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2,492,149

MULTIPLE VALVE

Original Filed Nov. 17, 1944

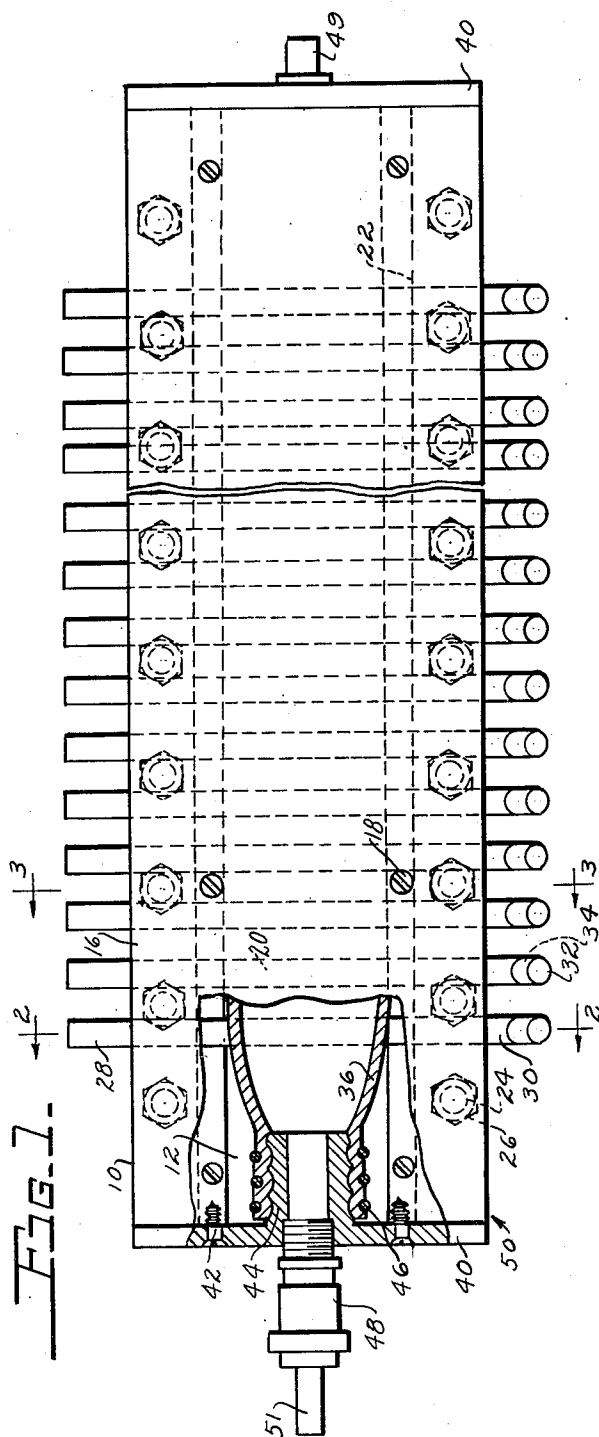


FIG. 3.

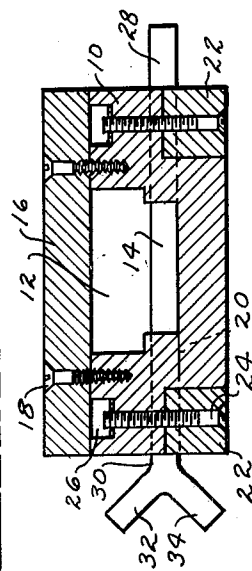
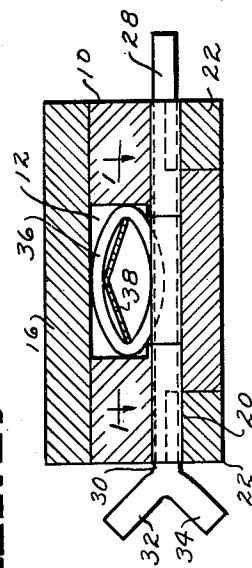


FIG. 2.



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MULTIPLE VALVE

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Original application November 17, 1944, Serial No. 563,977, now Patent No. 2,390,534, dated December 11, 1945. Divided and this application July 26, 1945, Serial No. 607,243

2 Claims. (Cl. 251-5)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment to me of any royalty thereon.

This invention is a division of my copending application Serial No. 563,977, filed November 17, 1944, now Patent Number 2,390,534, granted December 11 1945, and relates to apparatus for expediting the determination of pressure distribution on the surfaces of airfoils or the like. It is particularly applicable for recording the results of wind tunnel tests.

An object of the invention is to provide means for indicating and recording the pressure on the surfaces of a wing or the like at a plurality of points simultaneously.

Inasmuch as, for the purpose of proper analysis, it is usually desirable to determine the pressure at not less than several hundred points on the surface of a single wing, and inasmuch as a multiple manometer having a tube for each of the several hundred points would be too costly as well as too cumbersome, it is an object of this invention to divide the points to be pressure tested into groups, then provide a multiple valve means for selectively testing one after the other of the groups.

Other objects and advantages will become evident as the invention is described in detail and reference is had to the drawings, wherein:

Fig. 1 is a top plan view of a valve block which contains a group of valves all closable by the application of pressure to a single connection, a portion of the view being broken away to the line 1-1 of Fig. 2 to show the interior construction.

Fig. 2 is a transverse section taken at 2-2 of Fig. 1 showing the means employed for shutting off a group of tubes which extend to points on the wing which are to be evaluated.

Fig. 3 is a transverse section taken at 3-3 of Fig. 1 showing the manner in which the several parts of the valve block are secured in place.

Like reference characters refer to like parts throughout the drawings.

Referring now to the drawings, a valve block 10 has a longitudinally extending channel 12 and a smaller channel 14 in the bottom of the first channel (see Fig. 3). Channels 12 and 14 extend the entire length of the valve block, and a cover 16 is secured over them by screws 18. A plurality of small circular openings extend crosswise through the valve block for the flexible valve tubes 20 which have a length equal to the width of the block. The lower corners of the block 10

2

are cut away for the valve tube clamping strips 22 which are provided with adjusting screws 24 having nuts 26. Tubular metal nipples 28 are inserted in one of the ends of the flexible valve tubes 20, while similar nipples 30 having Y end connections 32 and 34 are inserted in the other ends of the valve tubes. Tightening of the screws 24 seals the metal nipples 28 and 30 in the flexible valve tubes 20 and holds the flexible valve tubes 20 positioned in the block 10 with their mid-portion exposed where they cross the channel 14. A relatively large valve shut-off hose 36 of flexible material is normally held, by a flat spring 38, to an oval shape which substantially fits the larger channel 12. The ends of the valve block 10 are closed by end plates 40 which are attached by screws 42. End plates 40 have integral nipples 44 extending inwardly, the ends of the hose 36 being bound to the nipples as at 46. The end plates are internally threaded for the fitting 48 by which one of the pressure lines 51 is connected to supply pressure to the interior of the shut-off hose 36, the tapped opening in the end plate at the opposite end of the block being plugged as at 49. Pressure applied to the valve shut-off hose 36 will expand it into a round cross section whereby the flexible valve tubes 20 will be closed.

The foregoing, taken in conjunction with Figs. 1, 2, and 3, completes the description of one valve block and its associated parts which, for purposes of further discussion, may hereinafter be referred to as a valve block assembly and be broadly designated by the numeral 50. It should be noted that the valve block arrangement shown lends itself particularly to any surface where the pressure at a large number of separate points is to be measured, since a greater number of individual valves may be got into the limited space available than by any other presently known construction.

It will be apparent that some modification may be made in the valve structure, as for instance, instead of providing the two channels 12 and 14, the channels 12 may be maintained at the width shown but have a depth equal to that of both channels 12 and 14 taken together. A group of valves which are opened or closed by manipulation of a single control valve may comprise only one valve block assembly 50, or it may comprise several of these assemblies connected in series, or it may comprise a stack of blocks 50 placed one upon the other, with all of the fittings 48 connected to a single control valve, if so desired, whereupon the opening of a single control valve will close all of the valve tubes 20 of the stack,

3

Having shown and described an embodiment of my invention, I claim:

1. An assembly of a series of close together valves with a single means for remote control of all of the valves of said series simultaneously, which consists of a relatively long valve block of rectangular cross section, a channel extending lengthwise through said block, the upper portion of said channel being wider than the lower portion, thereby leaving ledges in the sides intermediate the top and bottom, a series of closely spaced flexible tubes extending crosswise through said block and through the narrower portion of said channel, rigid reinforcing means in said tubes except in that portion which extends through the narrower portion of said channel, longitudinally extending clamping strips fitted into said block, the upper edge of said strips being on the center line of said tubes, a flexible hose passing lengthwise through said channel, spring means within said hose for holding said hose to an oval cross section, whereby the edges at the major diameter will lie on said ledges, and whereby, when said hose is blown to a round cross section, said hose will clear said ledges and extend into the lower portion of said channel to flatten said tubes and thereby shut off flow therethrough.

2. An assembly of a series of close together valves with a single means for remote control of all of the valves of said series simultaneously, which consists of a relatively long valve block of rectangular cross section, a channel extending

4

lengthwise through said block, the upper portion of said channel being wider than the lower portion, a series of closely spaced flexible tubes extending crosswise through said block crossing through the lower portion of said channel, rigid reinforcing means in said tubes except in that portion which extends through the narrower portion of said channel, means for clamping said tubes at their reinforced section, a flexible hose passing lengthwise through said channel, resilient means within said hose for holding said hose to an oval cross section, whereby the edges at the major diameter will span the wider portion of the channel, and whereby, when said hose is blown to a round cross section, said hose will extend into the lower portion of said channel to flatten said tubes and thereby shut off flow therethrough.

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