Nov. 30, 1943. W. H. REISNER 2,335,311

MULTIPLE MAGNETIC VALVE FOR ORGANS

Filed July 26, 1941 3 Sheets-Sheet 1

FIG. 1

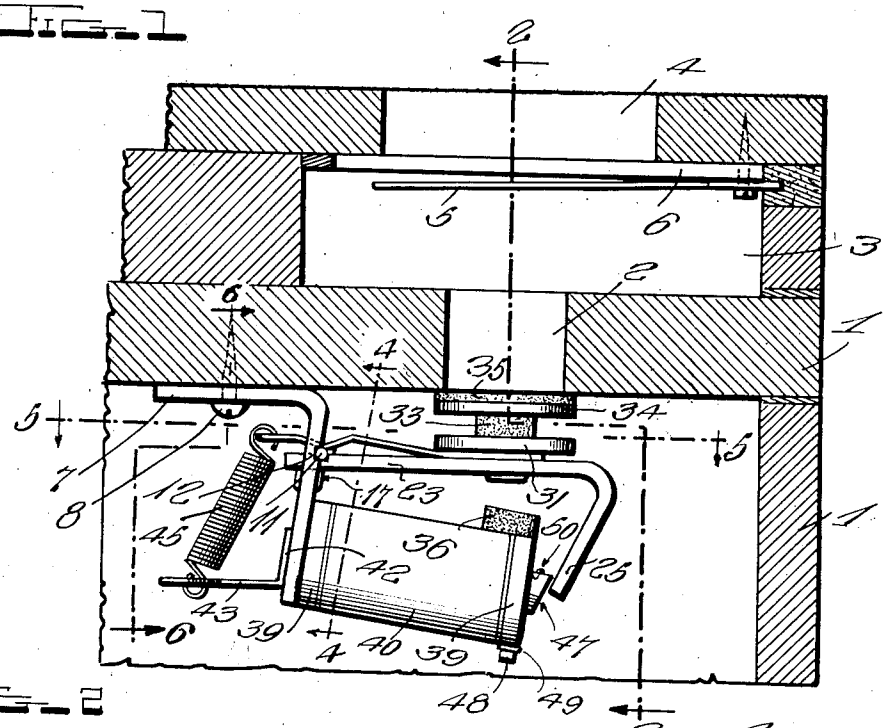
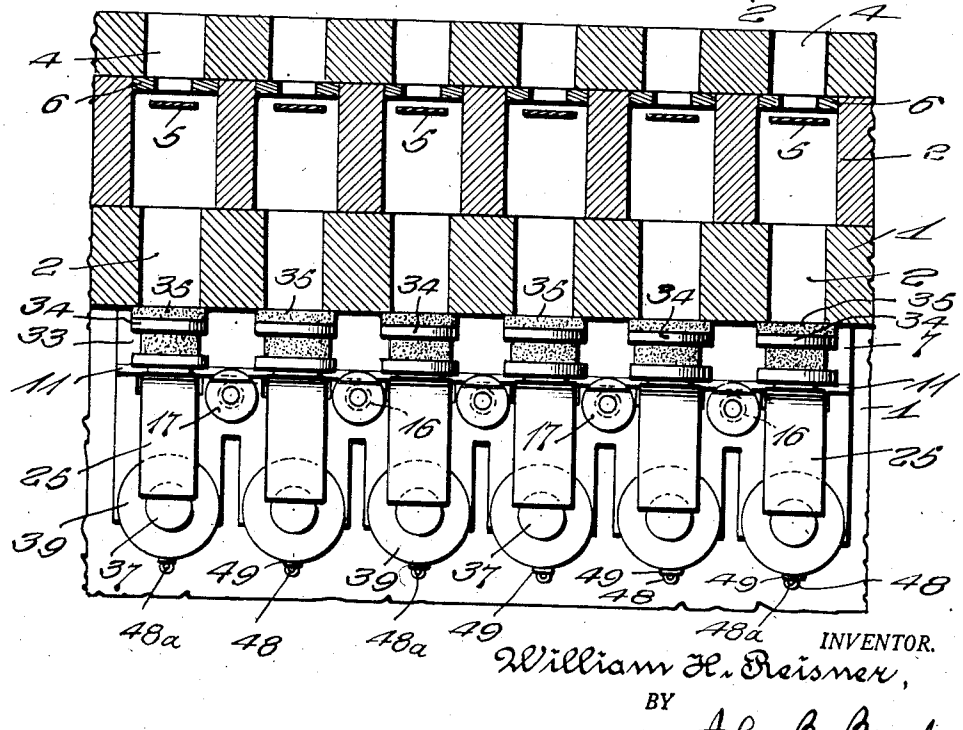


FIG. 2



INVENTOR.
William H. Reisner,
BY
John B. Brady
ATTORNEY

Nov. 30, 1943. W. H. REISNER 2,335,311

MULTIPLE MAGNETIC VALVE FOR ORGANS

Filed July 26, 1941 3 Sheets-Sheet 2

FIG. 3

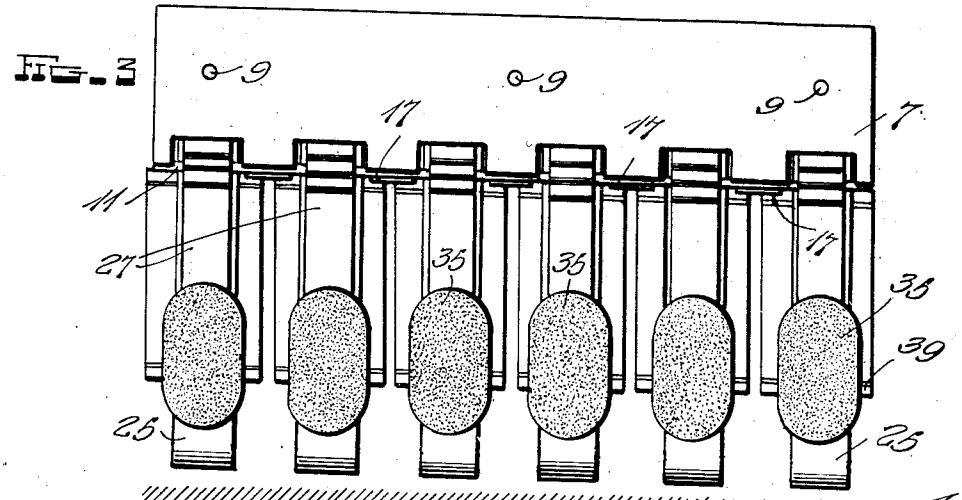
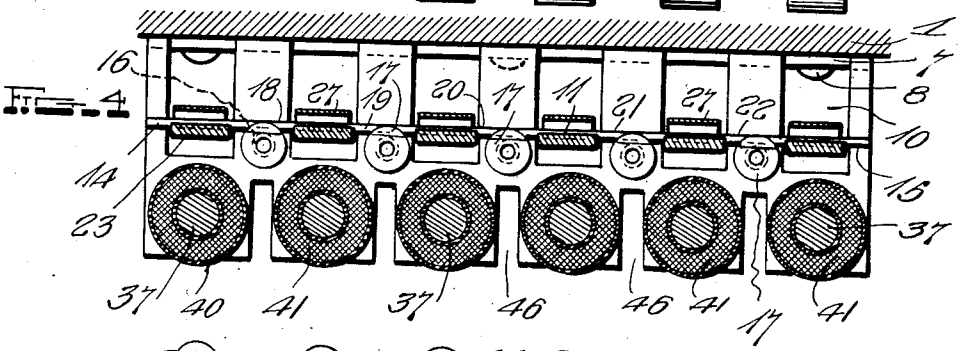


FIG. 4



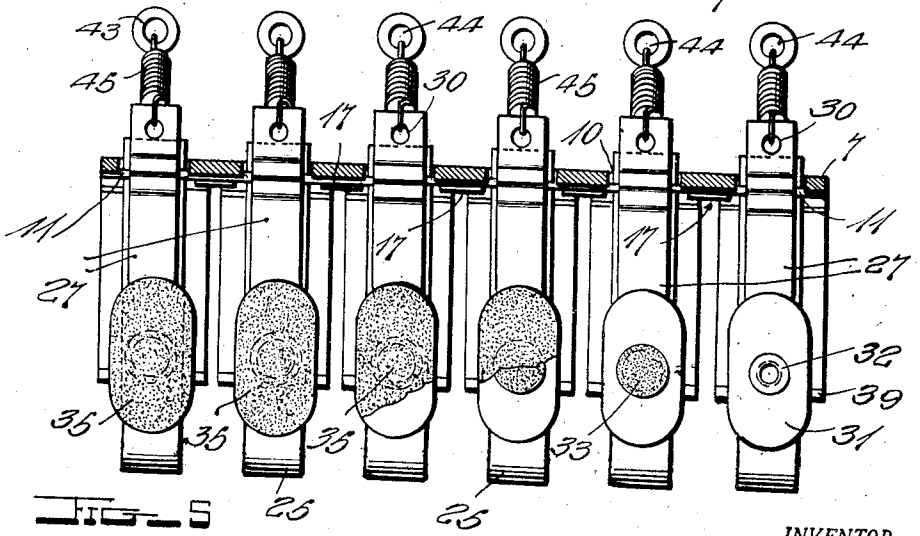


FIG. 5

INVENTOR.
William H. Reisner,
BY
John B. Brady
ATTORNEY

Nov. 30, 1943. W. H. REISNER 2,335,311

MULTIPLE MAGNETIC VALVE FOR ORGANS

Filed July 26, 1941 3 Sheets-Sheet 3

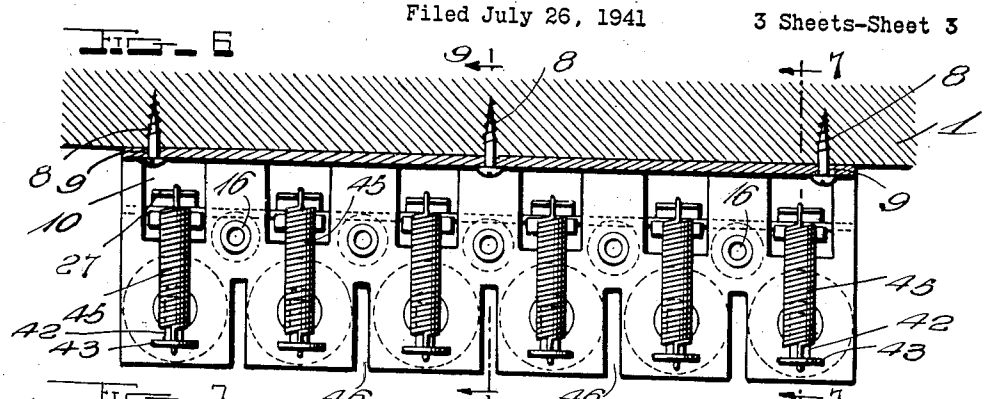


FIG. 6

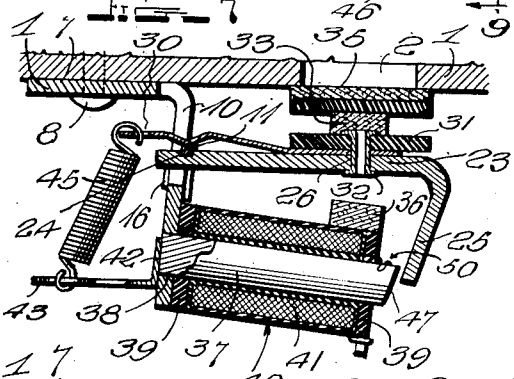


FIG. 7

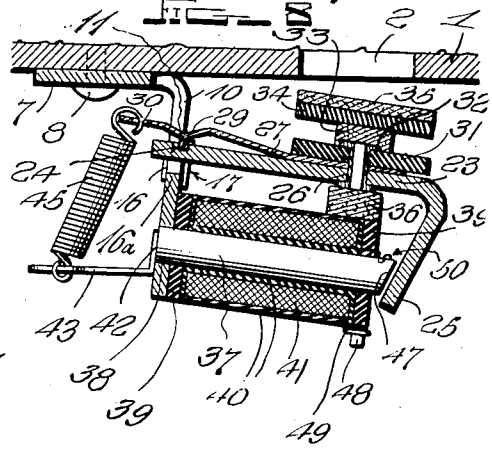


FIG. 8

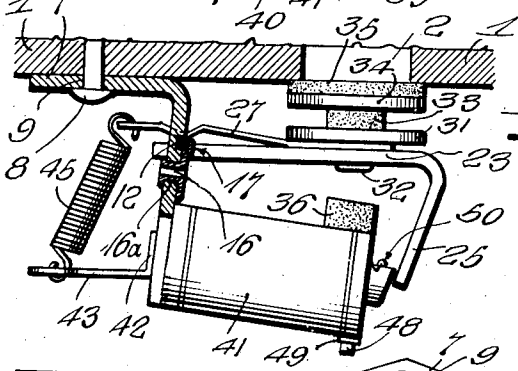


FIG. 9

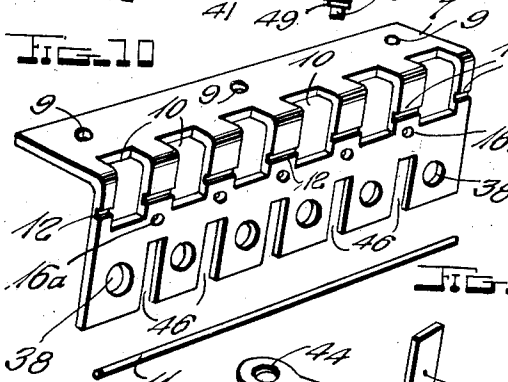


FIG. 10

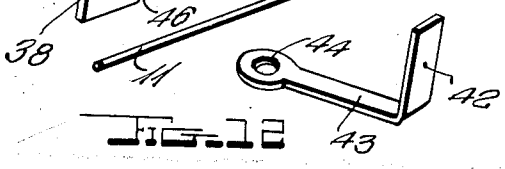


FIG. 11

FIG. 12

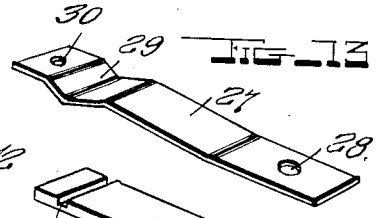


FIG. 13

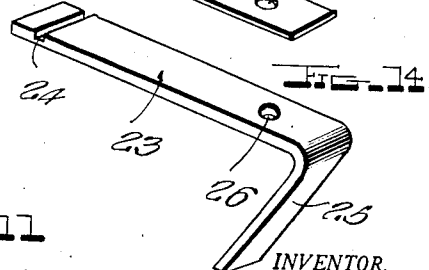


FIG. 14

INVENTOR.
William H. Reisner,
BY
John B. Brady
ATTORNEY

Patented Nov. 30, 1943

2,335,311

UNITED STATES PATENT OFFICE

2,335,311

MULTIPLE MAGNETIC VALVE FOR ORGANS

William H. Reisner, Hagerstown, Md., assignor to The W. H. Reisner Manufacturing Company, Inc., Hagerstown, Md., a corporation of Maryland

Application July 26, 1941, Serial No. 404,229

7 Claims. (Cl. 84—339)

My invention relates broadly to electric valve actions and more particularly to an electrically operated organ valve.

One of the objects of my invention is to provide a construction of electrically operated organ valve which is capable of inexpensive quantity production and assembly.

Another object of my invention is to provide a construction of electrically operated organ valve which comprises a bracket having a multiplicity of mounting means for electric valve actions in which the magnetic paths for each of the magnetic systems are maintained substantially independent and capable of variously operating any one of the valves in the multiple system.

Still another object of my invention is to provide a bracket mounting for a multiplicity of magnetic valve actions having bearing means for each of the valve actions, the bearing means being so arranged that the magnetic armatures may be readily positioned with respect to the bracket mounting for individual functioning by magnets carried by the bracket.

A further object of my invention is to provide an arrangement of bracket mountings for a magnetic valve action in which a magnetic core member is supported in the bracket, an angularly movable armature pivotally mounted with respect thereto and resilient means disposed between the mounting for the armature and a tongue which extends from the end of the magnetic core of the operating magnet whereby the entire system functions as a unit for controlling an electric valve action.

Other and further objects of my invention reside in the construction of electric valve action set forth more fully in the specification hereinafter following, by reference to the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a fragmentary portion of the pressure chamber of a reed operated organ, showing the electric valve action of my invention arranged in position in side elevation; Fig. 2 is a vertical sectional view through the electric valve action of my invention taken substantially on line 2—2 of Fig. 1; Fig. 3 is a top plan view of the electric valve action of my invention; Fig. 4 is a cross-sectional view through the electric valve action, taken on line 4—4 of Fig. 1; Fig. 5 is a transverse sectional view through the electric valve action on line 5—5 of Fig. 1; Fig. 6 is a sectional view taken substantially on line 6—6 of Fig. 1, with parts shown in front elevation; Fig. 7 is a transverse sectional view through the electric valve action on line 7—7 of Fig. 6, showing the electric valve action in de-energized condition with the valve closed; Fig. 8 is a view similar to Fig. 7, but illustrating the magnetic valve energized and the valve open; Fig. 9 is an enlarged side elevational view of the magnetic valve of my invention showing the magnet de-energized and the valve closed, and illustrating in section the manner of mounting the armature for rockable movement; Fig. 10 is a perspective view of the mounting bracket for the magnetic valve system of my invention, showing particularly the comb-like arrangement of the supporting plate for the several adjacent electromagnets, which is so shaped that the individual magnetic lines for each of the magnetic systems are maintained substantially independent; Fig. 11 is a perspective view of the bearing rod for the several rockable armatures of the multiple valve system; Fig. 12 is a perspective view of the tongue which is secured to the end of the magnetic core for connection of the springs for tensioning each of the rockable armatures; Fig. 13 is a perspective view of the resilient strip employed on each of the magnetic armatures for tensioning the armatures with respect to the bearing rod; and Fig. 14 is a perspective view of the rockable armature which controls the functioning of the valve.

My invention contemplates a magnetic valve system for organs operative either under vacuum or pressure control in which a multiplicity of electric valve actions may be assembled in a relatively small space and independently adjusted for proper mechanical tension, and independently operated under selective control of various keys. The bracket mounting for the electric valve actions is so constructed that the magnetic paths through the magnetic actuators for each of the adjacent valves are maintained separate and independent. Each magnetic armature is provided with a mounting groove and a resilient retaining member arranged to coact with a bearing rod for insuring precision rocking movement of each magnetic armature as the associated operating magnet is energized or deenergized. The core member for each magnetic system is provided with a tongue projecting therefrom which provides a connecting means for a spring which extends to the resilient strip associated with the armature. The bearing rod around which each of the armature members pivots, is welded to the supporting bracket at opposite ends thereof and at intermediate positions along the bracket. Preliminary to such welding action the bearing rod is secured in po-

sition by means of clamping rivets which pass through the bracket. The assembly of the valve system is extremely simple in that it is only necessary to spread the resilient strip away from the armature sufficiently to permit the groove in the armature to be engaged upon one side of the bearing rod, while the resilient strip engages the opposite side of the bearing rod. The spring which extends from the end of the resilient strip is connected at its opposite ends to the tongue which is secured to the end of the core of the operating magnet. This tongue is spot-welded to the end of the magnetic core and at no time establishes connection with, or is mounted upon, the bracket per se. The mechanical construction of the electric valve action of my invention will be more fully understood by detailed reference to the drawings.

Referring to Fig. 1 of the drawings, reference character 1 indicates the pressure chamber having ports 2 therein leading to the reed pressure box 3, having an outlet indicated at 4. The reed is indicated at 5, mounted at one end on the reed supporting frame 6. As represented in Fig. 2, the several reed pressure boxes 3 are partitioned one from the other for the independent passage of air therethrough under control of the electric valve action. It will be understood that the electric valve action of my invention may be used for both vacuum and pressure arrangements, as in the usual pipe organ system, and that the illustration of my invention in association with a reed system is merely for the purpose of illustrating one application of my invention.

The bracket for mounting the several electromagnets is represented at 7, secured by suitable means 8 to the wall of the pressure chamber 1. The bracket 7 is provided with apertures 9 therein through which a suitable number of securing means 8 may be passed. Perforations 10 are struck out of the material forming the brackets 7 and grooves 12 are provided in the material of bracket 7 through which bearing rod 11 extends. Bearing rod 11 is spot-welded at opposite ends 14 and 15 in the aligned grooves 12. The bearing rod 11 may also be spot-welded to the material of bracket 7 intermediate the ends 14 and 15. Preparatory to the spot-welding operation the bearing rod 11 is retained in position in the aligned grooves 12 by means of tubular rivets 16 which extend through apertures 16*a* in brackets 7 and secure clamping members 17 over the bearing rod 11. After the bearing rod 11 is thus secured in position it may be spot-welded to the bracket at the ends 14—15 and also in intermediate positions 18, 19, 20, 21 and 22.

The bearing rod 11, extending transversely across the perforations 10 is now ready to receive the several rockable armature members which control the electric valve action. The armature is formed from magnetic material shaped as shown at 23 having a groove 24 adjacent one end, and angularly disposed as represented at 25 adjacent the opposite end. The armature is perforated at 26 to provide means for securing the valve to the armature. A leaf spring 27 is secured at one end adjacent the armature with aperture 28 in leaf spring 27 in registry with aperture 26 in armature 23. The spring 27 has its opposite end displaced toward the groove 24 in armature 23 to provide a yieldable gripping face operative against the bearing rod 11. An aperture 30 is provided in the projecting resilient end of the leaf spring 27.

The armature 23 and its associated leaf spring 27 carries the plate of insulation material 31, through which the clamping tubular rivet 32 passes. Tubular rivet 32 clamps the armature 23, resilient leaf spring 27 and plate of insulation material 31 in superimposed position. A resilient pad member 33 is secured over the head of the tubular rivet 32 and over the plate of insulation material 31. The pad 33 supports plate 34 and the facing portion of valve gasket 35 which contacts the peripheral edge of port 2 for closing the valve and providing one of the limiting abutments for the movement of armature 23. The movement of armature 23 in the opposite direction is limited by abutment of the armature with stop 36 carried by the control magnet spool head.

The control magnet comprises the magnetic core 37 which is secured in aperture 38 in magnetic bracket 7. Core 37 is welded within aperture 38 in magnetic bracket 7 and projects therefrom. Spool heads 39 are provided adjacent opposite ends of core 37 and intermediate these spool heads the operating winding 41 is arranged. The operating winding 41 is suitably insulated by a wrapping of insulation material 40 which extends about the magnetic winding 41. One of the spool heads 39 has a perforated ear 48 extending therefrom with a girdle or band of solder or fusable metal 49 thereon to provide a terminal for the end of the operating winding 41. The perforation in ear 48 is shown at 48*a* forming a securing means for the connecting wire which connects the winding in the circuit. The other end of the operating winding 41 is grounded to the core 37, as indicated at 50. Circuits to the several electromagnets are thus completed by grounding to bracket 7 on the one side and by connection of individual wires to the solder girdles or bands 49 on the other side.

The bracket or tongue 42 which forms the connecting means for the coil spring 45 that tensions the movable armature, is welded to the end of core 37 and has a projecting end 43 extending from core 37. Coil spring 45 connects between the projecting end 43 of tongue 42 and the apertured end 30 of leaf spring 27.

The core 37 is suitably shaped at the end 47 to coact with the angularly disposed end 25 of rockable armature 23 to insure maximum utilization of the magnetic lines of force which extend around the magnetic circuit established through magnetic core 37, magnetic bracket 7, magnetic armature 23 and the shaped end 25 thereof.

As before noted the magnetic bracket 7 is slotted at 46 intermediate each of the portions of the bracket which are apertured at 38 so that the magnetic lines of force which thread the portions of the bracket 7 are maintained substantially independent and confined to substantially separate paths for controlling the rapid and various functioning of the several valves within a small area.

It will be understood that the electric valve action of my invention may be employed as a single unit or may be arranged in the multiple coacting units illustrated herein. The construction shown has been found to be very practical for manufacture and production and successful in operation. However, although I have described the preferred embodiment of my invention, I realize that modifications may be made and I

intend no limitations upon my invention other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a magnet supporting portion, a magnet core extending from said magnet supporting portion, said bracket member having a perforated portion intermediate said mounting portion and said magnet supporting portion, a bearing bar extending transversely of the perforated portion of said bracket member, a magnetic armature member transversely slotted adjacent one end and engageable with one side of said bearing bar, a leaf spring member carried by said magnetic armature member and engageable with the other side of said bearing bar for maintaining said armature in engagement with said bearing bar, a valve carried by said magnetic armature member, and means for tensioning said armature for normally maintaining said valve in closed position.

2. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a supporting portion for a multiplicity of electro-magnets, said supporting portion being substantially comb-like in contour and supporting a magnet core member in each of the comb-like portions of said supporting portion, armature members pivotally mounted in said bracket member and rockable with respect to an associated electromagnet, a valve carried by each armature member, and means for tensioning each of said armature members for operation by the associated electromagnets.

3. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a supporting portion, said supporting portion having a substantially comb-like depending skirt with perforations intermediate the comb-like skirt and the mounting portion, a bearing bar extending transversely of the perforated portions of said supporting portions, armature members rockably mounted on said bearing bar, a valve carried by each of said armature members, means for biasing said armature members to normally closed position, and electromagnets carried by said comb-like depending skirt for selectively operating said armature members.

4. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a supporting portion, said supporting portion having a substantially comb-like depending skirt with perforations intermediate the comb-like skirt and the mounting portion, a bearing bar extending transversely of the perforated portions of said supporting portions, armature members having their ends projecting through individual perforations, said armature members being transversely grooved for engaging one side of said bearing bar, spring members individual to each armature member and engageable with the other side of said bearing bar for maintaining said armature members in rockable position thereon, electromagnetic means mounted on the comb-like portions of the depending skirt of said bracket, a valve carried by each of said armature members, and yieldable means connected with said spring means for normally biasing each of said valves to closed position.

5. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a magnet supporting portion, said magnet supporting portion being constituted by a comb-like depending skirt with adjacent portions of the depending skirt forming mounting means for electromagnets, said bracket being perforated intermediate said mounting portion and said magnet supporting portion of said bracket immediately over each of the mounting means for said electromagnets, armatures in the form of narrow strips of magnetic materials extending through said perforations, each of said armatures being transversely grooved adjacent their projecting ends, a bearing bar extending transversely of the perforations in said bracket and engaged on one side by the transverse grooves in said armature members, spring means carried by said armature members and engaging the opposite sides of said bearing bar for retaining said armature members in rockable position thereon, a valve carried by each of said armature members, and means for normally biasing said armature members to maintain the valve thereon in closed position.

6. An electromagnetic valve actuating mechanism comprising a bracket member of magnetic material having a mounting portion and a magnet supporting portion, said magnet supporting portion being constituted by a comb-like depending skirt with adjacent portions of the depending skirt forming mounting means for electromagnets, said bracket being perforated intermediate said mounting portion and said magnet supporting portion of said bracket immediately over each of the mounting means for said electromagnets, armatures in the form of narrow strips of magnetic materials extending through said perforations, each of said armatures being transversely grooved adjacent their projecting ends, a bearing bar extending transversely of the perforations in said bracket, means intermediate said perforations for maintaining said bearing bar in position, said armatures being pivotally mounted on said bearing bar, a valve carried by each of said armatures, and means for normally biasing said armatures to a position closing said valves.

7. An electromagnetic valve actuating mechanism, comprising a supporting bracket of magnetic material, a magnetic core secured on position in said bracket, insulated spool heads on said core, one of said spool heads having an integrally extending perforated ear thereon, a girdle or band of solder or fusable metal carried by said ear intermediate the spool head and the perforation in the ear, a winding carried by said core and having one end connected with said girdle or band of solder or fusable metal on said insulated ear, the other end of said winding being grounded to said core, an armature member pivotally mounted in said bracket and movable with respect to said core, and a valve actuated by said armature member.

WILLIAM H. REISNER.