Director

Approved:

Paul R. ...

Director

* Qualified requesters may obtain copies of this report from ASTIA.

A B S T R A C T

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed. Six Adaptors were fabricated and submitted for evaluation to the Burn Therapy Section, Brooke Army Medical Center, Texas.

I. INTRODUCTION

The problem was submitted by the U.S. Army Surgical Research Unit, Brooke Army Medical Center, Fort Sam Houston, Texas, originating with the Burn Therapy Section.

In cases of accidental burn it sometimes becomes necessary to perform a tracheostomy and to supply air to the patient on an emergency basis from the time of the accident and during the period of transit to the burn treatment center. To accomplish this a tracheostomy tube is inserted into the trachea and connected to the artificial breathing mechanism. An adaptor is required between the two that will provide an airway between the small cannula of the tracheostomy tube and the larger opening of the resuscitation apparatus.

Previous connectors were generally unsatisfactory because they lacked the element of universality, that is, a separate one was required for each size of tracheostomy tube. They were made from materials that could not withstand sterilizing temperatures. They were unreliable in their capability of providing positive connections with the other elements which made it necessary for the nurse or attendant to hold the parts together by manual means during the whole trip.

II. DESIGN

The design criteria for the adaptor are

- a) adaptability to each size of tracheostomy tubes
- b) self-supporting, and secure in its attachment, requiring no external aid
- c) amenable to the temperatures encountered during sterilization by autoclave without distortion or destruction

The design incorporates unitized construction consisting of a flexible portion for connecting to the air passage of the air pump, a thicker portion through which is an air way directed toward the cannula of the tracheostomy tube and to which is attached two neck straps of tubular knitted Dacron (R).

Attachment to the tracheostomy tube is achieved by an external clip made of Lexan (R) polycarbonate resin and an internal device consisting of a tubular hole with a curved lateral depression interconnecting with it along part of its length.

The base of the adaptor in the region around the airway is contoured in such a manner as to conform to the mating surfaces of the base of the tracheostomy tube thereby creating an air seal between the two.

III. MATERIALS

While this adaptor was made from a vinyl chloride copolymer resin plasticized with polymerizable plasticizers to give it the necessary resistance to distortion by the high sterilizing temperatures, other rubberlike or elastomeric materials such as silicones or urethanes would also be suitable. Sulphur containing rubbers might not be indicated since the tracheostomy tubes are made of silver metal. Plasticized vinyl chloride compositions containing glycol or polyglycol dimethacrylates diallyl phthalate, allyl methacrylate to raise the heat distortion point to higher values than is obtainable from common plasticizers alone could be used.

The present series of adaptors were made from a plastisol of the following composition:^{1/}

Geon 135	60.0 gm.
Diocetyl fumarate	5.0
Diocetyl maleate	10.0
GE 73506	16.0
G-62	10.0
Diocetyl azelate	5.0
BC-30	1.2
Ch 201	0.4
Di tertiary butyl peroxide	0.6

The only change noted in this composition after autoclaving the cured product was a slight blanching from the moist steam but was considered to be of no consequence. It cleared to its original clarity after drying in the atmosphere.

The material for the neck straps was:

140 denier Dacron (R) knitted on a 5/8 inch cylinder at 66 counts per inch in tubular form.

Lexan (R) sheet 1/16 inch thick was cut into strips 1/4 inch wide and formed into clips in an aluminum die shown in the accompanying diagram of the molds.

^{1/} Suppliers listed in appendix

IV. FABRICATION

To fabricate the adaptor proceed as follows:

1. Cut a 20 inch length of Dacron (R) fabric.
2. Insert the ends individually into the slotted openings in the base of the mold.
3. Draw a short length of the fabric through the opening.
4. Trim the width of each end of the strap from its width of 5/8 inch to 3/8 inch by cutting 1/8 inch from each edge lengthwise.
5. Cut off each of the pieces leaving the 3/8 inch of material remaining.
6. Draw the strap back through the base until only the cut portion of the end is exposed above the base.
7. Secure the ends in place by means of the metal wedges. The fabric should lay inside the wedge.
8. Trim the length of the exposed edges of the fabric to about 1/4 inch above the surface of the base.
9. Place the cylindrical wall mold in position on the base so as to clear the tabs of fabric.
10. Cut a piece of the same fabric 1/4 inch long and place it around the small flat upright core.
11. Place the large center core into position in the base.
12. Fill the mold with plastisol up to the top of this core.
13. Press the mold top firmly into place on top of the core and secure by means of the screw.
14. Place mold in air oven and cure for 25 minutes at 150°C.
15. Remove, cool, and disassemble the mold.
16. Trim the Lexan (R) clip to the outline and dimensions shown in the diagram.
17. Force the clip into the cavity of the adaptor.
18. Trim any excess or flash material.

V. DIRECTIONS FOR USE

The efficacy of the Adaptor depends upon its operating cooperatively with the tracheostomy tube. The base of the Adaptor is designed in a manner that will provide a positive seal against the face of the tracheostomy tubes when properly applied. To achieve the seal a clip is provided that engages the under side of the framework of the cannula. Opposite this clip is a hook that is designed to engage the post and fin that is attached to the upper side of the framework of the tube.

It is important that the rotatable post be turned so that the fin is directed outwardly. In this position it will engage the material of the Adaptor when the latter is pressed ALL THE WAY DOWN to the face of the cannula through the hole in its base and will lock in this position. A positive seal is assured only when the Adaptor is in the locked position.

To remove the Adaptor simply "break" it off by twisting it out from under the clip and continue the same motion in the same direction until the post is disengaged. Pulling the Adaptor does not tend to unlock it.

When the Adaptor is to be autoclaved it should be removed from the cannula.

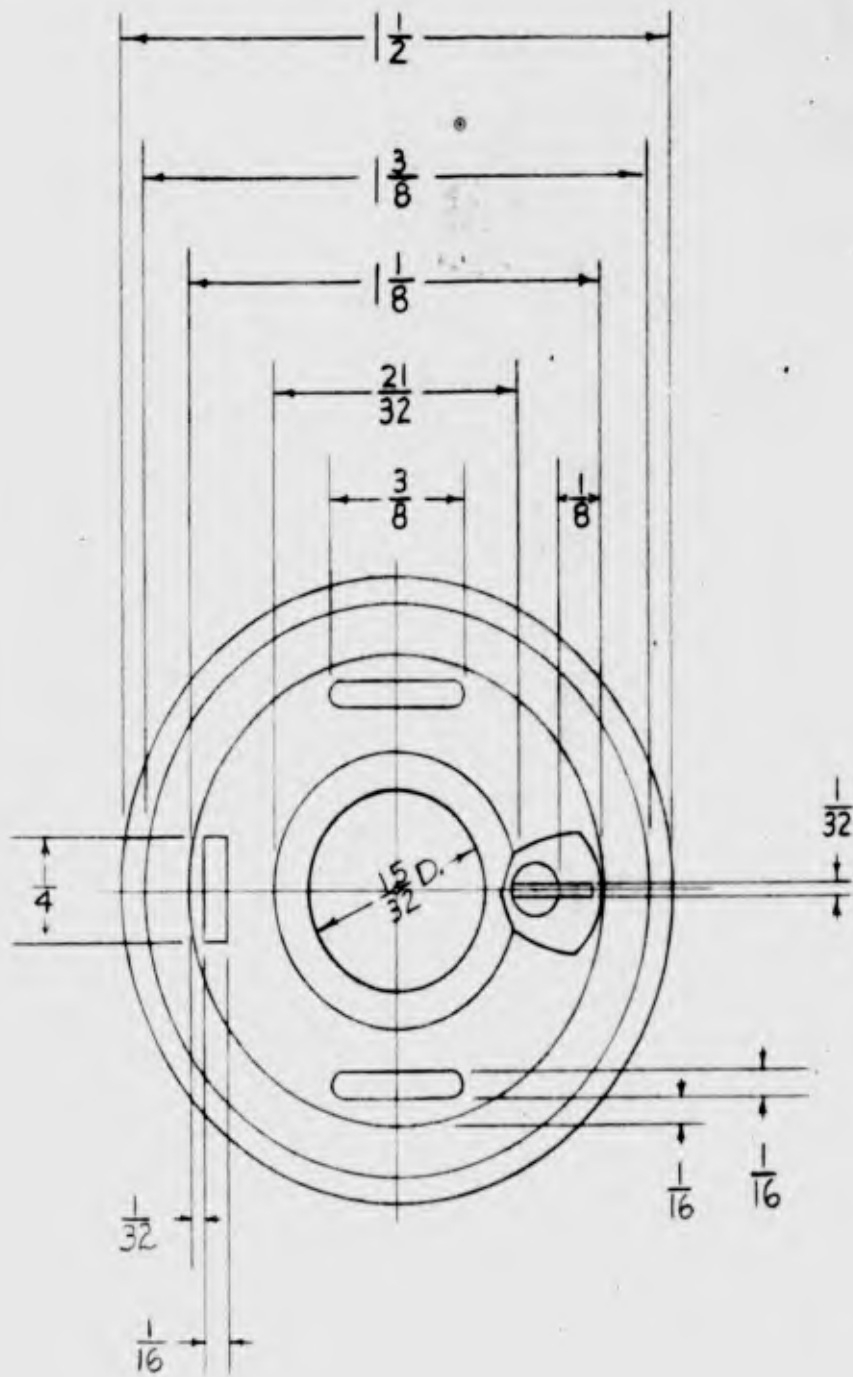
VI. ACKNOWLEDGEMENT

The work of Mr. Stanley Baker in machining the molds and of Miss M. J. Orloski in preparing the sketches and drawings in this report is gratefully acknowledged.

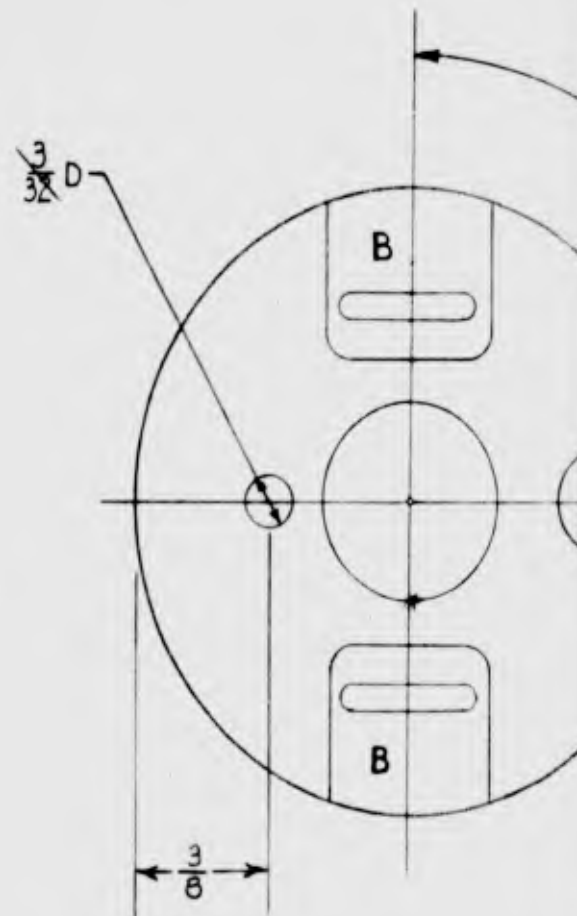
A P P E N D I X

Proprietary Names and Abbreviations

<u>Name or Abbreviation</u>	<u>Supplier</u>
Geon 135	B. F. Goodrich Co., Cleveland, Ohio
Di octyl Fumarate	Rubber Corp. of America Hicksville, New York
Di octyl Maleate	" " "
GE 75506	General Electric Co. Schenectady, New York
G-62	Rohm & Haas Co. Philadelphia, Pa.
Di octyl Azelate (Z-66)	Union Carbide Chemical Co. So. Charleston, West Virginia
BC-30	Advance Solvents & Chemical Corp. New York, N.Y.
Ch 201	" " " "
Di tertiary butyl peroxide	Shell Chemical Corp. 300 Madison Ave., New York, N.Y.
Dacron (R)	Philadelphia College of Textiles and Sciences Schoolhouse Lane, Philadelphia, Pa.
Lexan (R)	General Electric Co. Schenectady, New York

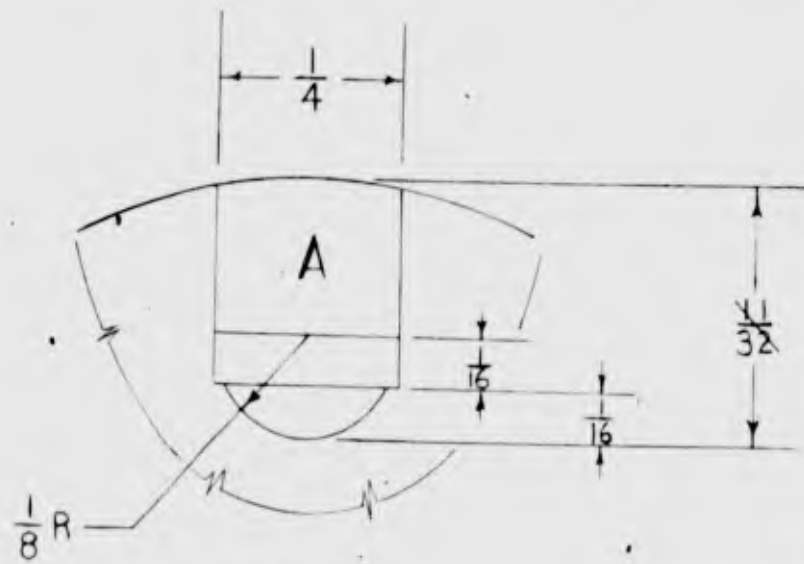
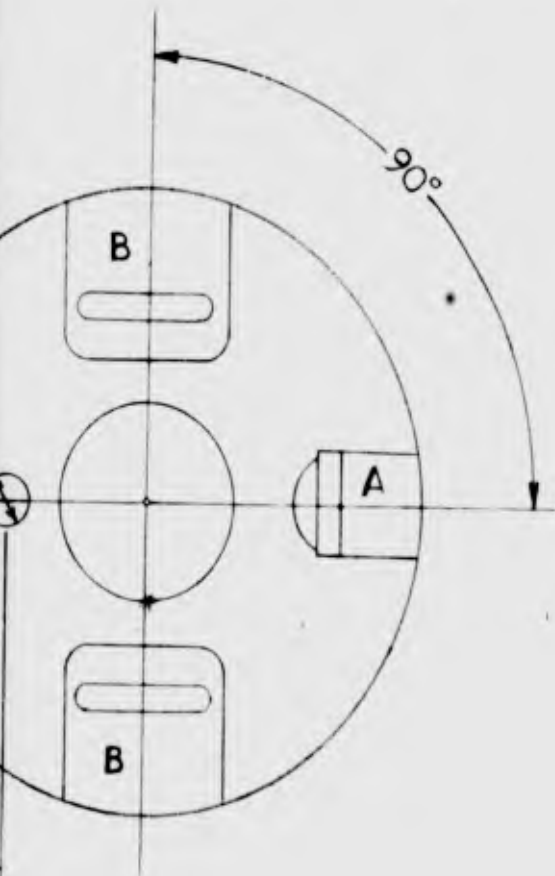


SCALE: 2=1



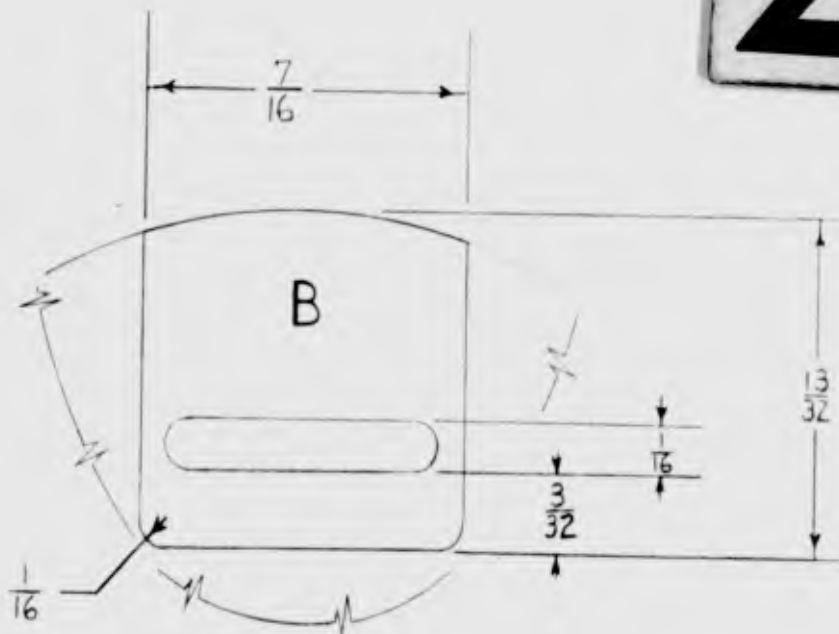
SCALE: 2=1

1



SCALE: 4 = 1

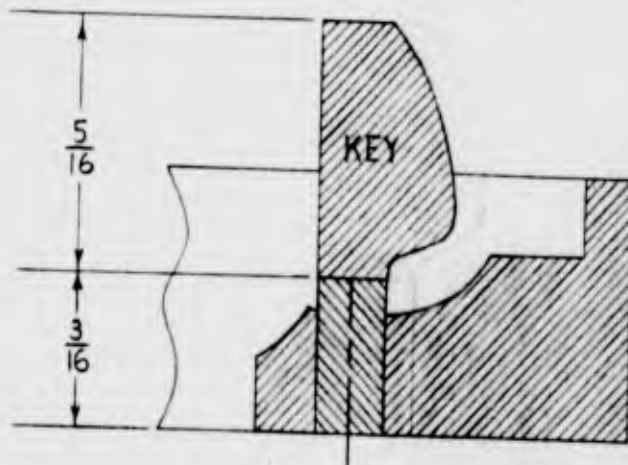
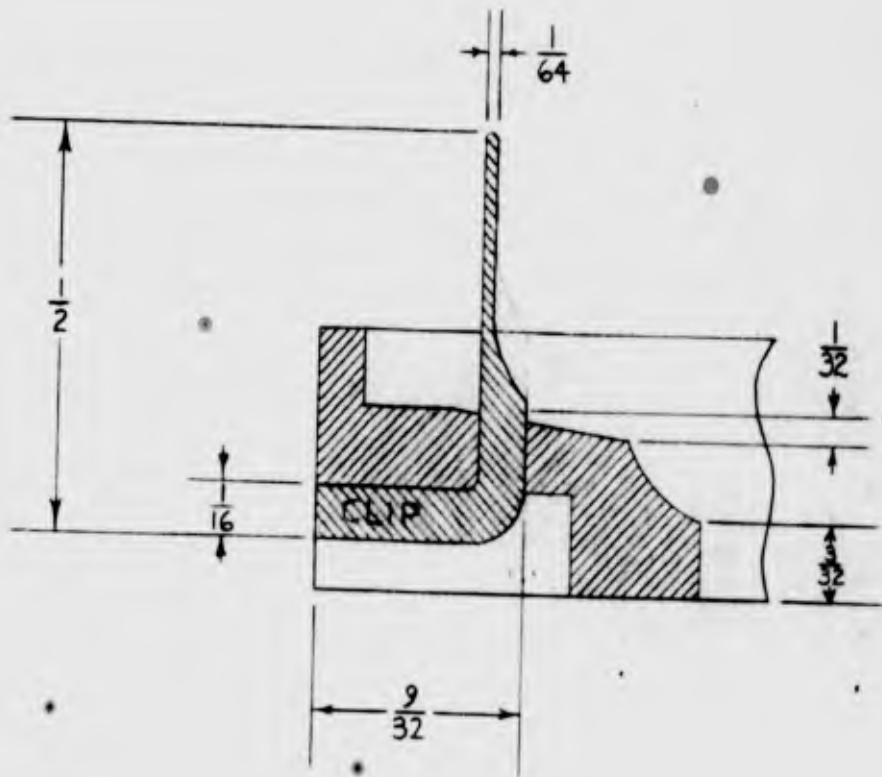
2



SCALE: 4 = 1

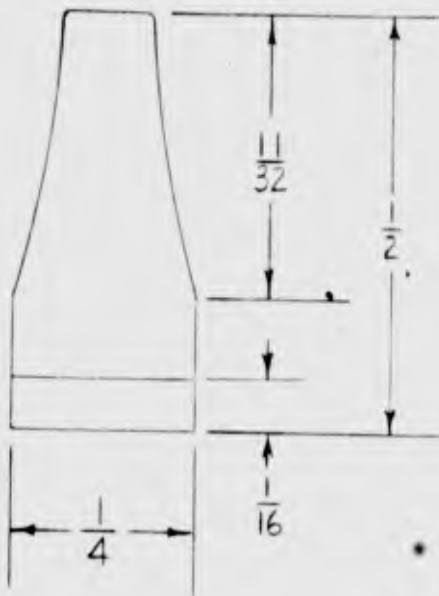
SCALE: 2 = 1

PART NO.	PART NAME	NO. REQ.	MATERIAL	REMARKS
	MOLD		ALUM.	
SCALE AS SHOWN		ARMY PROSTHETICS RESEARCH LABORATORY, ARMY MEDICAL CENTER WASHINGTON - 12 D.C.		SUPERSEDES
DRAWN m.j. orloski	DATE 8-20-62			NEXT ASSEMBLY
CHECKED	DATE	TITLE RESUSCITATION APPARATUS		DRAWING NO.
APPROVED	DATE			

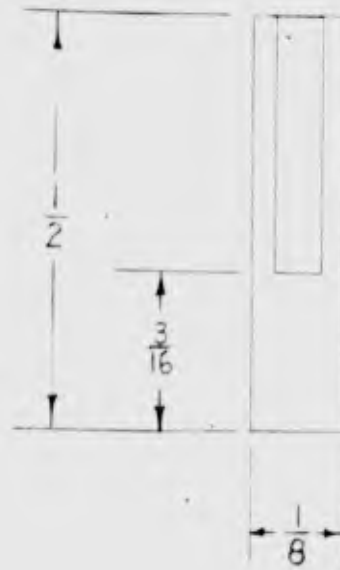


1

NOTE: CLIP AND KEY ARE MADE OF STAINLESS STEEL



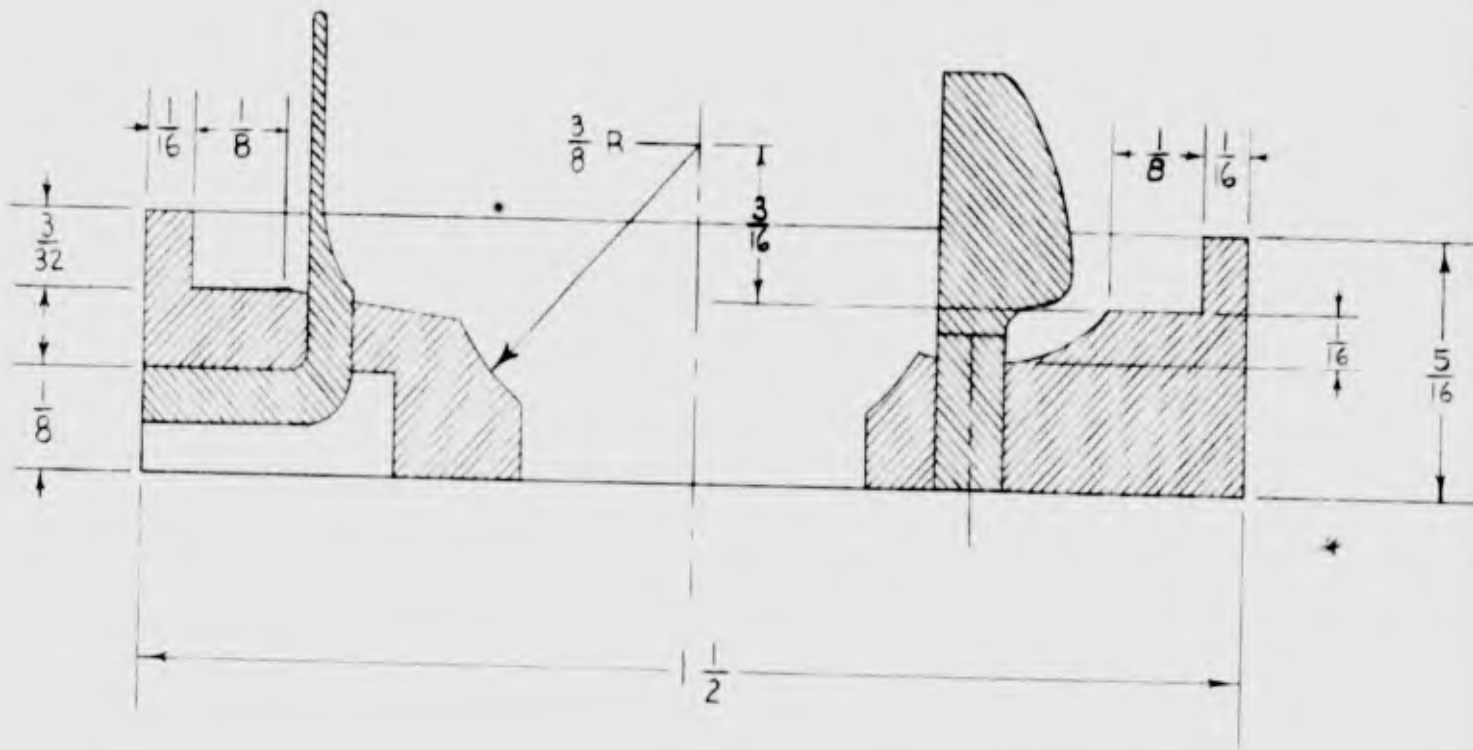
CLIP



KEY

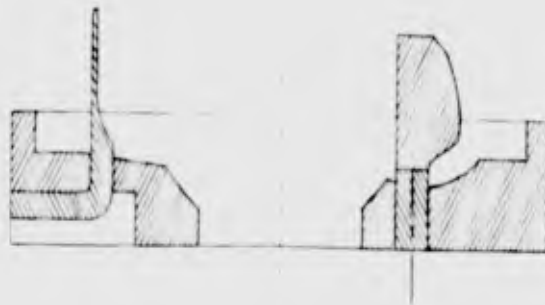
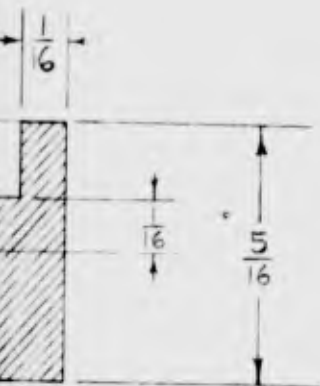
2

PART NO.	PART NAME	NO. REQ.	MATERIAL	REMARKS
	MOLD		ALUM.	
SCALE 4 = 1		ARMY PROSTHETICS RESEARCH LABORATORY, ARMY MEDICAL CENTER WASHINGTON - 12 D.C.		SUPERSEDES
DRAWN m j orloski	DATE 8-21-62			NEXT ASSEMBLY
CHECKED	DATE	TITLE RESUSCITATION APPARATUS		DRAWING NO.
APPROVED	DATE			



SCALE: 4 = 1

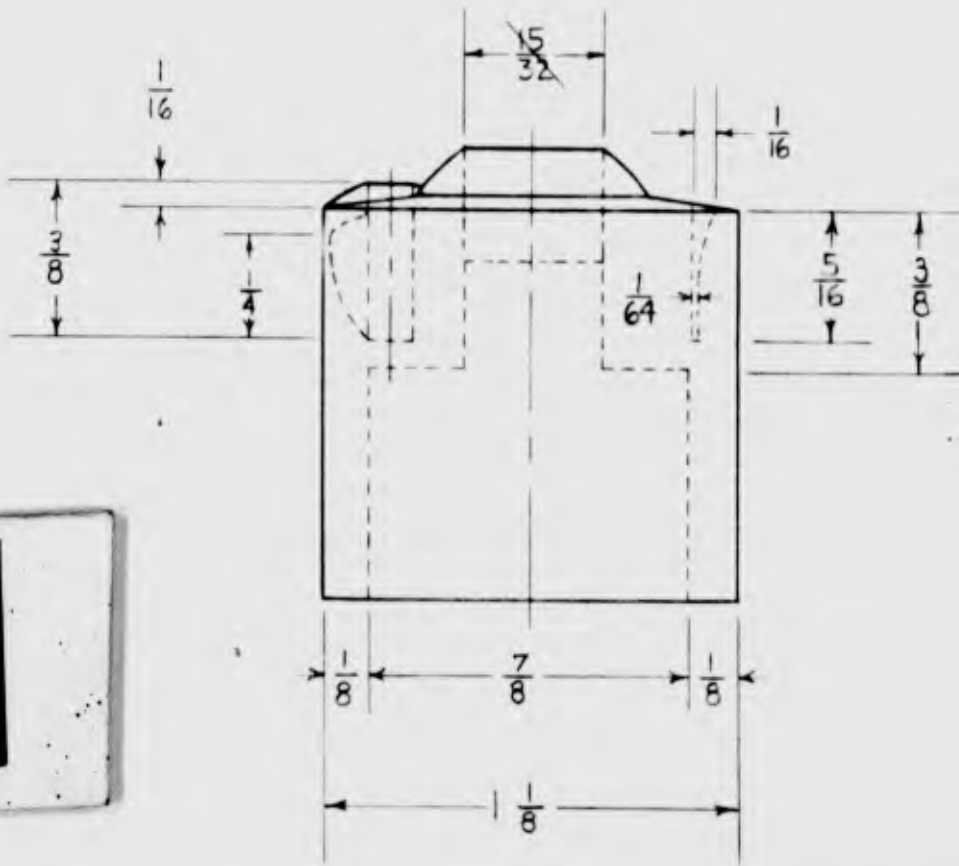
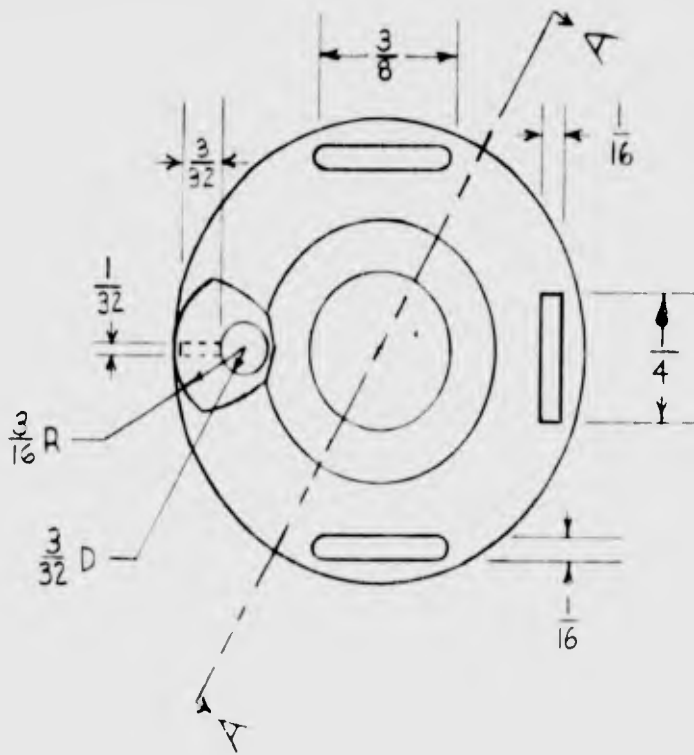
1



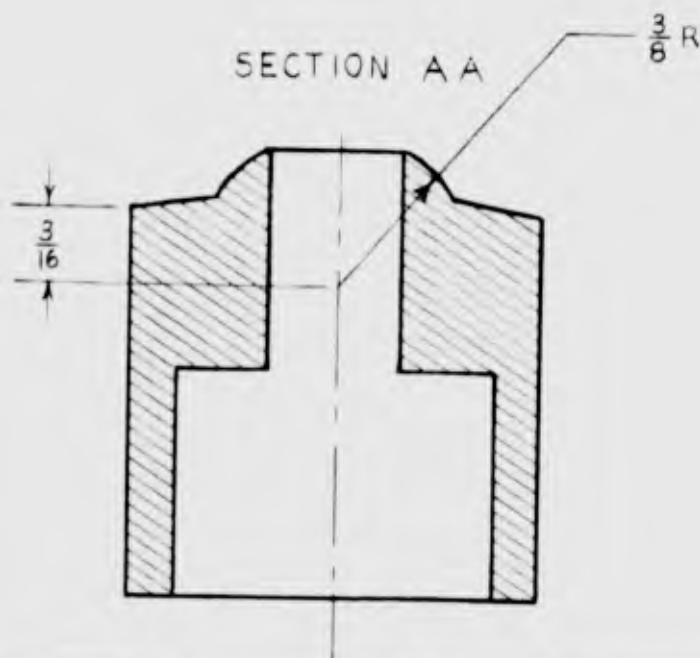
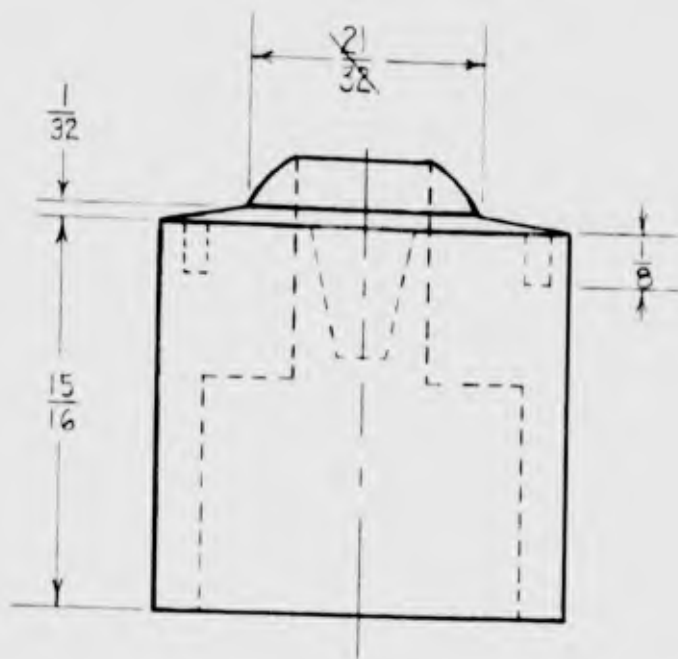
SCALE: 2 = 1

2

PART NO.	PART NAME	NO. REQ.	MATERIAL	REMARKS
	MOLD		ALUM.	
SCALE AS SHOWN		ARMY PROSTHETICS RESEARCH LABORATORY, ARMY MEDICAL CENTER WASHINGTON - 12 D.C.		SUPERSEDES
DRAWN <i>my orloski</i>	DATE 8-22-62			NEXT ASSEMBLY
CHECKED	DATE	TITLE RESUSCITATION APPARATUS		DRAWING NO.
APPROVED	DATE			



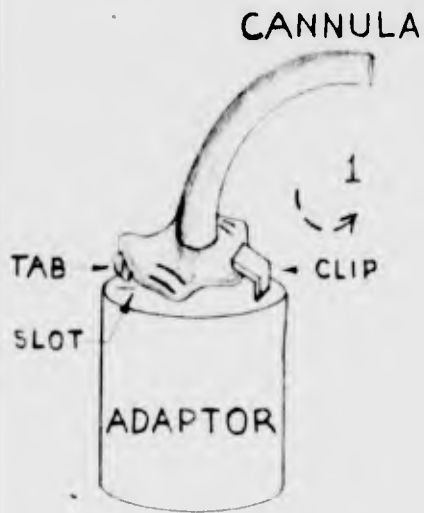
1



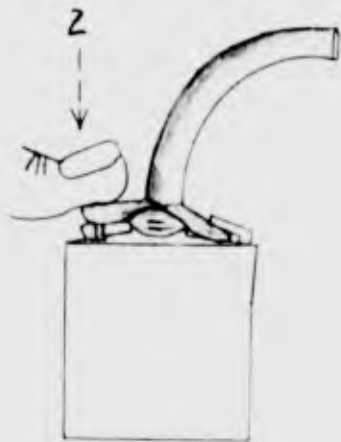
2

PART NO.	PART NAME	NO. REQ.	MATERIAL	REMARKS
	ADAPTOR		VINYL	
SCALE 2 = 1		ARMY PROSTHETICS RESEARCH LABORATORY, ARMY MEDICAL CENTER WASHINGTON - 12 D.C.		SUPERSEDES
DRAWN m. j. orloski	DATE 8-6-62			NEXT ASSEMBLY
CHECKED	DATE	TITLE		DRAWING NO.
APPROVED	DATE	RESUSCITATION APPARATUS		

DIRECTIONS FOR USE OF RESUSCITATION ADAPTOR



1. The cannula is pushed under the clip.

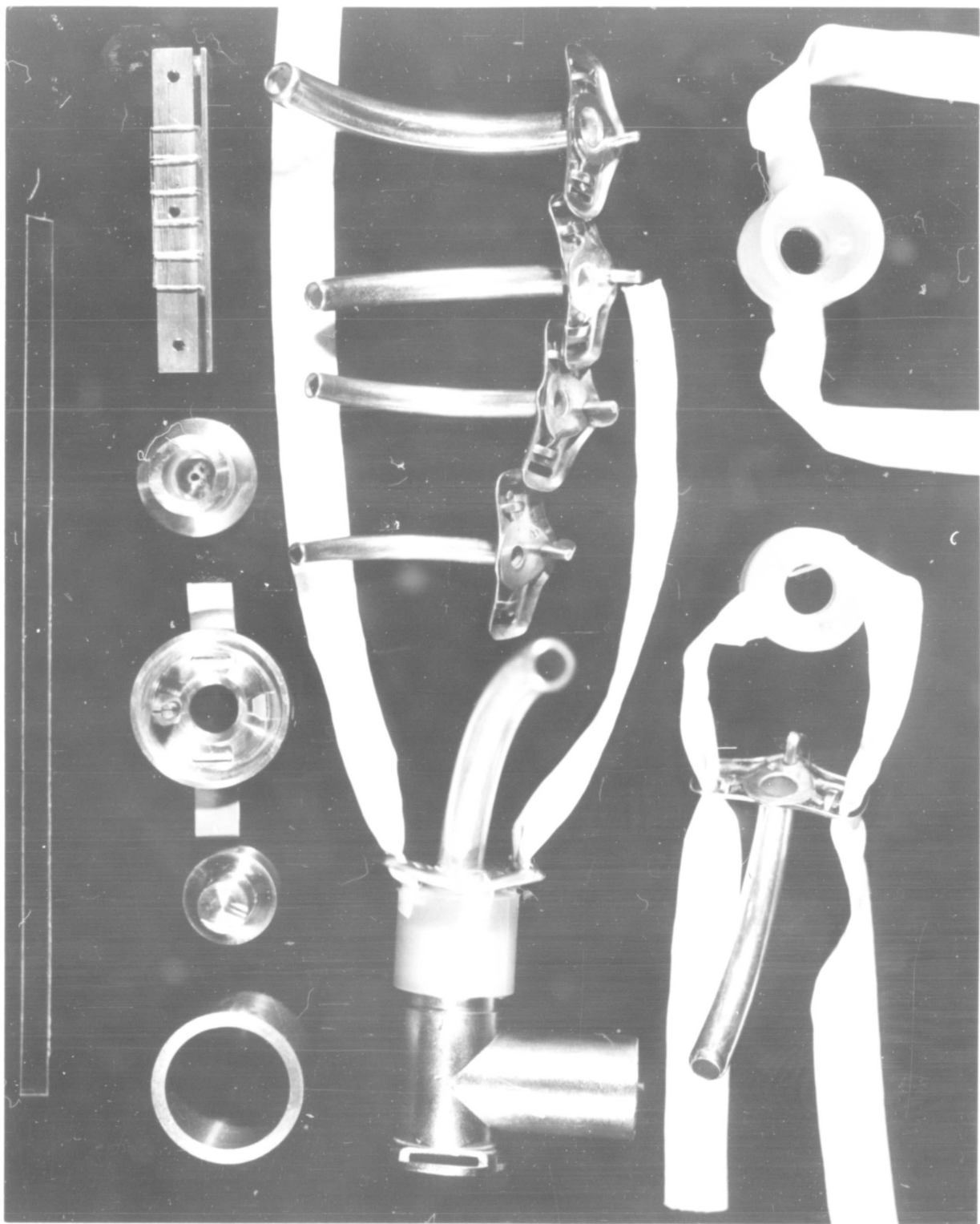


2. With the finger, the metal tab is pressed into the slot of the adaptor.



3. To remove, the cannula is slowly twisted out by pulling it from under the clip.

NOTE: STRAPS NOT SHOWN



ABSTRACT CARD
 TITLE: Adaptor for Resuscitation Apparatus
 AUTHOR (S): Carl A. Nielson
 AGENCY: USA Prosthetics Res. Lab.
 Walter Reed AMC, Washington 12, D. C.
 TECH. RPT. 6219
 Project 6X59-01-001-04
 ABSTRACT:

AD # _____
 1. Adaptor, resuscit.
 2. Resuscitator, plast.
 3. Connector,
 4. tracheostomy tube

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
 15 MAY 1961

ABSTRACT CARD
 TITLE: Adaptor for Resuscitation Apparatus
 AUTHOR (S): Carl A. Nielson
 AGENCY: USA Prosthetics Res. Lab.
 Walter Reed AMC, Washington 12, D. C.
 TECH. RPT. 6219
 Project 6X59-01-001-04
 ABSTRACT:

AD # _____
 1. Adaptor, resuscit.
 2. Resuscitator, plastic
 3. Connector,
 4. tracheostomy tube

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
 15 MAY 1961

ABSTRACT CARD
 TITLE: Adaptor for Resuscitation Apparatus
 AUTHOR (S): Carl A. Nielson
 AGENCY: USA Prosthetics Res. Lab.
 Walter Reed AMC, Washington 12, D. C.
 TECH. RPT. 6219
 Project 6X59-01-001-04
 ABSTRACT:

AD # _____
 1. Adaptor, resuscit.
 2. Resuscitator, plastic
 3. Connector,
 4. tracheostomy tube

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
 15 MAY 1961

ABSTRACT CARD
 TITLE: Adaptor for Resuscitation Apparatus
 AUTHOR (S): Carl A. Nielson
 AGENCY: USA Prosthetics Res. Lab.
 Walter Reed AMC, Washington 12, D. C.
 TECH. RPT. 6219
 Project 6X 59-01-001-04
 ABSTRACT:

AD # _____
 1. Adaptor, resuscit.
 2. Resuscitator, plastic
 3. Connector,
 4. tracheostomy tube

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
 15 MAY 1961

ABSTRACT CARD

TITLE: Adaptor for Resuscitation

Apparatus

AUTHOR (S): Carl A. Nielson

AGENCY: USA Prosthetics Res. Lab.

Walter Reed AMC, Washington 12, D. C.

TECH. RPT. 6219

Project 6X59-01-001-04

ABSTRACT:

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
15 MAY 1961**ABSTRACT CARD**

TITLE: Adaptor for Resuscitation

Apparatus

AUTHOR (S): Carl A. Nielson

AGENCY: USA Prosthetics Res. Lab.

Walter Reed AMC, Washington 12, D. C.

TECH. RPT. 6219

Project 6X59-01-001-04

ABSTRACT:

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
15 MAY 1961

AD #

1. Adaptor, resuscit.
2. Resuscitator, plastic
3. Connector,
4. tracheostomy tube

AD #

1. Adaptor, resuscit.
2. Resuscitator, plast.
3. Connector,
4. tracheostomy tube

ABSTRACT CARD

TITLE: Adaptor for Resuscitation

Apparatus

AUTHOR (S): Carl A. Nielson

AGENCY: USA Prosthetics Res. Lab.

Walter Reed AMC, Washington 12, D. C.

TECH. RPT. 6219

Project 6X 59-01-001-04

ABSTRACT:

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
15 MAY 1961

AD #

1. Adaptor, resuscit.
2. Resucitator, plastic
3. Connector,
4. tracheostomy tube

AD #

- 1 Adaptor, resuscit.
2. Resuscitator, plastic
3. Connector,
4. tracheostomy tube

ABSTRACT CARD

TITLE: Adaptor for Resuscitation

Apparatus

AUTHOR (S): Carl A. Nielson

AGENCY: USA Prosthetics Res. Lab.

Walter Reed AMC, Washington 12, D. C.

TECH. RPT. 6219

Project 6X59-01-001-04

ABSTRACT:

An Adaptor or connecting mechanism between the tracheostomy tubes of current manufacture and other elements of the resuscitation apparatus used during the emergency transport of patients from the site of the accident to the treatment center was developed.

WRAMC FORM 0183 (ONE TIME)
15 MAY 1961

AD #

1. Adaptor, resuscit.
2. Resucitator, plastic
3. Connector,
4. tracheostomy tube

AD #

- 1 Adaptor, resuscit.
2. Resuscitator, plastic
3. Connector,
4. tracheostomy tube

UNCLASSIFIED

UNCLASSIFIED