

# pemco

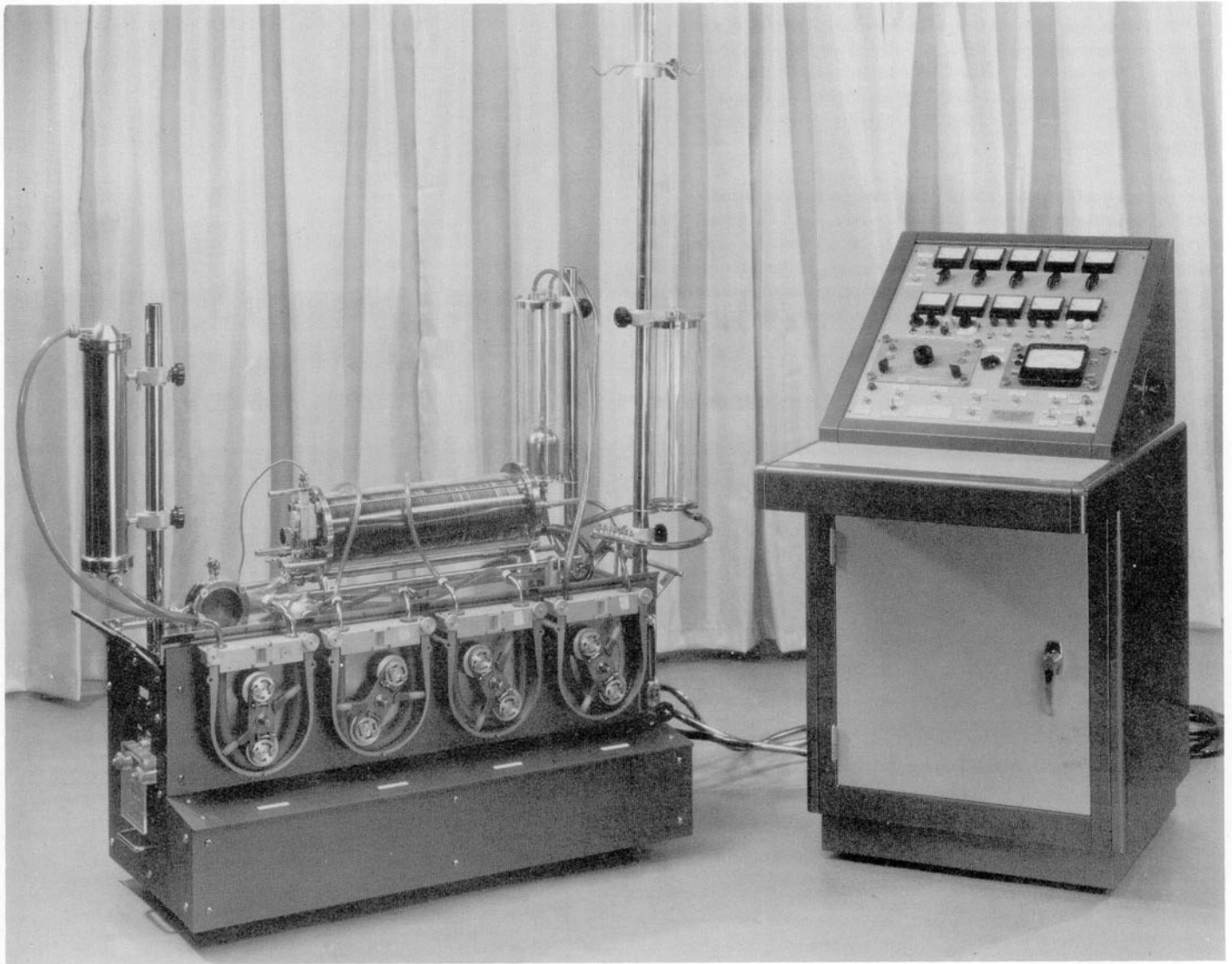
Inc.



## HEART LUNG UNITS

PEMCO INC.  
5663 BRECKSVILLE RD.  
CLEVELAND 31, OHIO

OCTOBER 1962



## DAVILA-PEMCO HEART-LUNG PUMP

Illustrated is a remote controlled four pump unit, built in co-operation with Dr. Julio C. Davila of Presbyterian Hospital, Philadelphia. The model is constructed with a console that controls pump RPM rate. Automatic leveling of the oxygenator is by electronic control of the arterial pump to increase or decrease the average flow rate selected by the pump operator. The arterial flow rate is monitored by a modified Medicon Flow Meter contained within the console. Slave meters indicate Arterial and Venous pressures as well as  $PO_2$  or Oxygen saturation. The Tele-Thermometer has four input channels. Automatic warming circuit for the oxygenator is accomplished with the use of a Yellow Spring automatic temperature regulator. Clamping of the arterial line, coronary artery perfusion lines, venous line, and shunt line are accomplished with devices controlled by switches at the console. Venous pressure in the gravity system is clamp controlled at the console by the pump operator. The pump motors and the separate disc drive motor all have the RPM rate indicated on meters at the console.

Special coronary sinus return bubble trap and venous reservoir designed by Dr. Julio C. Davila, are illustrated.

The Heat Exchanger, Arterial Filter and the Kay-Cross Rotating Disc Oxygenator are standard Pemco parts modified to suit the installation. The I.V. rack is augmented with a donor blood manifold that accepts 7 donor bottle lines. All pumps are equipped with shafts that accept emergency hand cranks for use during loading and also for use should power fail. A gage to measure the actual gas flow to the oxygenator is mounted on the pump.

Service doors on the console permit access to the four pump handles, the Flow meter circuitry, the D.C. rectifier stacks and the level detector circuitry. The Tele-thermometer and the Thermistemp unit are removable in a unit if battery or tube replacement is necessary. The complete unit has a two toned enamel finish. The aluminum sections are anodized to match. All switches, meters, lights, pump and functions are labeled.

Control cables and power can be inserted from either end of pump unit. Casters are conductive.

Pemco Heart Lung units have 1, 2, 3, 4, or 5, seven inch working diameter, 200° pumps. The pump castings are machined in one setup to assure concentricity between rollers and pump body, giving constant pressure on tubing during the complete length of pumping cycle. Two anodized aluminum rollers are mounted on antifriction needle bearings in a cast aluminum rotor. The assembly is keyed to a stainless steel shaft. Precision roller adjustment is provided for each roller.

The pumps are driven by a Leland explosion-proof motor, U.L. approved for use in ether atmosphere. Counter shafts drive the mechanical speed changers through semi-flexible couplings. Timing belts couple the mechanical speed changers to fixed speed reducers which in turn drive the pumps. The main motor also provides the power for the Kay-Cross Rotating Disc Oxygenator. Tachometers, all speed controls, powerstat adjustment and a tele-thermometer are mounted on a convenient central front panel. Hand cranks for loading and for emergency operation are provided for each pump. Tachometers will also register R.P.M. when pump is turned by hand, assuring proper flow rate at all times.

Carts are fitted with large diameter conductive wheels for easy portability. Water temperature controls for the Heat Exchanger, masts to hold venous equipment, Heat Exchanger and I.V. rack, are mounted on the cart.

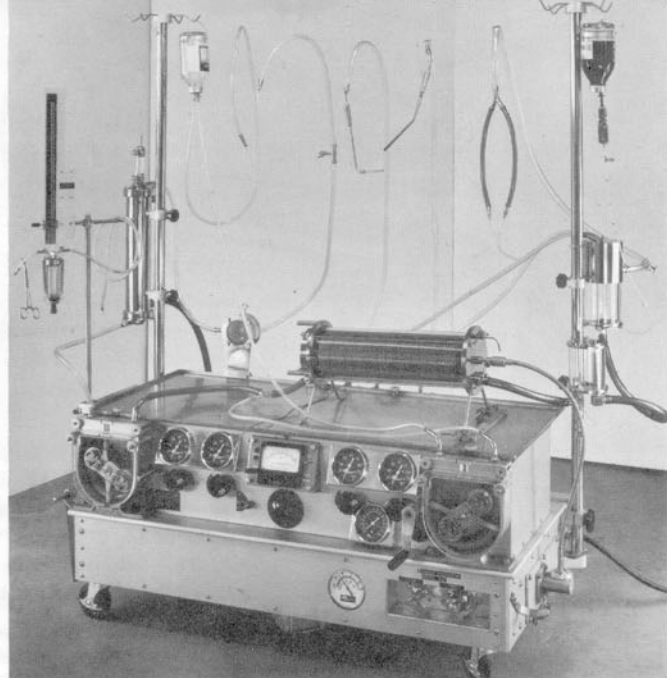
**NIH MODEL PUMP**—The National Heart Institute Heart-Lung Unit combines the Kay-Cross Oxygenator with three adjustable single roller 360° pumps. The pumps are driven directly by variable speed D.C. motors, obviating the necessity of mechanical speed controls, and provide flows to 7.0 liters per minute. Their operation is essentially noiseless. The pumps, oxygenator, electronic control and monitoring devices are housed in a compact console of a height sufficiently low to permit gravity drainage of venous blood with operating table at the usual level. Automatic regulation of the volume of blood in the oxygenator is provided by level sensing electrodes which activate a bidirectional occlusive pump that pumps blood to or from a calibrated reservoir. The oxygen tension of the arterialized blood is sensed by a Clark electrode in the arterial end plate. A newly designed meter permits a constant display of the oxygen tension on the control panel.

All electronic components are constructed as individual plug-in units providing ease and speed in servicing. Circuits to the arterial and coronary return pumps are duplicated in each unit, with provisions for switching. Strategically grouped panel meters provide display of the patient's central venous and arterial pressure from an external amplifier. The clamp for the arterial line is electrically operated (with manual override). The venous clamp is manually operated. Each pump as well as the disc drive is equipped with an override clutch to permit manual operation in the event of total power failure. A gas flow meter on the console accurately indicates the rate of oxygen flow and assures that it is passing into the oxygenator. A Pemco Heat Exchanger with attached low volume bubble trap is provided. The water temperature control valve and flow regulator are conveniently grouped on the console.

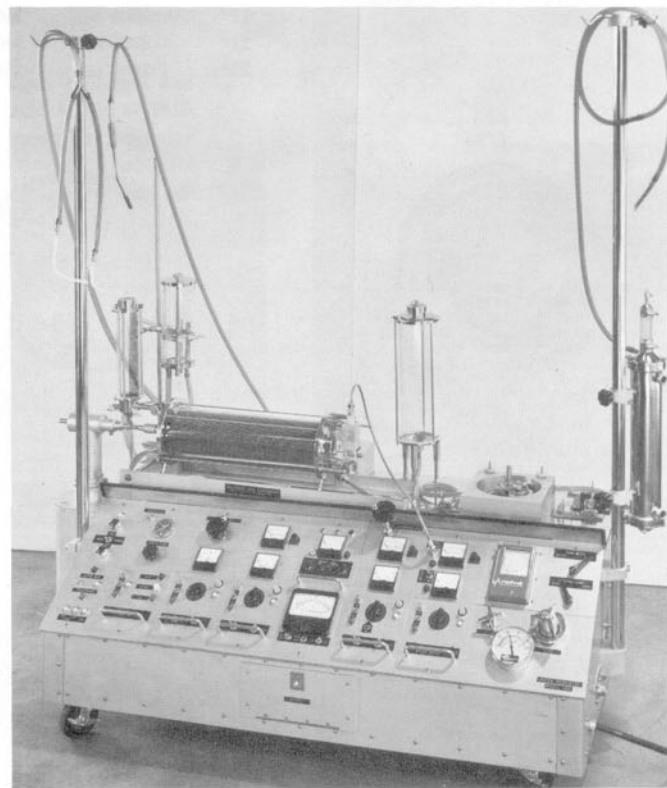
**PEMCO SINGLE PUMP UNIT**—This unit is constructed of the same high quality components as the multi-pump models by Pemco. A single 200° working diameter pump with two wide, large diameter, individual adjustable rollers is used. Pump speed control is adjustable from 0 to 80 R.P.M. Both a tachometer for direct visual reading of the pump speed and a hand crank for the emergency operation of the pump during a power failure are provided. Power is derived from a Leland explosion proof motor and switch, U.L. approved for use in an ether atmosphere.

With the proper choice of latex within the pump, flows from 10 drops per minute to 8500 cc./min. are achieved in overlapping steps. Two pump connectors—latex to Tygon should be ordered with the unit. Pump connectors ordered for 3/4" I.D. latex will accept 3 sizes of latex; 3/4", 5/8" or 1/2" I.D. latex. Sizes below 1/2" I.D. latex are ordered two for each size (3/8", 1/4", 1/8", etc.). In each case the latex size is followed by the Tygon size to be used (1/2", 3/8", 1/4", etc.). If threaded connectors are requested for Tygon side, specify wall thickness of Tygon to be used. When requesting connectors of 1/2" I.D. or less for latex, two bushings should be ordered to match the connector to the pump clamp.

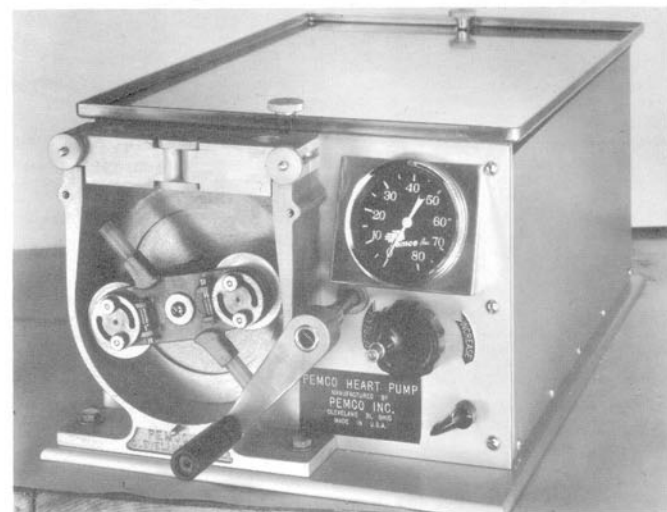
The Pemco single pump unit is designed to be placed on any flat surface; table, hospital cart or work bench. A cart can be supplied on request built to your submitted dimensions at additional cost.



PEMCO LOW UNIT PUMP

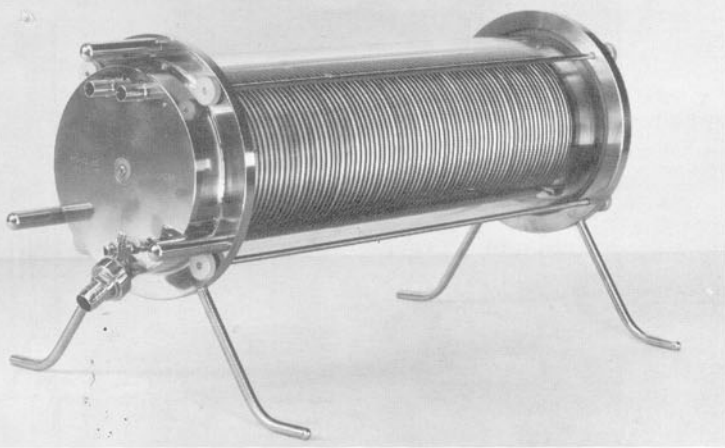


PEMCO-NIH MODEL PUMP



PEMCO SINGLE PUMP UNIT

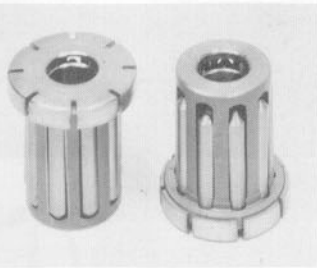




1100

The oxygenators are supplied in lengths of 6", 9", 13", 17", 21" and 25". The following table compares some of the various size oxygenators:

Size	Priming Volume	Rec. Nom. Flow
6"	600 cc.	600 cc./min.
9"	900 cc.	1000 cc./min.
13"	1400 cc.	1600 cc./min.
17"	1800 cc.	2500 cc./min.
21"	2200 cc.	3000 cc./min.
25"	2600 cc.	4500 cc./min.

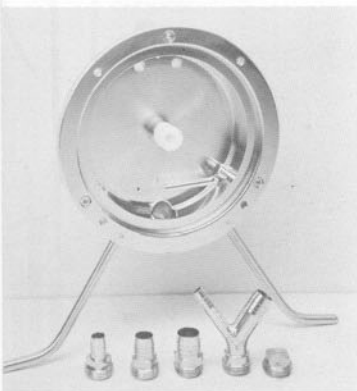


1145

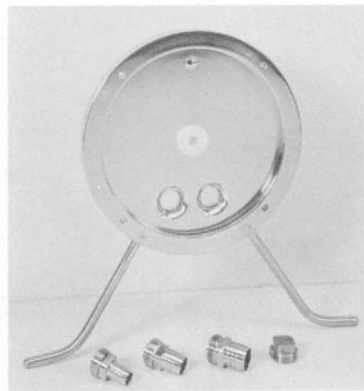
**1100 — OXYGENATOR** — The Kay Cross Rotating Disc Oxygenator, made by Pemco, Inc., was developed by Drs. F. S. Cross, E. B. Kay, R. M. Berns, and R. D. Jones in the Claud Foster Laboratory for Surgical Research in the Department of Surgery, Saint Luke's Hospital, Cleveland, Ohio.

The basic principle of the oxygenator is the exposure of a film of blood to oxygen atmosphere on a series of rotating discs mounted within a horizontal cylinder of Pyrex glass, with no foaming or bubbling of the blood. The steel and glass surfaces may be prepared with silicone preparations which make them non-wetting, and prevents the deposition of fibrin. The entire oxygenator may be steam sterilized after assembly. Stainless steel #304 is used throughout.

**1145 — STAINLESS STEEL ROLLER BEARING** — Reduces friction and lowers driving requirement of the disc drive mechanism. These units lessen the hazard of seizing which sometimes occurs with nylon bearings that distort due to repeated autoclaving. Stainless steel roller bearings are simple to assemble and disassemble and easily cleaned. The stainless steel bearings are replacements for the nylon bearings supplied with the oxygenator. 2 required. **\$30.00 ea.**



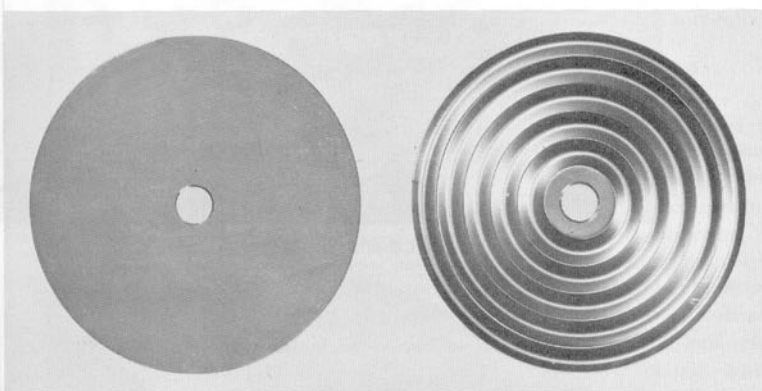
1104-F



1103-F

**1104-F, 1103-F — PEMCO END PLATES** — Allows blood to flow from the bottom of the rotating disc oxygenator at the arterial end. Removable spouts fit either venous or arterial end plates. The venous end plate accepts 2 spouts. If one spout is all that is necessary a plug is supplied for the other inlet. The arterial end plate is supplied with a Tele-thermometer shield and a stopcock for blood sampling. When coronary perfusion equipment is ordered the arterial spout can be replaced with a Y connector. Order 1552-1 perfusion Y as an extra accessory. The Arterial End Plate can be modified to accept the PO<sub>2</sub> and the Level Sensing probes.

Arterial 1104-F **\$350.00**  
Venous 1103-F **\$187.50**



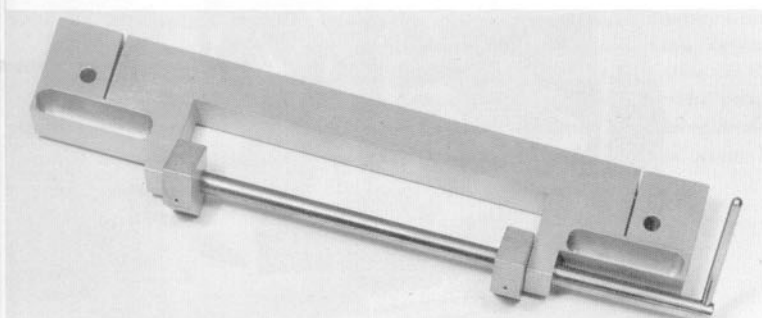
1117

1117-C

**1117, 1117-C — DISCS** — Straight or convoluted discs can be supplied for the oxygenator. For additional oxygenation of each size oxygenator a choice of convoluted discs mounted with standard .185 spacer washers or straight discs mounted with .140 spacers will provide more oxygenation. The convoluted discs present more surface area and the straight discs with narrower spacers allow additional discs to be mounted in the unit. Discs furnished siliconized upon request, add 25¢ each.

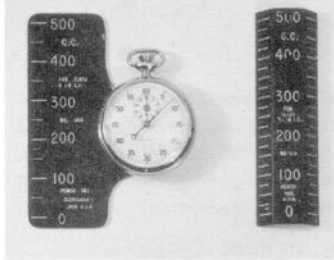
Straight 1117 **\$2.50**  
Convoluted 1117-C **\$4.50**

**5390 — MAIN MOTOR DISC DRIVE** — The Kay-Cross rotating disc oxygenator is driven by the main motor. A mechanical variable speed transmission is used with a flexible shaft that locks on the venous end of the disc shaft. Speed is variable from 0 to 150 revolutions per minute and is read directly on a tachometer. **\$500.00**

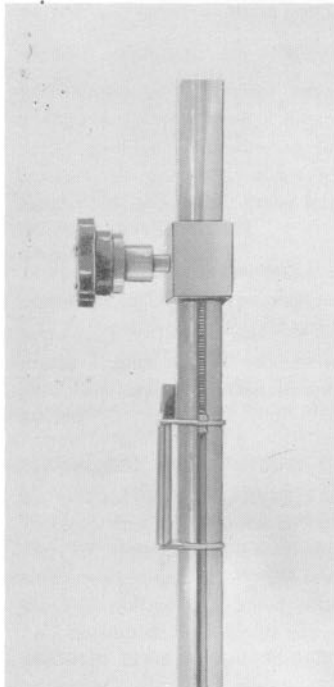


1434

**1434 — PEMCO DISC OXYGENATOR TILTING DEVICE** — A unit designed to tilt the Kay-Cross Rotating Disc Oxygenator during high flow. This helps maintain a constant level across the oxygenator by preventing accumulation of blood at the venous end. Raises the venous end of the oxygenator from 0 to 3/8 inches in 1/8 inch steps. Mounts on pump cover without need for modification. Built of clear anodized aluminum and stainless steel. **\$45.00**



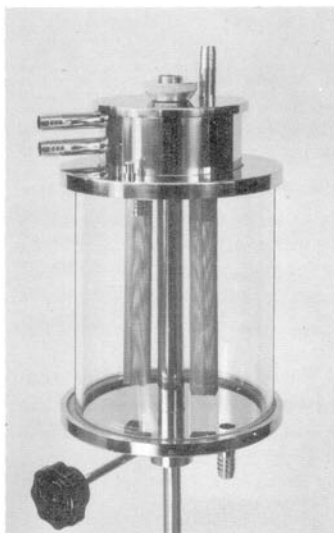
1414 1418



1422



1421



1426

**1410 — GROSS BUBBLE TRAP** — Used in a full gravity system. Inlet and outlet are  $\frac{5}{8}$ " inside diameter for minimum resistance to flow. Cover has provision for four hubs from donor bottle feed lines. Stainless steel, 500 cc. capacity pyrex cylinder, silicone rubber gaskets. **\$275.00**

**1414 — FLOW SCALE** — Used with Pemco built Gross equipment. Scale reads up to 500 cc. in 50 cc. graduations. A stopwatch is attached. Interpolation in cc./min. is therefore possible during cardiac by-pass. **\$40.00**

**1418 — VOLUME SCALE** — Designed for application to either the Pemco built 1410 Gross bubble trap or the 1412 Pemco built Gross type collection chamber. This scale indicates levels from 0 to 500 cc. in 25 cc. graduations. **\$22.00**

**1411 — GROSS ARTERIAL FILTER** — Arterial line filter accepts  $\frac{3}{8}$ " inside diameter arterial line. Flow is directed through a fine mesh stainless steel screen. The unit has two stopcocks to facilitate removal of air from either side of screen. Mounts on the Pemco pump cover. Pyrex viewing window is provided. Assembly gasketed with silicone rubber. **\$250.00**

**1422 — RACK ADJUSTABLE MAST** — Developed to allow fine adjustment of either the 1412 Gross collection chamber or 1415 Ankeney reservoir modified in gravity systems. The operator can adjust height to correct venous pressure with one hand. Self locking at any setting. Mountable on Pemco pump. **\$325.00**

**1442-B** — Rack Adjustable Mast with separate caster base. **\$365.00**

**1412 — GROSS COLLECTION CHAMBER** — Venous inlet  $\frac{1}{2}$ " inside diameter. Outlet  $\frac{5}{8}$ " inside diameter. Two coronary sinus inlets direct blood through four stainless steel screens to remove large bubbles. A 500 cc. capacity pyrex cylinder and silicone rubber gaskets are used. Pyrex is available for 1000 cc. capacity. **\$450.00**

**1421 — PEMCO BUBBLE TRAP** — Used in systems employing direct pumping from vena cavae. 1000 cc. capacity. Built of stainless steel and pyrex with two  $\frac{3}{8}$ " inside diameter coronary sinus inlets and one  $\frac{3}{8}$ " outlet. Mounts on 1416 corner mount and support rod when used with Pemco pumps. **\$175.00**

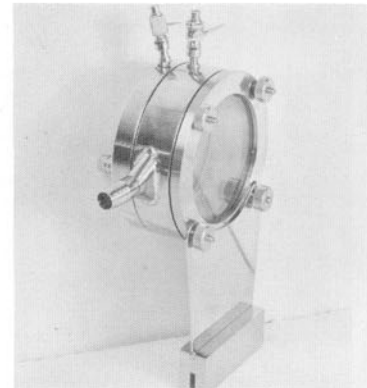
**1426 — PEMCO 2 LITER BUBBLE TRAP-RESERVOIR** — A bubble trap and reservoir has two  $\frac{3}{8}$ " inside diameter coronary sinus inlets to a velocity arrestor. The blood then flows through two stainless steel filter screens to the reservoir chamber. The outlet is also  $\frac{3}{8}$ " inside diameter. Stainless steel and pyrex are used with silicone rubber gaskets. Autoclavable. It mounts on the 1416 corner mount and support rod. **\$350.00**

**1415 — ANKENY RESERVOIR** — Venous blood, gravity fed from vena cavae, flows into a  $\frac{1}{2}$ " I.D. inlet on bottom of unit and then to the rotating disc oxygenator through a  $\frac{5}{8}$ " I.D. outlet in a full gravity system. When pumping from the reservoir to the oxygenator a  $\frac{3}{8}$ " I.D. outlet is provided. Two  $\frac{3}{8}$ " I.D. inlets pass the coronary sinus blood through Teflon shavings to remove large air bubbles and direct flow down the side of the pyrex cylinder to the reservoir section. This unit is made of stainless steel, pyrex and uses silicone rubber gaskets. Autoclavable. Maximum capacity is 750 cc. Unit mounts on a large diameter mast. **\$500.00**

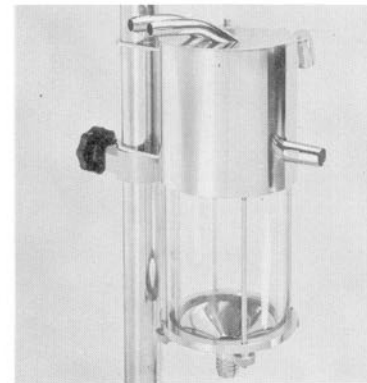
**1415-10 — TEFLON SHAVING REFILL** Pkg. **\$5.00**



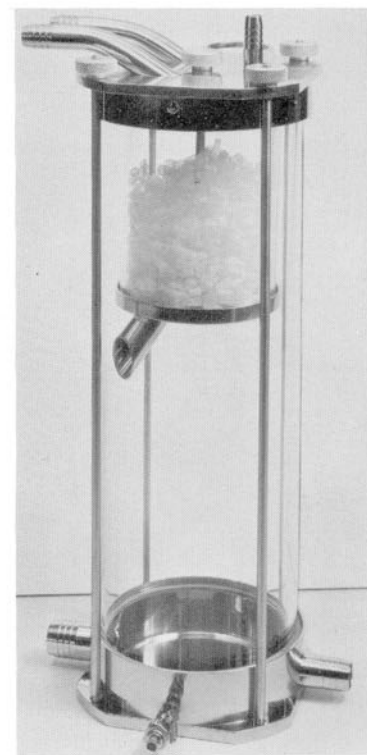
1410

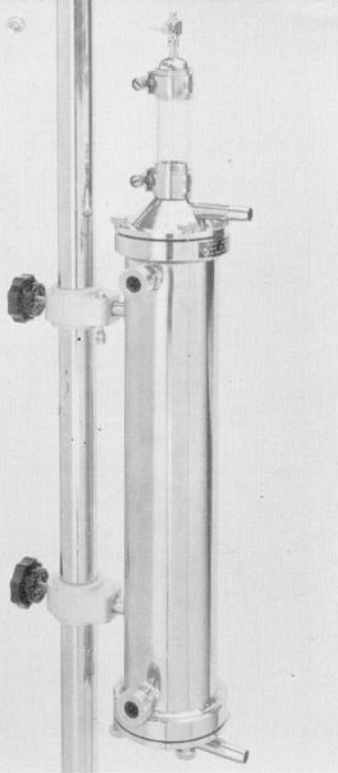


1411



1412





1425-10



1001 with 1425-10 Mounted

**1425-10 — PEMCO HEAT EXCHANGER** — This Heat Exchanger is built of highly polished #304 stainless steel. Specially designed removable ends allow for choice of blood inlet and outlet direction. The outflow end cap has a highly efficient bubble trap of low priming volume and a Tele-thermometer probe shield. **\$700.00**

**1425-30 — PRIMING VOLUME REDUCING RODS** — Stainless steel. set **\$29.25**

**1425-31 — PRIMING VOLUME REDUCING RODS** — Teflon. set **\$58.50**

**1001 — PEMCO THERMOSTATIC WATER TEMPERATURE REGULATOR** — This caster based unit is supplied with a mast to mount a 1425-10 Pemco Heat Exchanger, a regulator to mix and maintain water temperature, a thermometer dial calibrated in Centigrade and Fahrenheit and a rate of flow valve. On initial pump orders this unit can be mounted in the cart. 1001 On Stand **\$300.00**

1002 In Cart **\$350.00**

**1003 — HOSE KIT** (not illustrated) — For use with Heat Exchanger and regulators. Consists of 3 lengths of hose 25 feet long, 1 length 6 feet long, 7 new type leak proof quick connectors, 2 goose neck bent connectors, and necessary washers. **\$60.00**



1449



1425-50

**1425-50 — PEMCO SMALL SIZE HEAT EXCHANGER** — This 250 cc. priming volume Heat Exchanger is used in conjunction with coronary artery perfusion equipment. The single blood inlet accepts 1/4" I.D. Tygon tubing. The two outlets accept 1/4" I.D. Tygon lines. This eliminates the Y connector used at this point. The outflow end cap also has a built in Tele-thermometer probe shield. Unit mounts on 1 1/4" O.D. Mast. **\$500.00**

**1425-30 — PRIMING VOLUME REDUCING RODS** — Stainless Steel. set **\$25.00**

**1425-31 — PRIMING VOLUME REDUCING RODS** — Teflon. set **\$32.00**

**1425-32 — HEAT EXCHANGER BRUSHES.** 5 for **\$6.00**

**1449 — PEMCO COOLING UNIT** — The Cooling Unit is placed between the Heat Exchanger and the Water Temperature Regulator. A valve controls the water circuit and switches the exchanger from the Water Temperature Regulator used for warming and cooling within the tap water temperature range to the Cooling Unit for lowering the water temperature range. Valves mounted in the unit allow control over the Heat Exchanger temperature. Dial thermometers on the unit indicate temperature of coolant and exchanger temperature. Two pumps provide circulation of the coolant within the unit and pressure for propelling coolant through the heat exchanger. **\$850.00**

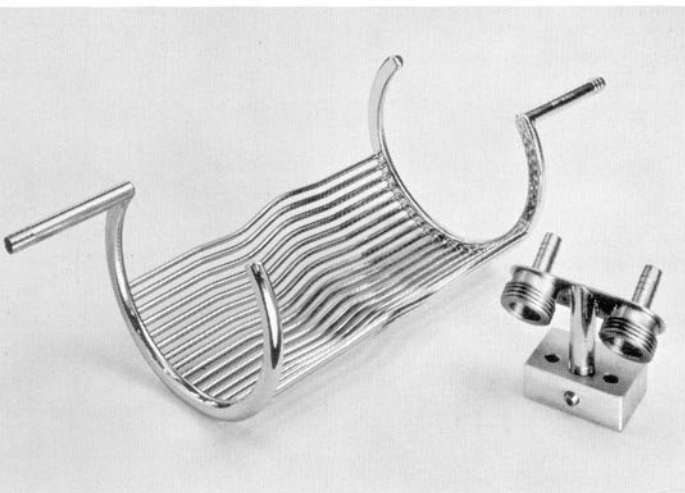
**1458 — GEBAUER-PEMCO HEAT EXCHANGER\*** — This #304 stainless steel heat exchanger is designed to fit within the confines of the Kay-Cross Rotating Disc Oxygenator. Adding one new hole in each end plate is the only modification necessary to install this unit. The assembly is welded with a non-corrosive metal. No significant increase in hemolysis has been reported with its use. The use of this heat exchanger in the oxygenator requires no priming volume. Specify size of oxygenator when ordering.

Oxygenator Size 6", 9", and 13" **\$300.00**

\**Hawaii Medical Journal* 17" **\$320.00**

*July-August 1960, Vol. 19.* 21" **\$330.00**

*No. 6 PP 651-653* 25" **\$350.00**



1458

1461

**1461 — HOSE SUPPORT BRACKET** — The Gebauer-Pemco Heat Exchanger uses Tygon tubing to transfer the coolant in and out of the heat exchanger. The bracket supports and connects the Tygon tubing and rubber hose. In this way no pull is exerted on the oxygenator from the hose. **\$60.00**



**1580 — KAY CORONARY CANNULA OF STAINLESS STEEL** — These units feature a swivel cannula and are described in J.A.M.A. Vol. 168; pages 1767-68. The unit can be disassembled and each side used individually. The three sizes made are  $\frac{3}{16}$ ",  $\frac{1}{4}$ " and  $\frac{5}{16}$ ". The size is governed by the size of the ball at the swivel connection. **\$125.00**

**1580-1 through 6 — CORONARY ARTERY CANNULA** — An individual hand held cannula terminated with a female luer lok at one end and either a fixed or a swivel cannula at the other end. The request for cannula shapes for left coronary and right coronary are many. We illustrate those configurations most commonly furnished. The cannula size is governed by the diameter of the tip that prevents retrograde loss of blood. The three sizes made are  $\frac{1}{4}$ ",  $\frac{5}{16}$ " and  $\frac{3}{8}$ ". When ordering please indicate model and size desired. Model 1580-2 and 1580-5 have swivel tips and models 1580-1, 1580-3, 1580-4 and 1580-6 have fixed tips. Each **\$65.00**

**1586 — PERFUSION CANNULA CONNECTOR** — A stainless steel connector for  $\frac{1}{4}$ " I.D. Tygon coronary artery perfusion line to female luer lok. This connector achieves gradual reduction in lumen of the line to coronary artery perfusion cannula with an absolute minimum of connectors, interruptions and fibrin producing connection crevices. The connector permits rapid change of 1580 type cannula. **\$30.00**

**1584 — KAY POLYETHYLENE CORONARY CANNULA** — A ball valve fits snugly into the orifice of the artery and prevents retrograde loss of blood. A suture passed around the coronary artery, through the aortic wall, and around the cannula proximal to the ball valve, maintains the cannula in position. Extreme flexibility permits maximum aortic valve exposure. Two each of six sizes make up a set. Set of 12 **\$120.00**

**1584-1 — MALE STAINLESS STEEL CONNECTORS** — to  $\frac{1}{4}$ " I.D. Tygon tubing. Each **\$16.00**

**1584-2 — FEMALE STAINLESS STEEL CONNECTORS** — From Polyethylene to male connector — Specify Polyethylene size. Each **\$ 7.00**  
Set of 12 consists of two 1584-1 and twelve 1584-2 **\$120.00**

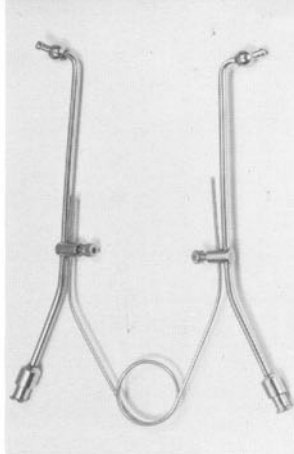
**SPECIAL CANNULA** — We will be pleased to quote and build special cannula to your drawings and specifications.

**1451 — CORONARY ARTERY PERFUSION BOTTLE CAP** — Stainless steel bottle cap and insert allow the use of an ordinary 600 cc. Abbott donor bottle in each coronary artery perfusion line. The adaptor plate has an inlet and an outlet spout to accept  $\frac{1}{4}$ " I.D. Tygon Coronary Artery Perfusion line, and an air tube terminated with a female luer lok. Pressure reading of the line is taken from this point. Price indicated is for the Bottle Cap insert and nut with two Tygon gaskets. **\$80.00**

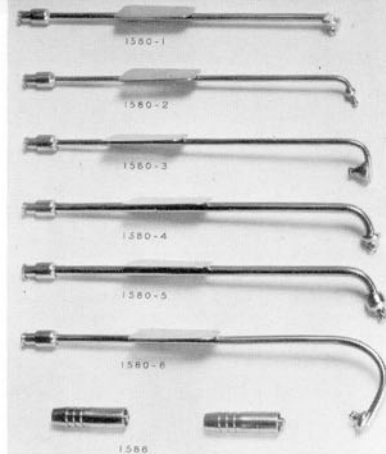
**1452 — LACTATE RINGERS SOLUTION BOTTLE CAP** — The insert, which fits a 1000 cc. Abbott bottle, has one outlet for the solution and one air tube with female luer lok so the Lactate Ringers Solution Bottle can be pressurized. The bottle cap and insert are of stainless steel and the two gaskets provided are of Tygon. The outlet accepts Tygon tubing of  $\frac{3}{16}$ " I.D. Two bottles are usually paired with a  $\frac{3}{16}$ " x  $\frac{3}{16}$ " x  $\frac{3}{16}$ " Y connector to assure adequate supply during clinical use. **\$75.00**

**1455 — DIAL MANOMETER 0-285mm./Hg.** — This Manometer is used to measure the pressure in the coronary perfusion line. One Manometer for each line is connected to the air tube luer lok and will pick up pressure reflected in the air chamber of the Abbott bottle. This unit mounts on a  $\frac{1}{2}$ " diameter rod. **\$150.00**

**1581 — KAY RETRACTOR** — A self retaining, left auricle, retractor to expose the mitral valve during cardiac repair. Made of stainless steel with inner surfaces buffed dull to eliminate glare. Available in five sizes —  $1\frac{1}{8}$ ",  $1\frac{3}{8}$ ",  $1\frac{5}{8}$ ",  $1\frac{7}{8}$ " and  $2\frac{1}{8}$ " inside diameter. Each **\$40.00**

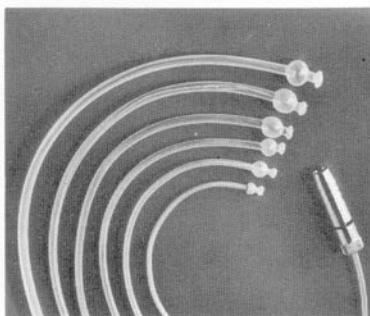


1580



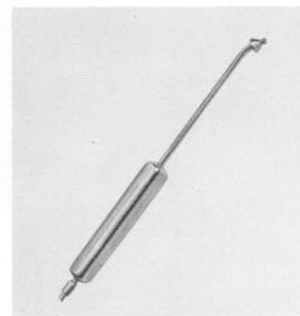
1580-1 through 6

1586



1584

1584-1 & 2



Special



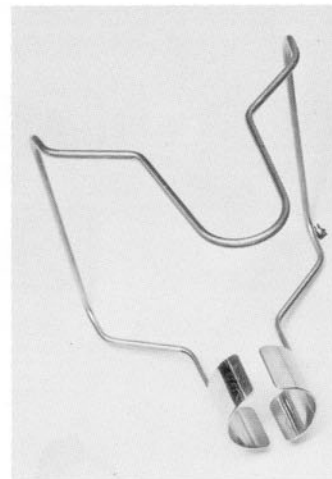
1451



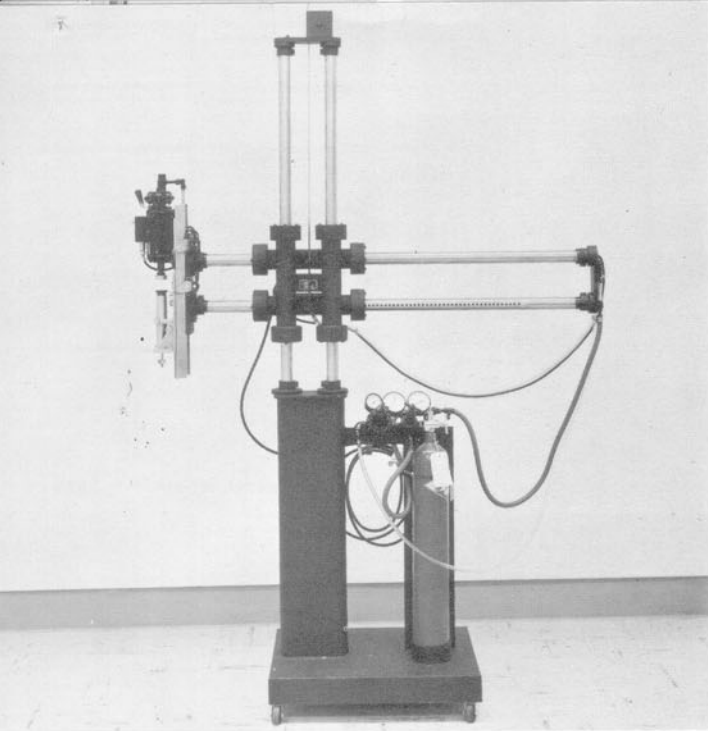
1452



1455



1581



1440

**1440 — PEMCO PORTAJUST STAND** — Counter-balanced arms to support the Zimmerman Power Injector are provided with fingertip controlled locks to prevent accidental movement of injector after placement. The gas bottles and regulators are also mounted on the caster base. Over-all design of the unit conforms with other standard equipment in the laboratory. Vertical and horizontal positioning require a minimum of effort on the operator's part since the movement of the unit is on roller bearing surface in all directions. This unit was manufactured specifically for the 1439-E Zimmerman Power Injector.

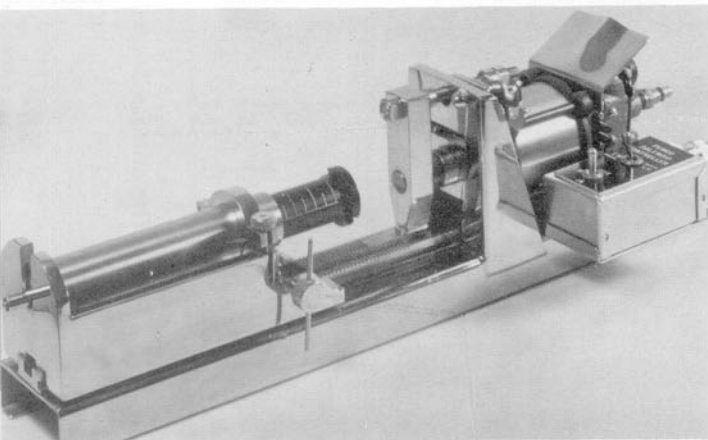
**\$1195.00**



1439-E

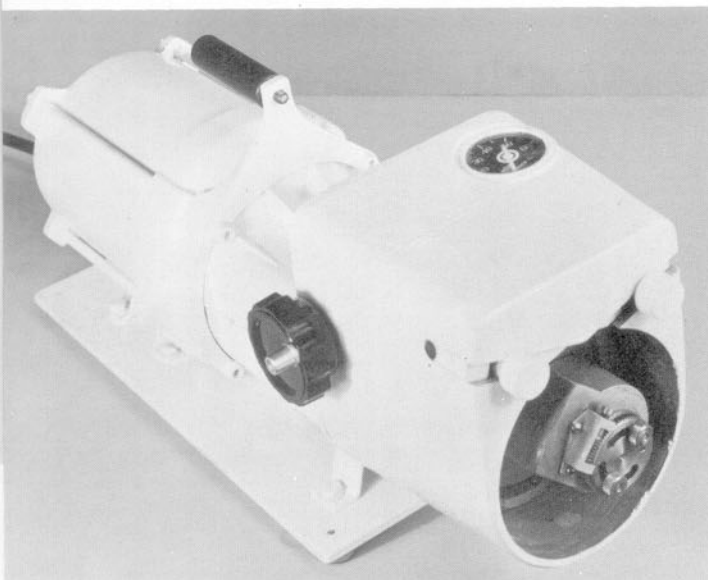
**1439-E — ZIMMERMAN POWER INJECTOR** — A fast acting 50 cc. capacity syringe, of stainless steel with a Teflon capped plunger. Withstands pressure without danger of self destruction. Stainless steel outlet terminated in male luer lok. Autoclavable. The unit is easily dismantled. The release of power to the syringe can be made at syringe position (local) or from other positions (remote) or devices. For example, angio equipment provided with output switch connections for proper phase relation giving co-ordinated injections. Unit is CO<sub>2</sub> powered through gas regulator supplying 200 lbs. pressure at high flow rates. Hospital type regulators *do not* normally supply high flow rates. *Pemco Model 1441 gas regulators should be used with the Zimmerman Power Injector.*

**\$500.00**



1439-RFU

**1439-RFU — ZIMMERMAN POWER INJECTOR** — A controlled cycle selective quantity radioopaque fluid injector. It will deliver 2 cc. of fluid or any multiple of 2 per release up to a total of 50 cc. **\$575.00**



6000

**1441 — GAS REGULATOR AND HOSE KIT** — The gas regulator and hose kit is a pressure regulating system as used in the Pemco Portajust Stand with the 1439 series of Zimmerman Power Injectors. This regulator is a two gage system. One 2000 psi gage indicates tank pressure and the other 400 psi gage indicates the pressure of the propellant. The assembly is fitted with a medical yoke mount pin indexed for medical CO<sub>2</sub> tank. The kit includes ten feet of high pressure hose and the necessary clamps and quick disconnect couplings for assembly to the Zimmerman Power Injector. **\$79.00**

**6000 — MICRO PUMP** — A portable micro pump that is useful in the laboratory or the clinic. It delivers from 0 to 400 cc/min, with a 360 degree stroke, in a virtually steady flow. Powered by an explosion-proof motor and a variable speed transmission. A built in tachometer reads pump speed directly in R.P.M. The wide single roller in the pump is adjustable and allows accurate setting from zero to full occlusion. The pump head has tubing clamps that accept 1/4" inside diameter — 1/8" wall, or smaller, Latex tubing.

This Micro pump is most commonly used for coronary perfusion circuit and the perfusion of extremities. Gross weight 45 pounds. 120 Volts A.C. at 60 cycles. **\$875.00**



**1427 — PEMCO TRANSISTORIZED PACEMAKER** — The unit completely self-contained. Flexible leads clip to stainless steel heart wires. Extremely compact and light. Measures only 3¼" x 2" x 1⅝" overall and weighs 150 grams with battery, flexible wire cable and plug. It can be strapped to the patient, worn on a garment or attached to the bed.

Rate of stimuli is adjustable continuously from 44 to 160 per minute. Voltage is adjustable continuously from 0 to 12 volts delivered to the heart and designed for a work load of 100 ohms impedance. A neon indicator light on the front panel flashes with each stimulus. Inserting the flexible wire cable plug into the unit activates the pacemaker, removal of the plug turns it off.

Normal minimum battery life of 1,000 hours at a rate of 100 stimuli per minute or six weeks. Available as extras are: Spare battery, heart wires, extra long flexible cable with clips and plug.

Designed by Fredrick Olmstead — Cleveland Clinic Foundation, Cleveland, Ohio. **\$150.00**

**1427-1 — HEART WIRES** — A set of 2 for Pacemaker **\$4.50**

**1427-2 — REPLACEMENT BATTERY** — For Pacemaker **\$2.25**

**1460 — PEMCO OXYGENATOR LEVEL INDICATOR** — The 1460 Oxygenator Level indicator mounts on the I.V. Mast. It makes use of the 1433 Level Detector Probe mounted on the arterial end plate. The span of levels within which the indicator will work is completely adjustable. **\$550.00**

**1423 — VENOUS MANOMETER** — A manometer graduated from 0 to 350 mm. of water with adjustable scale for vernier adjustment of initial setting. When used with Pemco pumps this unit fastens on 1416 corner mount and support rod. **\$150.00**

**1424 — ARTERIAL MANOMETER** — This mercury manometer fastens on 1416 corner mount and support rod either separately or on the same support as the venous manometer. Calibrated from 0 to 300 mm. of mercury, the adjustable scale is also featured in this item. **\$100.00**

**1416 — CORNER MOUNT AND SUPPORT ROD** — Designed to clamp solidly on either of the four corners of the Pemco pump cover for mounting manometers, bubble traps, I.V. racks, etc. Supplied with a 36" x ½" dia. stainless steel rod. **\$40.00**

**1450 — JONES-CROSS SUCTION PROBE\*** — The Jones-Cross suction probe is a stainless steel instrument with two interchangeable tips, finely balanced with carefully designed bends for maximum handling comfort. The Tygon end accepts ¼" or ⅜" Tygon. **\$38.00**

**1450-90 — JONES-CROSS SUCTION PROBE\*** — The tip is inserted through the tricuspid valve into the right atrium when removing blood during a right ventriculotomy for closure of a ventricular septal defect. Two interchangeable tips are included. **\$38.00**

**1450-S — JONES-CROSS SUCTION PROBE\*** — This probe is offered with the same features as the standard Jones-Cross Suction Probe. The non-removable tip allows construction of the unit so that the internal diameter remains constant. This permits large volume flow through the suction probe with a minimum of hemolysis. **\$38.00**

**1450-Jr. — JONES-CROSS SUCTION PROBE\*** — A reduced size suction probe for use on infants and those conditions where the standard 1450 is too large. An especially fine instrument for tonsillectomy. The tip is removable. **\$32.00**

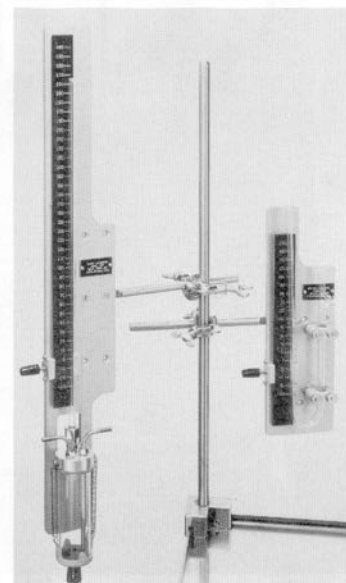
\*See *The Journal of Thoracic and Cardiovascular Surgery*, Vol. 41, No. 3, pp 412-415, March, 1961.



1427

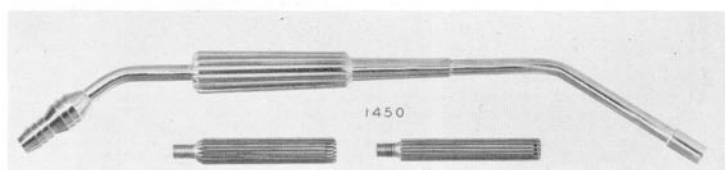


1460

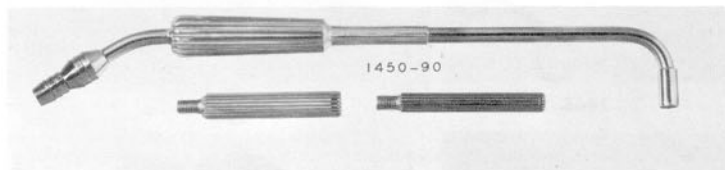


1423

1416 1424



1450



1450-90



1450-S

1450-S



1450-JR.

1450-Jr.

## THE DAVILA PEMCO PULSE DUPLICATOR

**THE DAVILA PEMCO PULSE DUPLICATOR**—The unit illustrated produces 16 different pulse shapes, variable stroke volume, and adjustable pulse per minute selection. All adjustments available to the operator. AC plugs are mounted on either side of the unit for lighting fixtures used during photography of valve action. Plastic cannula are available in various sizes for mitral, aortic, or heart apex connections. Viewing surface is Pyrex glass. Because of its hard surface the Pyrex resists scratches and halo producing disturbance of the view. Adjustable pressure chamber with large dial read-out assist in duplicating actual operating conditions of the heart and its valves. A sturdy laboratory instrument. The unit illustrated is completely self contained and can be supplied with manual changing of pulse shape cams at a reduced price.

**1750 — CARTWRIGHT-PALICH HEART VALVE**—The open-end caged ball valve was presented at the April, 1962, St. Louis meeting of the American Association for Thoracic Surgeons in a paper entitled "Combined Replacement of the Aortic and Mitral Valves."\*

This prosthesis was designed to incorporate the following features: (1) a titanium cage which combines a high degree of corrosion resistance with strong, light-weight construction; (2) a silastic ball similar to that used in the Harken and Starr-Edwards valves; (3) adequate ball excursion as determined by invitro testing; (4) elimination of cage structure in the area of maximal turbulence during valve function (the "open-end" cage) and (5) streamlining of all valve surfaces.

The fixation rims are constructed of dacron fabric and felt. The aortic rim is scalloped to permit suturing to the fibrous base of the aortic cusps whereas the mitral rim provides a flat surface for approximation to the margins of the atrio-ventricular orifice.

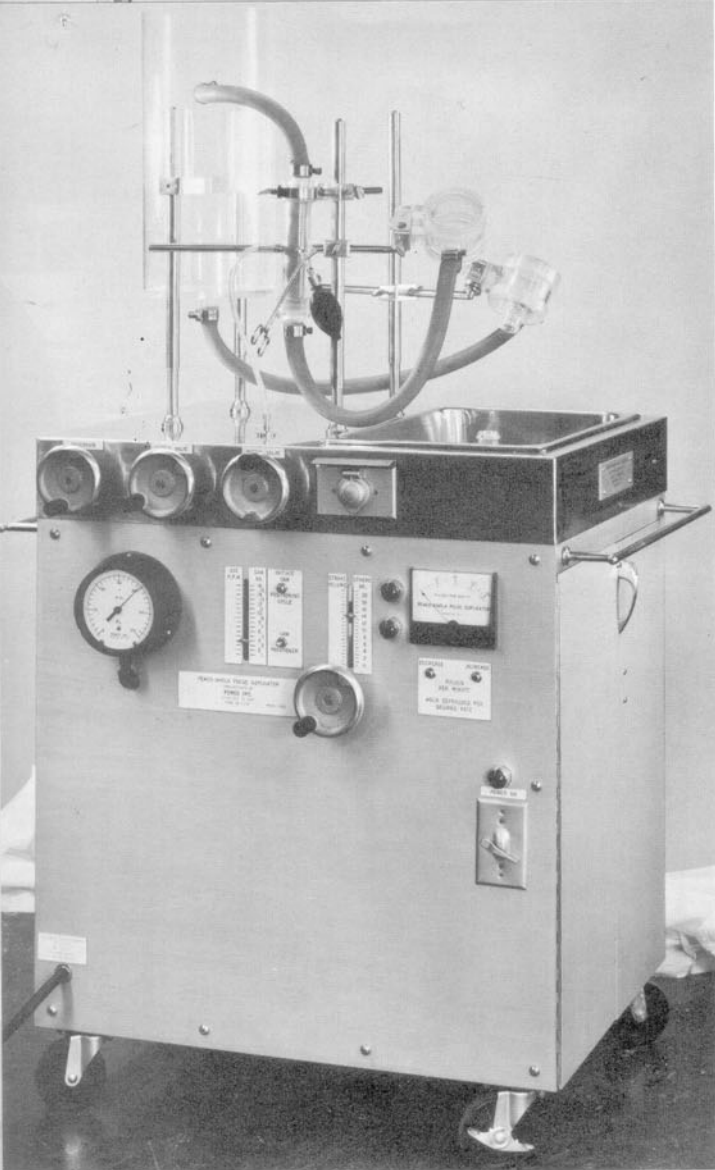
AORTIC VALVE SIZES		MITRAL VALVE SIZES	
Ball	Orifice	Ball	Orifice
.675	.585	.875	.756
.750	.652	1.000	.866
.825	.715		

\*Cartwright, R. S. et al. Combined Aortic and Mitral Replacement. J. Thor. Cardivasc. Surg. In Press.

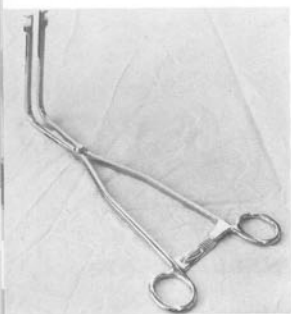
**1468 — PALICH-CARTWRIGHT VALVE HOLDER**—A stainless steel tool designed to hold ball type valves for ball valve prostheses. Surface for holding the valve is lined with nylon to prevent metal to metal contact. The tool can be provided with bends to meet your specifications.

**1141 — PEMCO OXYGEN-CO<sub>2</sub> LINE FILTER**—This filter is of simple construction and uses four medium size cotton balls for the filter element to prevent bacterial contamination through the oxygen line during extra corporeal circulation. See Journal of Thoracic and Cardiovascular Surgery, 14:675, May 1961. **\$40.00**

**1700-C — DIRECT DRIVE UNIT**—This new improved unit is driven by a stronger, high torque capacitor motor. This friction type variable speed unit mounts on the three dismantling legs of the arterial end plate. The motor is a high quality Bodine motor with a speed reducing gear head. The driven wheel is spring loaded for optimum pressure against the driving wheel. A two section, pin driven coupling, corrects any misalignment that might occur and allows easy removal and assembly of drive to the oxygenator end plate. **\$300.00**



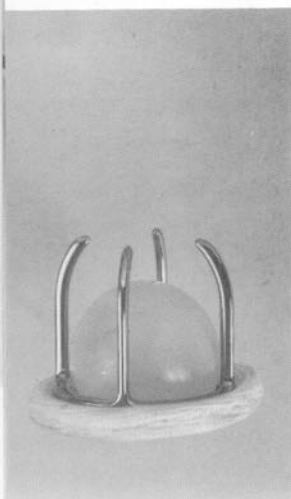
THE DAVILA PEMCO PULSE DUPLICATOR



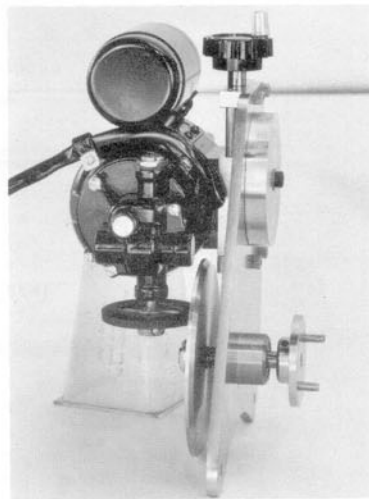
1468



1141

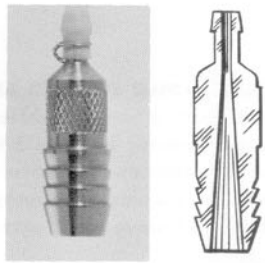


1750



1700-C

- No. 0 ● No. 4 ● No. 9 ●
- No. 1 ● No. 5 ● No. 10 ●
- No. 2 ● No. 6 ● No. 11 ●
- No. 3 ● No. 7 ● No. 12 ●
- No. 8 ●



1500

**1500 — ARTERIAL CANNULA CONNECTORS** — Stainless steel arterial cannula connectors, sizes 0 through 12 A.W.G., can be purchased in individual sizes or as a set of 13. These connectors are constructed with a knurled section on the body for ease in handling and securing.

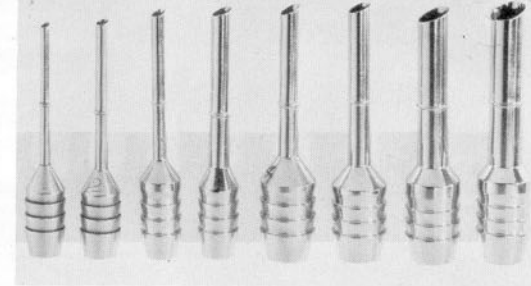
Set of 13 **\$169.00**  
Price ea. **16.00**

**1500-T — TEFLON TUBING** — Sizes 0 through 12 A.W.G. are used for the arterial cannula. One foot each of 13 sizes **\$15.00**  
Per foot (specify size) **1.25**

**1583 — FEMORAL CANNULA** — The Femoral Cannula is made of stainless steel. French sizes 6 to 14 have a barbed end to accept 1/4"



1582

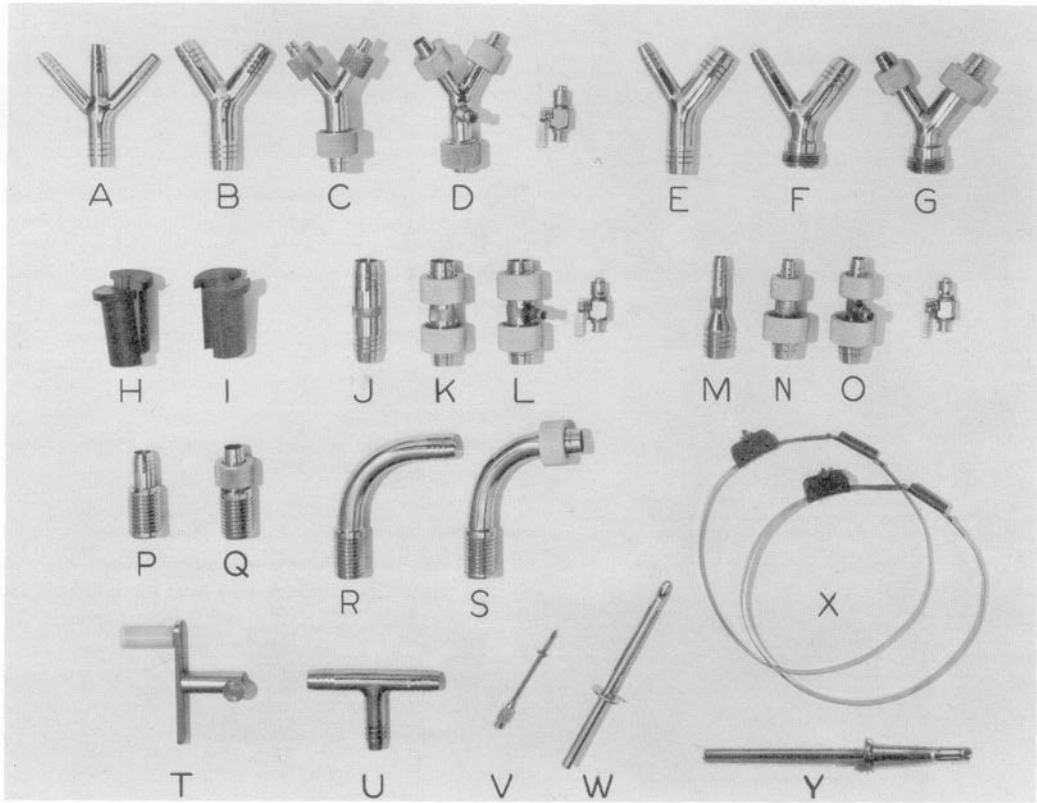


1583

inside diameter Tygon. French sizes 16 to 24 have a barbed end to accept 3/8" inside diameter Tygon. This allows a slow taper within the cannula. Cannula are numbered in French outside diameter sizes. The cannula walls are thin and have a very high polish. Each cannula is carefully radiused at both ends. These fittings are made of one piece stainless steel with no welded or soldered sections.

Even Sizes (French) 10-24 **\$20.00** ea.  
6-8 **25.00** ea.

**1582 — SUBCLAVIAN CANNULA** — As described in 1583.  
10-24 **\$30.00** ea.  
6-8 **35.00** ea.



**CONNECTORS AND ACCESSORIES**

**CONNECTORS AND ACCESSORIES** — A variety of connectors and accessories made of #304 Stainless Steel in I.D. sizes of 5/8", 1/2", 3/8" and 1/4" to fit Tygon tubing are available at Pemco. Each connector has a highly polished interior and exterior surface. In units with stopcocks, the mating section is of stainless steel eliminating the danger of wear. Other sizes available on request. When ordering please indicate the size and the wall thickness of the tubing as well as the type of tubing (Tygon, Mayon or Latex) to be used at each end of the connector.

- A — 1550-S — One variation of Y connector (built on request).
- B — 1550-1 — Y connector — Barbed.
- C — 1550-3 — Y connector — Threaded.
- D — 1550-4 — Y connector — Threaded and with stopcock.
- E — 1551-1 — Perfusion Y — Barbed. For in the line insertion.
- F — 1552-1 — Perfusion Y — Barbed. For use with Pemco Series "F" Arterial end plate.
- G — 1552-2 — Perfusion Y — Threaded. For use with Pemco Series "F" Arterial end plate.
- H — 1590 — Fiber pump bushing — Single hole split. For using single Tygon tube through pump.
- I — 1591 — Double hole fiber bushing. For two 3/8" I.D. Tygon tubes through one pump.
- J — 1530-1 — Straight connector — Barbed.
- K — 1530-3 — Straight connector — Threaded.
- L — 1530-4 — Straight connector — Threaded and with stopcock.
- M — 1540-1 — Reducer connector — Barbed.
- N — 1540-2 — Reducer connector — Threaded.
- O — 1540-3 — Reducer connector — Threaded and with stopcock.
- P — 1520-1 — Straight pump connector — Barbed.
- Q — 1520-2 — Straight pump connector — Tygon side threaded.
- R — 1520-3 — 90° Bent pump connector — Barbed.
- S — 1520-4 — 90° Bent pump connector — Tygon side threaded.
- T — 1139 — Kay-Cross Rotating disc oxygenator emergency hand crank.
- U — 1555-1 — Variation of straight connector — T connector — Barbed.
- V — 1438 — Potassium Citrate injection needle.
- W — 1437 — Rapid drain needle for donor bottle.
- X — 1129 — Set of heater wire clamps.
- Y — 1437-2 — Rapid drain needle for Donor Bag.

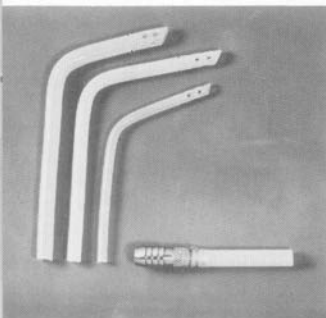




1647



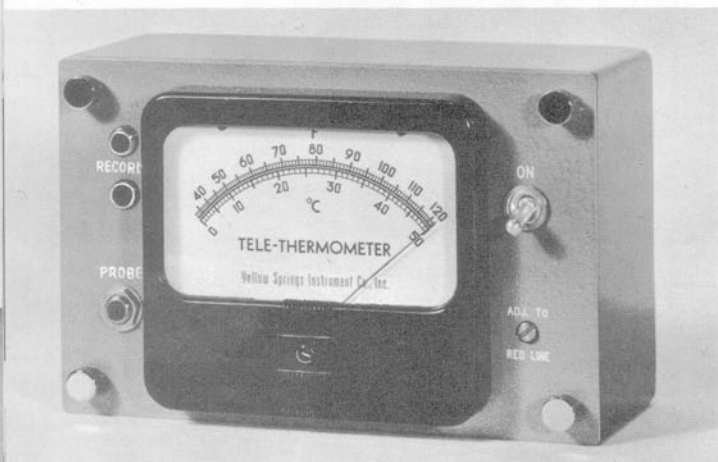
1645



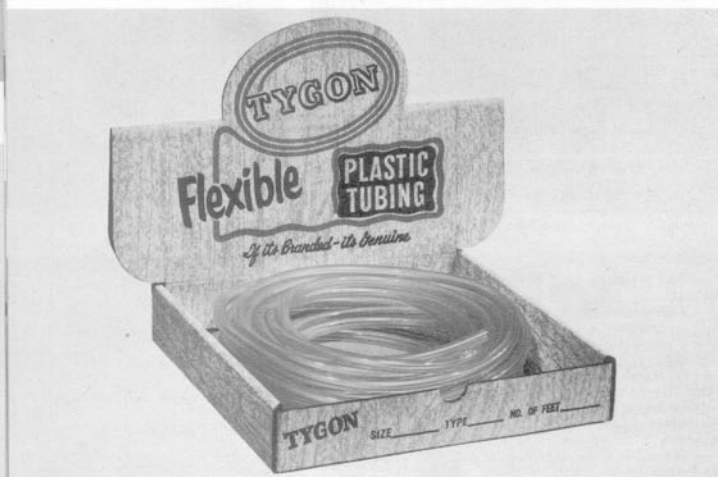
1585



1646



5340



TYGON TUBING

**1647 — DOW CORNING ANTI-FOAM A SPRAY** — This silicone foam preventive is used in bubble traps, on suction tips, and on any surface where foaming is apt to develop. It is used very sparingly as are any of the silicones. Screens or bubble breaking devices such as plastic sponges, stainless steel sponges or Teflon shavings can be treated with this anti-foam to assure prevention of foam build up.

6 ounce spray can

**1645 — DOW CORNING SILICONE RESIN 803** — The silicone resin should be mixed into a solution of 3% resin in toluene, by volume. This acts as a primer for the application of the silicone grease solution. The resin coating is stripped and reapplied periodically depending upon use and handling procedures. This coating may be applied to discs, end plates, reservoirs or on any surfaces contacting blood.

1 pound can

**1585 — POLYETHYLENE VENA CAVA CATHETERS** — These special polyethylene Vena Cava Catherers are designed for minimum resistance to flow from the caval system. The groove behind the tapered holes serves as a guide behind which the tourniquet is applied. The characteristic semi-rigid properties of polyethylene allow more control during insertion of catheters. Sizes A, B and C with short foot or long foot.

Set of 12 (2 of each size) **\$60.00**

**1585-T — TEFLON VENA CAVA CATHETERS.**

Set of 12 (2 of each size) **\$144.00**

**1646 — DOW CORNING HIGH VACUUM GREASE** — The silicone grease should be mixed 50% by volume with toluene and applied in a very thin film over surfaces that have been treated with silicone resin. This procedure assures a non-wetting surface and prevents the disposition of fibrin. Pyrex cylinders, reservoirs, and discs are treated in this manner.

8 ounce jar

**5340 — YELLOW SPRINGS TELE - THERMOMETERS** — Single channel units or special units can be supplied by Pemco in two channel or five channel inputs. Prices available on request.

**SILICONIZING** — Pemco will supply resin siliconized discs, pyrex, end plates, connectors and heat exchangers. Refer to price list.

**STRIPPING AND RESILICONIZING** of discs, end plates, pyrex and metal surfaces is available. We require one week after receipt of your equipment for this service.

**TYGON TUBING** — Tygon tubing, formulation B44-3 or S22-1 as used for blood handling lines in Heart-Lung equipment, available from stock.

See Tygon Tubing list for quantity price breakdown. Request quotation on special sizes and formulations not listed.

When ordering tubing indicate I.D., O.D. and wall thickness, and designate B44-3 or S22-1.

All prices listed are domestic.

# PEMCO INC.

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