COMBINATION SWIVEL EYE AND SWIVEL BASE

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UNITED STATES PATENT OFFICE

2,434,318

COMBINATION SWIVEL EYE AND SWIVEL BASE

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Application September 4, 1946, Serial No. 684,782

15 Claims. Cl. 59-95)

This invention relates to swivel eyes, swivel bases and clevises.

Among other objects, the invention aims to provide a swivel eye and a plural part base therefor (which may be part of a clevis or may be a separate swivel base member attachable to a clevis) which interlock in such a manner that the base cannot separate into its parts while the swivel eye is under working stress, but may be easily separated if desired, after the load has been removed. Another object is to provide a clevis which is split so that it may be easily assembled on and disassembled from trunnions, etc., but which may be held together securely by an interlocking swivel eye. Another object is to provide a novel form of swivel eye. A further object is to provide a novel swivel base which is split so that it may be easily assembled on and disassembled from the preferred swivel eye. A still further object is to provide an interlocking clevis, swivel base and swivel eye which are especially easy to assemble and disassemble. Another object is to provide a clevis which although split for easy assembly is after assembly readily made into a unitary or permanent one-piece construction. Another object is to provide a plural part swivel base which may be united with either of two different swivel eyes, either of which will hold the parts of the swivel base together. Other objects will be pointed out below or will be obvious from the following description of two embodiments of the invention shown in the accompanying drawings forming a part of this specification.

In said drawings:

Fig. 1 is a plan view of the clevis and swivel eye assembly, showing a chain in phantom attached to one end of the clevis and showing part of a link of another chain attached to the eye of the swivel eye;

Fig. 2 is a side elevation of the clevis and swivel eye assembly;

Fig. 3 is an end elevation as from the left end of Fig. 2 but showing bolts for holding the clevis parts together;

Fig. 4 is a sectional elevation of one of the clevis parts;

Fig. 5 is across section on line 5-5 of Fig. 4;

Fig. 6 is an elevation of the swivel eye per se, but on a larger scale, with a part in section;

Fig. 7 is an end elevation similar to Fig. 3 but showing a cotter pin holding the swivel eye against undesired movement relative to the clevis;

Fig. 8 is a plan view of another form of the invention embodying a clevis, a separate swivel base and a swivel eye;

Fig. 9 is a plan view of the swivel eye and swivel base of Fig. 8 shown without the clevis, an alternative position of the swivel eye end being indicated in dotted lines;

Fig. 10 is a plan view with a part in section of the swivel eye of Figs. 8 and 9 shown alone;

Fig. 11 is an elevation of the swivel base, the view being at right angles to that of Fig. 9, and the swivel eye being omitted;

Fig. 12 is a separated view, in elevation, of the swivel base of Fig. 11, but looking at it from the opposite side and

Fig. 13 is an elevation of one of the halves of the swivel base of Figs. 11 and 12.

Referring particularly to the drawings and first to Figs. 1 to 7 inclusive, the improved clevis generally designated by the reference numeral 18 is unusual in that it is split, that is, is formed of two like parts, 16, 17, which are symmetrical with respect to the longitudinal or medial axis of the clevis, said axis being indicated by the dot-and-dash line A—A. Each clevis part has a shank which terminates at one end in a perforated ear 18, to which a flat link chain (for example) shown in phantom and designated 19, is secured as by a pin 20 passing through the perforations 21 in the ears. As will be made clear later on, pin 20 need not be secured to the clevis by a cotter pin or other fastening means or expedients, although it must be secured to the end of the chain if not made fast to the clevis. A swivel eye generally designated 22 is attached to the opposite end of the clevis and a round link chain 23 (only part of one link being illustrated) is shown attached to the swivel eye. The round link chain may be assumed to be part of a load-binding chain, while the flat link chain may be considered as part of a load binder, for instance like the one disclosed in my Patent No. 2,157,451 dated May 9, 1939. Of course various other machining elements may be attached to the swivel eye and clevis.

Each half of the clevis has a half bore 24 (Figs. 4 and 5) formed in the base 16a or 17a, having its axis coinciding with the axis A—A; that is to say, the two parts of the clevis when brought together form a round, smooth cylinder bore or perforation through which the cylindrical shank 25 of the swivel eye passes when the parts are assembled as shown in Figs. 1 and 2 and in which the swivel eye is freely rotatable. It will be noted that the clevis is split in the plane which includes the axis of the bore and which intersects the
plane of the clevis arms 16 and 17, preferably at a right angle thereto. Adjacent each half bore 24 is a raised semi-circular bead or ring 26, preferably rounded in cross section, these two semi-circular rings when put together forming a completely circular ring on the inside wall of the base 16a, 17a. The swivel eye 22 has a flange 47 at its inner end and this flange is formed with a circular groove 28 which snugly fits the ring formed by the two matched semi-circular rings 26, thus swiveling the swivel eye on the interior wall of the base of the clevis. The eye 29, of the swivel eye is conventional.

To assemble the parts as shown in Fig. 1, the clevis is initially in two parts, 16, 17, as described, and these halves are merely brought together on opposite sides of the shank 25 of the swivel eye and on opposite sides of the end of the flat link chain (or other part). Then the two halves of the clevis may be semi-permanently secured together by means of a small weld 30 (Fig. 1) which is conveniently limited to a small area by the provision of a notch 31 (see also Fig. 3) formed in the clevis base on either side, the two notches 31 facing on opposite sides and providing a small pocket for the reception of the molten metal. Notch 31 may have a V-shape if desired. It will be noted from Fig. 1 that this pocket does not reach all the way across the clevis base, so that the molten metal will not flow to the flange 21 of the swivel eye, hence will not interfere with free swiveling of the eye. Once the parts are secured in this manner, they can never become disconnected. The reaction of the grooved flange 27 of the swivel eye on the clevis base is to hold the two parts of the clevis more firmly together as greater and greater stress is put on the parts. In other words, the welds are subjected to no working stresses whatever, and merely serve to prevent separation of the halves of the clevis when the clevis is under no stress. The flat link chain (or other part) cannot become searedated from the clevis so long as the clevis parts are held assembled.

If it is desired to frequently detach the flat link chain (or other part attached to the perforated ears of the clevis) weld 30 will not be used, but instead bolts 32 (Fig. 3) will be passed through small bores 33 drilled in the center of the clevis parts, such bolts being inserted after the halves of the clevis have been assembled as previously described. Screws (not shown) may be used in lieu of bolts 32. However, if very quick detachment of the clevis is desired, a cotter pin 34 (Fig. 7) is passed through a small hole 35 (Fig. 6) drilled in the shank of the swivel eye. Such a cotter pin will strike the base of the clevis when the clevis is relieved of a stress to prevent the grooved flange 27 from separating from the two semi-circular rings 26, which in turn prevents the halves of the clevis from separating. A straight pin or almost any piece of metal which may be secured in hole 35 so as to project therefrom may be used instead of a cotter pin.

Now referring to Figs. 8–13 inclusive, the same split clevis made up of the parts 16, 17 is used, with bolts 32 to hold the parts together in its pulling when the clevis is relieved of a stress. The flat link chain is omitted and instead a novel swivel eye and base assembly is united to the perforated ears 16 of the clevis. This novel swivel eye and base assembly is shown in Fig. 8 apart from the clevis, the swivel eye being shown per se in Fig. 10, and the swivel base per se in Figs. 11, 12 and 13. A link 23 of a round link chain is illustrated in Fig. 8 as united to the swivel eye 40 and a hook, block, load binder chain of the machinery part though not shown may be assumed to be united to the round link chain. Swivel eye 40 is exactly like swivel eye 22 except that its flange 41 at the end of shank 42 is of a smaller diameter, as the circular lip 43 formed by its groove 44 swivels on a differently dimensioned part on the swivel base 45, as will be explained.

The swivel base 45 is split or formed of two parts 45a, 45b which are exactly alike except for a minor detail. Each part of the swivel base consists of half of a square base having half of a round bore 49 or 43 located centrally thereof, the complete round bore receiving the round shank 42 of the swivel eye, which therefore is free to rotate in the bore. To each part 45a, 45b, half round shafts or trunnions 50 are secured. Preferably each half of the swivel base is a single metal casting although it could be a forging. The two trunnions formed by bringing the parts 45a, 45b together are exactly aligned as shown in Fig. 11, and are shown as of the proper dimensions to fit in the perforations of the clevis ears 16, so that the parts 45a, 45b are held together by the clevis. In other words, when the clevis remains assembled about the swivel base the latter cannot be disassembled. The swivel base of course, may swing or oscillate on its trunnions when assembled with the clevis. To hold the swivel base parts temporarily together which is a convenience in machining and handling, dowels 51 may project from part 45a and fit in holes 52 in part 45b.

To make a locking swiveling connection between the swivel eye and the swivel base, a half circular groove 53 is formed in each part 45a, 45b on one of the flat faces thereof bordering the half bore 48, 49 and the circular groove formed by the matched halves of the swivel base receives the circular lip 43 on the end of the swivel eye. Thus the swivel eye may turn freely on the swivel base. This fact is just long enough to give a little looseness or play between the swivel eye and the swivel base, the result being that when the swivel eye is pushed toward the swivel base, the circular lip 43 will be moved out of the groove 53, where the parts of the base of the swivel eye base assembly can be separated by merely pulling apart. This slight looseness or play is indicated by the dotted line, Fig. 9. So long as lip 43 engages groove 53 the halves of the swivel base can never be separated, and as previously stated, so long as the trunnions 50 are held in the bearings of the clevis, the swivel base parts cannot be separated.

Instead of swivel 46, swivel eye 22 may be assembled with the swivel base, if the latter is merely turned over, because a half round, raised ring or bead 54, 55 (Figs. 12 and 13) is formed on the opposite side of each part 45a, 45b, bordering the half bore 48 or 49. The circular bead formed by the two assembled swivel base parts fits in the circular groove on the flange 27 of swivel eye 22, so that the parts may swivel and are locked together, yet are separable in the manner described above. The parts are assembled slightly off center (although this is not shown) to prevent incorrect assembling of the swivel base parts. In other words the half beads 54, 55 on one side of the swivel base and the half circular grooves 53 on the other side will always be matched, if the dowel pins and holes clearly show that the parts are improperly assembled. In-
stead of employing dowels, a projecting lug or rib (not shown) on one swivel base part may fit a recess (not shown) in the other base part when said parts are properly assembled, but not otherwise. A cotter pin similarly placed to cotter pin 34 may be used with the swivel eye and base assembly of Fig. 9.

Due to the peculiar interlocking and swiveling surfaces on the swivel eye and the swivel base (whether the latter is a separate member as in Fig. 9 or is integral with a clevis as in Fig. 1) the parts of the swivel base are held together more securely by the greater the stress to which the swivel eye is subjected. The present improvements make for safety and easy and quick assembly and therefore will reduce the cost of manufacture of certain machine elements used extensively in oil fields, in hoisting equipment, farming and logging machinery, etc., including especially chain jacks and load binders. According to the present practice, the legs or shanks of a clevis are spread apart far enough to go on the trunnions to which the clevis must be attached, and then the legs or shanks are pressed together. But this frequently weakens the casting at the bend or base of the clevis and sometimes the castings so weakened will break. Then too, the desired close fit is frequently not obtained because the casting always springs back after the legs or shanks are pressed together. In the present invention, the clevis is not subjected to any strain whatever during assembly or disassembly, hence these objectionable results are obviated.

An advantage of the swivel eye is that the groove 28 or 48 forms an oil or grease container, especially when the swivel eye is used in a vertical position as on traveling pulley blocks or hay fork pulleys. If desired a gasket (not shown) may be placed between the swivel eye and the swivel base. The principal advantage of the swivel eye is, however, the fact that it will hold the parts of the swivel base together while under load even if said parts should break. Moreover, the swivel eye will prevent the clevis from spreading apart; the greater the load on the swivel bearing, the harder it is to separate the legs or shanks of the clevis. A further advantage is that the two halves of the clevis are identical, hence may be made from the same mold. Likewise the two halves of the swivel base (which except for the dowels and dowel holes are identical) may be made from the same mold or die.

Obviously the present invention is not limited to the two embodiments thereof herein described and shown. Moreover it is not indispensable that all the features of the invention be used conjointly since they may be employed advantageously in various combinations and sub-combinations.

Having described the invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a clevis and a swivel eye, the clevis being split into two symmetrically identical parts, the swivel eye having a circular flange lockingly engaging each part and swiveling on each part so engaged.

2. The combination of a clevis and a swivel eye, the clevis being split into two symmetrically identical parts, each part having a half round bead on the inside of the base of the clevis, and the two half round beads together forming a circular bead, the swivel eye having a flange with a groove therein which interlocks with said circular bead to permit free swiveling of the swivel eye on the clevis.

3. The combination of a clevis and a swivel eye, the swivel eye having a shank and a flange on the end of the shank, the clevis base having a bore in which the shank of the swivel eye may freely turn, the clevis being split in a plane which includes the axis of the bore and which intersects the plane of the clevis arms, which clevis fits in a complementary part provided on the flange of the swivel eye; said complementary parts so interfitting that free swiveling of the swivel eye is permitted.

4. A clevis made up of two identical parts adapted to be joined together to make a complete clevis, each part having a perforated ear at one end of the usual straight shank, and a swivel base at the other end, said swivel base having a half round bore therein and a bead of half circular cross section bordering the half round bore.

5. The invention according to claim 4, wherein the swivel base also has a notch formed therein adjacent the plane of symmetry of the clevis part, said notch extending generally parallel to the half bore and being spaced from that end of the swivel base which has the half circular bead.

6. The invention according to claim 4, wherein the swivel base has two small bores for bolts drilled therethrough at right angles to the axis of the half bore and on either side of the half bore.

7. The combination of a swivel eye having a shank, a flange on the end of the shank, and a circular groove in the flange, and a swivel base which is split into two identical parts held together by engagement of the swivel eye, the parts of the swivel base having means formed therein for interfitting in said circular groove, so that the swivel eye swivels on the swivel base.

8. The combination of a swivel base which is split into two parts and a swivel eye having a shank which swivels in a bore provided by said two base parts when assembled, circular means bordering the bore on one side of the swivel base, and other circular means on the end of the shank which fits into the first mentioned circular means, the interfitting of said means permitting free swiveling of the swivel eye when assembled on the base and effecting locking of the two parts of the swivel base while the swivel eye and its base are subjected to the usual stress.

9. The combination of a swivel eye including an eye, a shank, a flange at the end of the shank, and a circular groove on that side of the flange which is toward the eye, and a swivel base which has a bore for rotatably receiving said shank, said swivel base being of plural parts and each part having a surface which fits in said groove, all said parts being locked together by the engagement of the grooved flange therewith.

10. The combination of an interlocking swivel eye and swivel base, the swivel eye having a shank and a flange at the end of the shank, the swivel base being in two parts and having a bore in which the shank is swiveled, each part of the swivel base providing one half of the bore, the swivel base also having surfaces which both interlock and swivelly engage the flange, said surfaces bordering the bore and being so constructed and arranged that the greater the stress to which the swivel eye is subjected the greater the force necessary to separate the parts of the swivel base.

11. A swivel eye consisting of an eye, a shank integral with the eye, and a flange integral with the shank and located at the end of the eye, said flange having a circular groove and a rounded raised portion on the side toward the eye.

12. A swivel base including a block-like body
which is split into two like parts, each part providing a half bore for the shank of a swivel eye, and two half trunnions extending from opposite sides of the body, either the top or bottom of the body having semi-circular swiveling and interlocking surfaces for co-operation with complementary surfaces on the swivel eye.

13. A swivel base including a block-like body having a bore for the shank of a swivel eye and having aligned trunnions on opposite sides, the body being divided into two like parts diametrically of the bore and trunnions, the axis of the aligned trunnions being at right angles to the axis of the bore.

14. A swivel base as set forth in claim 13, wherein the body has at either end of the bore a circular groove or bead adapted to interlock with a circular lip or groove, respectively, on a swivel eye.

15. A swivel base as set forth in claim 13, wherein the body has at one end of the bore a circular groove formed in the surface of the body, and has at the other end of the bore a circular bead also integral with the body, both the groove and the bead being provided half on one part of the body, half on the other.

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