A mounting arrangement for piston and cylinder devices comprising: a generally U-shaped bar with the mid-portion of the "U" intended to span the end of a cylinder at the bottom thereof, and the two legs of the "U" intended to straddle the bottom portions of the side of the cylinder device, adjacent the end caps thereof. Fastener receiving openings extend through the legs of the "U" in a direction intended to be perpendicular to the length of the cylinder rod for fastening the cylinder to a supporting surface. In addition, fastener receiving openings extend through the mid-portion of the "U" intended to be in alignment with tie rods that hold opposite end caps of the cylinder together for fastening the mounting arrangement to the cylinder.

6 Claims, 4 Drawing Figures
DEMONTABLE SIDE LUG MOUNTING FOR PRECISION PISTON AND CYLINDER DEVICES

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates to piston and cylinder devices, and more particularly to a mounting arrangement for a piston and cylinder device.

2. Brief Description of the Prior Art
There are many different mounting arrangements for mounting cylinder devices to a support. Applicants’ assignee makes a variety of such mountings as illustrated in its “Miller” cylinder bulletins, which are available to the public.

One form of mounting arrangement made by applicants’ assignee has been a so-called Model “72,” wherein generally tetrahedral lug holes are disposed on opposite sides of the cylinders adjacent to the opposite end caps of a tie rod-type cylinder. These lugs have fastener receiving openings extending therethrough, generally transverse to the length of the cylinder rod. The National Fluid Power Association (NFPA) has adopted standards for various mounting styles as to their dimensions. These standards permit various manufacturers to equip their particularized piston and cylinder devices with styles of mountings permitting interchangeability in the field of use.

The particular mounting arrangement with which this invention is concerned is given the name “side lugs” by the NFPA standards of Nov. 9, 1969, such standards being presently in effect. Dimensions are given to cylinders rated to nominal bore size. The dimensions that are specified have to do with the distances between centerlines of mounting bolts which pass through whatever mounting structure is attached to the cylinder and the bolt diameter. Thus, for example, the distance between centerlines of mounting bolts, four in number located respectively at the four corners of the cylinder, are given, as well as the distance between the centerline of the cylinder rod and the mounting surface attached to the cylinder. Any mounting conforming to these dimensions ought to fall within the standards, no effort being made to specify design of the mounting itself. Heretofore, “side lug” mountings have been welded onto cylinders. The present mounting is demountable.

Thus, it is the object of this invention to meet the need and desire in the art to provide an improved “side lug” mounting arrangement for a piston and cylinder device.

SUMMARY OF THE INVENTION
This invention is directed, in brief, to the provision of an improved form of “side lug” mounting arrangement for a piston and cylinder device.

The best mode currently contemplated for carrying out the invention includes the provision of a generally U-shaped bar 30 of suitable durable hard material such as a tempered steel or the like. Bar 30 has a mid-portion or “bight” 32 having top surface 32a, bottom surface 32b, an outer surface 32c and an inner surface 32d. In addition, the bar 30 is provided with a pair of parallel legs 34 and 36, which are spaced apart and extend transversely relative to the mid-portion 32. Each of the legs also has a top 34a, 36a, respectively; a bottom 34b, 36b, respectively; an outer surface 36c, 36c, respectively; and an inner surface 34d, 36d, respectively.

A pair of openings 38 is provided in the mid-portion 32 for receiving the tie rods 22 therethrough and the openings are recessed at 40 in the outer surface 32c for receiving the mounting nuts 41. By this arrangement the mounting bar 30 may be affixed to the piston and cylinder device 12.

FIG. 1 is a perspective view of the mounting arrangement and a piston and cylinder device with which the mounting arrangement is used;

FIG. 2 is an end elevational view of the piston and cylinder device and mounting arrangement of this invention;

FIG. 3 is a side elevational view of a piston and cylinder device and mounting arrangement of this invention; and

FIG. 4 is a top plan view of the mounting arrangement of this invention.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment therefor, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT 21

The cylinder mount 10 of this invention is intended for use with a piston and cylinder device 12, preferably, through not necessarily, of the so-called tie rod type as illustrated in the drawings. Generally speaking, a piston and cylinder device is provided with a linearly extensible piston rod 14, which extends through a bushing 16, in at least one of the end caps 18, which close the opposite ends of the cylinder tube 20. In a tie rod type cylinder, tie rods 22 extend lengthwise of the cylinder, and hold the end caps on the tube with the aid of tie rod nuts 24. Fluid ports 26 may be provided for permitting the ingress and egress of fluid from the interior of the cylinder tube. As is well known, in operation, when fluid under pressure is admitted through ports 26, it exerts a force against a piston element inside the tube 20, which is connected to the rod 14. This causes the rod 14 to move linearly with respect to the tube 20, and therefore produce a motion which can be converted into a work function. However, the cylinder assembly (or rod) must be connected to a supporting surface in order for the thrust exerted by the rod to produce a work function and therefore some form of a mounting arrangement for the cylinder is necessary.

The mounting arrangement or mounting device 10 of this invention can be characterized as a so-called “side lug” form of cylinder mount. Generally speaking, the mounting device 10 comprises a generally U-shaped bar 30 of suitable durable hard material such as a tempered steel or the like. Bar 30 has a mid-portion or “bight” 32 having top surface 32a, bottom surface 32b, an outer surface 32c and an inner surface 32d. In addition, the bar 30 is provided with a pair of parallel legs 34 and 36 which are spaced apart and extend transversely relative to the mid-portion 32. Each of the legs also has a top 34a, 36a, respectively; a bottom 34b, 36b, respectively; an outer surface 36c, 36c, respectively; and an inner surface 34d, 36d, respectively.

A pair of openings 38 is provided in the mid-portion 32 for receiving the tie rods 22 therethrough and the openings are recessed at 40 in the outer surface 32c for receiving the mounting nuts 41. By this arrangement the mounting bar 30 may be affixed to the piston and cylinder device 12.
In addition, each of the legs 34 and 36 is provided with fastener receiving openings 42 which extend from the top surface 34a and 36a through the bottom surface 34b, 36b, respectively, so that a suitable fastening element, such as a bolt or the like, might extend through the openings 42 to secure the bar 30, and cylinder 12, to a supporting surface. Preferably, the fastener receiving openings 42 are recessed as at 42a in the top surfaces 34a and 36a of each of the legs 34 and 36, respectively.

It is contemplated that the bar 30 would be made in different sizes for different size cylinders. It is common for cylinder sizes to generally be denoted by the size of the bore of the cylinder tube, with mounting dimensions being standardized based upon the bore size. For each different bore size cylinder, it is contemplated that the openings 38 would be spaced different distances apart, to receive the tie rods 22 with minimum clearance. This dimensional relationship of the openings 38 with respect to the tie rods 22 would insure that for every size cylinder, each dimensionally different bar 30 would be precisely located relative to the lower surface of the end cap of that cylinder. Moreover, it is contemplated that the dimension between the centerlines of the fastener receiving openings or cross-bores 42 in each of the legs 34 and 36 would be a precise dimension apart for each different size cylinder, all in accordance with the NFPA standards.

A pair of shoulders are provided in the inner face 32d between the inner faces 34d and 36d of each leg 34 and 36. The shoulders are defined by a pair of spaced apart parallel surfaces 44a and 44b which terminate in return surfaces 46a and 46b which join with the inner faces 34d and 36d. In the preferred embodiment, the faces 34d and 36d taper slightly outwardly from the juncture with return surfaces 46a and 46b. It is intended that this specific form would be preferably used with a cylinder end cap, which is also slightly tapered, as indicated by the surfaces 50a, 50b, 50c and 50d in Fig. 1.

By way of example, for a 1/4 inch bore, the preferred dimension between the surfaces 44a and 44b would be 2 inches and the preferred dimension between the juncture of surfaces 46a and 46b with faces 34d and 36d would be 2.08 inches. Moreover, the length of each leg 34 and 36 from the front face 32c to the free end would be 1.607 inches and the distance between faces 34d and 36d at the free ends of each leg would be 2.160 inches. The provision of the mating tapered surfaces on the cylinder end cap and the legs of the mounting member provides the advantage of a snug facial engagement between the surfaces as the mounting member is assembled on the end cap.

As shown in the illustrated embodiment, it is preferred that the mounting arrangement of this invention would be utilized with a tie rod type piston and cylinder device. In these types of cylinder devices the tie rods are maintained in a prestressed state. It is desirable that the inner face 32d of the portion 32 be in facial engagement with at least a substantial portion of the exterior of the end cap 18. This is accomplished in the illustrated embodiment by making the surface 32d a planar surface which mates with a substantial portion of the end cap between the tie rods.

It is to be understood that the faces 34d and 36d do not have to be tapered. The mounting arrangement of this invention would still provide a secure, stable mounting, so long as there is firm facial engagement between the end cap and the surface 32d, and so long as the fastening member which extends through the apertures 42 is firmly secured within a supporting surface. When assembled, the mounting member is, in effect, locked to the cylinder when it is bolted against the head and held in place by the nuts 41 on the tie rods. The side legs are fixed in position with the fastener elements extending therethrough to lock the cylinder to a supporting surface. The underside of each leg 34b and 36b is preferably smoothly machined to lie in a position below the centerline of the cylinder rod, conforming to the NFPA standard dimension for the bore size involved. The piston and cylinder device will be firmly locked against movement in any direction so that the work stroke of the rod may be true and precise, insuring the accuracy of the stroke and prolonging the life of the cylinder. The heads of the cylinder will be firmly secured against the mounting surface, insuring proper height and location of the piston rod. The side lug mounting will conform to dimensional standards yet be demountable upon removal of the securing mounting nuts 41.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

We claim:

1. A mounting arrangement for use with a piston and cylinder device having a cylinder tube, a piston rod about a common centerline, opposite end caps, and tie rods passing through the caps to hold the device assembled, comprising: a member having a first portion for disposition in face abutment with the outer face of an end cap, removable means for connecting the member to the cylinder end cap abutted; and a pair of spaced second portions respectively extending beside the cylinder end cap for generally embracing the sides of the end cap, each second portion including cross-bore means for receiving a fastener element therein, said receiving means extending generally in a direction which is transverse to the length of the cylinder to which the member is connected, and said cross-bore means being located relative to each other and to said centerline in predetermined relation.

2. The mounting arrangement of claim 1 wherein the member is generally U-shaped in plan.

3. The mounting arrangement of claim 1 wherein in the means in the first portion for connecting the member to the cylinder end cap comprises apertures for receiving the tie rods of the piston and cylinder device and threaded nuts on said tie rods securing the mounting in assembly with the cylinder device.

4. The mounting arrangement of claim 1 wherein the fastener receiving means in the second portion are apertures extending therethrough.

5. The mounting arrangement of claim 1 wherein the side surfaces of the cylinder cap are arranged to taper toward the exposed end of the cap and the mounting member has inner surfaces mating with the side surfaces of the cap when the mounting member is in snug end face abutment with the end surface of the cylinder cap.
6. The mounting arrangement of claim 1 wherein the lower surface of the member is positioned relative to bores through the first portion for receiving the tie rods so as to position such lower surface in relation to the centerline of the cylinder such that the end caps may be secured against a mounting surface by securing the mounting means to such surface.

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