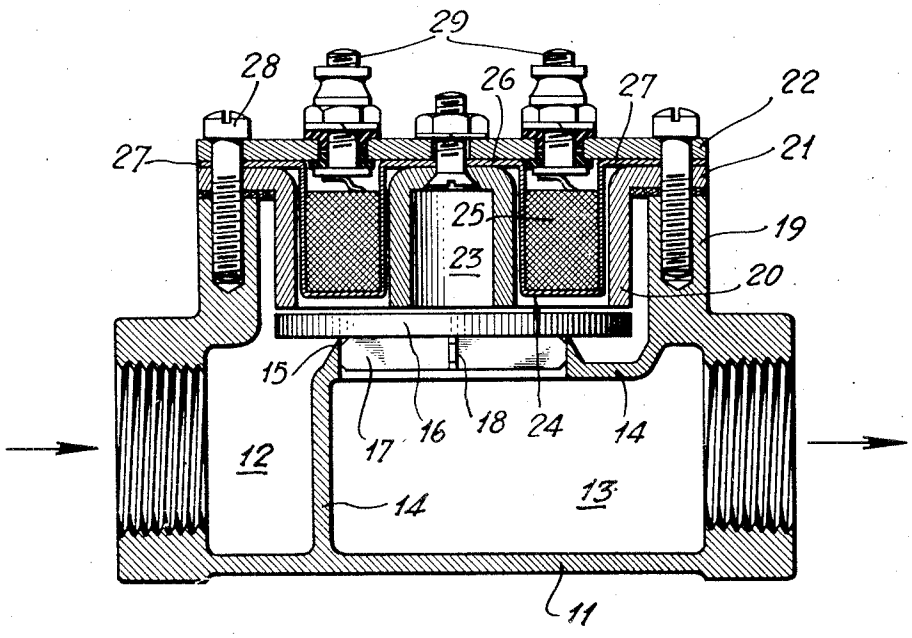
Nov. 24, 1942. W. A. RAY 2,303,066

COIL RECEPTACLE FOR ELECTROMAGNETICALLY OPERATED VALVE

Filed Nov. 6, 1939



WILLIAM A. RAY,
Inventor.

By John H. Rouse,

Attorney

Patented Nov. 24, 1942 2,303,066

UNITED STATES PATENT OFFICE

2,303,066

COIL RECEPTACLE FOR ELECTROMAGNETICALLY OPERATED VALVES

William A. Ray, Glendale, Calif.

Application November 6, 1939, Serial No. 303,093

9 Claims. (Cl. 137—139)

My present invention relates to electromagnetically operated fluid control valves and has for an object the provision of means whereby the energizing coil of the electromagnet is shielded from the fluid controlled by the valve.

Another object is the provision of means whereby the coil may be readily replaced in the electromagnet.

Another object is the provision, in an electromagnetic operator, of a novel structure wherein the magnetic members may be formed of sheet metal.

Another object is the provision of a metallic receptacle for the coil, portions of the receptacle being selectively so treated as to render them magnetically different from the remaining portion.

Other objects and advantages of my invention will be found in the description, the drawing, and the appended claims.

For complete understanding of the invention, reference may be had to the following detailed description and accompanying drawing, the single figure of which is a sectional view of a valve embodying my invention.

In the drawing, the numeral 11 indicates a valve casing having an inlet 12 and an outlet 13 separated by a ported partition 14 provided with an annular valve seat 15. Cooperable with said seat is a valve member 16, of magnetic material, provided with a guide member 17 having vanes 18.

An upper extension 19 of the casing provides an opening for the reception of an electromagnet comprising an outer cylindrical core member 20 having a laterally extending marginal flange 21. A cover member 22, of magnetic material, for the outer core carries on its underside an inner concentric inverted cup-shaped core 23.

A trough-shaped receptacle 24, having a marginal center portion 26 and a marginal outer flange portion 27, is provided for a coil 25. This receptacle is disposed between the cores with the center portion 26 interposed between the inner core 23 and the cover member 22, and the flange portion 27 between the flange 21 of the outer core and the cover member.

The receptacle 24 is preferably formed from a single piece of non-magnetic sheet material, such as an iron alloy containing approximately 18 per cent of chromium and 8 per cent of nickel. This alloy, commonly known as "18–8 Stainless Steel," is normally relatively non-magnetic, but by suitable heat treatment may be rendered magnetic. I preferably selectively so treat only the portions 26 and 27 so that their reluctance is reduced, a more efficient magnetic circuit thus being provided.

It will be seen that the member 24 effectively shields the coil from the fluid controlled by the valve and facilitates replacement of the coil.

The electromagnet is secured together and to the valve casing by screws 28; terminals 29, insultatingly mounted in the cover member, being provided for the external connection of a source of current to the coil.

The bottom faces of the cores, cooperable with the magnetic valve member 16, are arranged in a single plane by accurate machining and lapping. The magnetic members 16, 20, 22 and 23 are preferably of an iron alloy, having a high nickel content, which has high permeability and is suitable for punch-press forming. The electromagnet is especially adapted for sensitive operation on direct current.

While I have herein shown and described a specific embodiment of my invention, I wish it to be understood that modifications may be made without departing from the spirit of my invention. I intend, therefore, that my invention be limited only by the scope of the appended claims.

I claim as my invention:

1. The combination, with a fluid control valve casing having an opening in the upper wall thereof, of an electromagnet comprising a hollow coil, a continuous trough-shaped receptacle for said coil formed of sheet material and having a marginal center portion and a marginal outer flange, and means for sealingly mounting said receptacle in said opening by the aid of said flange so that the trough extends within said casing and is exposed to the fluid controlled by the valve.

2. The combination, with a fluid control valve casing having an opening in the upper wall thereof, of an electromagnet comprising a hollow coil, a continuous trough-shaped receptacle for said coil formed of sheet material and having a marginal center portion and a marginal outer flange, and means for sealingly mounting said flange on the surface of said casing surrounding said opening so that the trough extends within said casing and is exposed to the fluid controlled by the valve.

3. The combination, with a fluid control valve casing having an opening in the upper wall thereof, of an electromagnet comprising a hollow cylindrical coil, an annular trough-shaped receptacle for said coil formed of sheet material and having a marginal center portion and a marginal outer flange, and means for sealingly mounting said receptacle in said opening by the aid of said

flange so that the receptacle extends within said casing and is exposed to the fluid controlled by the valve, said flange being adapted to overlie the surface of said casing surrounding said opening.

4. The combination, with a fluid control valve casing having an opening in the upper wall thereof, of a core member, a continuous trough-shaped receptacle surrounding said core, a coil in said trough, said receptacle being formed of sheet material and having a marginal center portion and a marginal laterally extending outer flange, and means for sealingly mounting said core and said receptacle in said opening by the aid of said flange so that the core and the receptacle extend within said casing and are exposed to the fluid controlled by the valve, said flange being adapted to overlie the surface of said casing surrounding said opening.

5. In combination, a hollow coil member, a continuous trough-shaped receptacle for said coil formed of sheet material and having a marginal center portion and an integrally formed marginal laterally extending outer flange in the same plane as said center portion, and a closure member for said receptacle mounted on said flange and on said center portion.

6. In combination, a hollow coil member, a continuous trough-shaped receptacle for said coil formed of sheet metal and having a marginal center portion and a marginal laterally extending outer flange, and a closure member of magnetic material for said receptacle and mounted on said flange, said sheet metal normally having relatively non-magnetic properties, the flange of said receptacle being so treated as to render that portion magnetic, the flange portion and the closure member together serving as a unitary conductor for the flux produced therein by current flow in said coil.

7. The combination, with a fluid control valve casing having an opening in the upper wall thereof, of an electromagnetic operator comprising a hollow cylindrical outer core receivable in said opening and having an upper outwardly turned flange for engagement with the outer surface of said casing, a cover member of magnetic material for said core, a cylindrical inner core concentrically mounted on the underside of said cover member, the inner ends of said cores terminating in a single plane, an annular trough-shaped coil receptacle formed of sheet material disposed between said outer and said inner core and having a marginal center portion and a marginal outer flange portion, said center portion being interposed between the upper surface of said inner core and said cover member and said flange portion being interposed between the upper surface of the flange of said outer core and said cover member, a coil in said receptacle, and a relatively flat armature member cooperable with the inner ends of said core.

8. In a fluid control valve, a casing having an inlet and an outlet, a partition separating said inlet and said outlet and provided with a valve port, the upper wall of said casing having an opening axially aligned with said port, a hollow cylindrical outer core receivable in said opening and having an upper outwardly turned flange for engagement with the outer surface of said casing, a cover member of magnetic material for said core, an inverted cup-shaped inner core concentrically mounted on the underside of said cover member, the bottom ends of said cores terminating in a single plane, an annular trough-shaped coil receptacle formed of sheet material disposed between said outer and said inner core and having a marginal center portion and a marginal outer flange portion, said center portion being interposed between the upper surface of said inner core and said cover member and said flange portion being interposed between the flange of said outer core and said cover member, a coil in said receptacle, and a valve member cooperable with said port and comprising a relatively flat armature cooperable with the bottom ends of said cores.

9. In combination, a hollow coil member, a continuous trough-shaped receptacle for said coil formed of sheet metal and having a marginal center portion and a marginal laterally extending outer flange, said sheet metal normally having relatively non-magnetic properties, the flange of said receptacle being so treated as to render that portion magnetic, a closure member of magnetic material for said receptacle and mounted on said flange, and a core member also of magnetic material and mounted on the side of said flange opposite to that whereon the closure member is mounted.

WILLIAM A. RAY.