Feb. 17, 1942. O. H. BRAUER 2,273,510

SHEET METAL JOURNAL BOX

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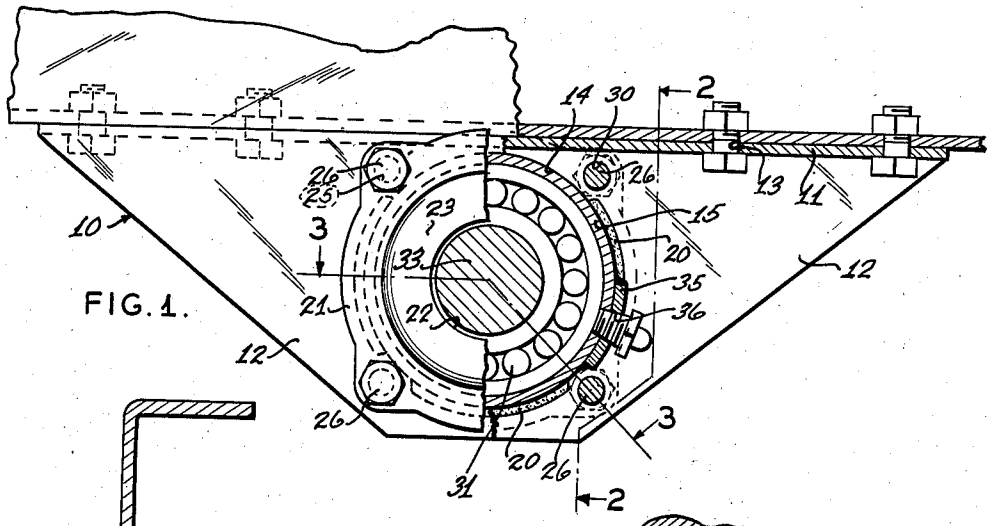

FIG. 1.

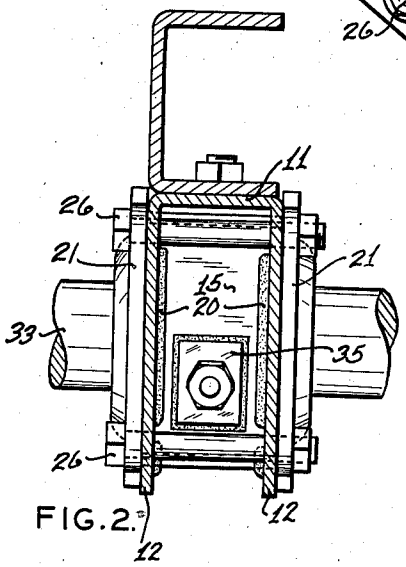

FIG. 2.

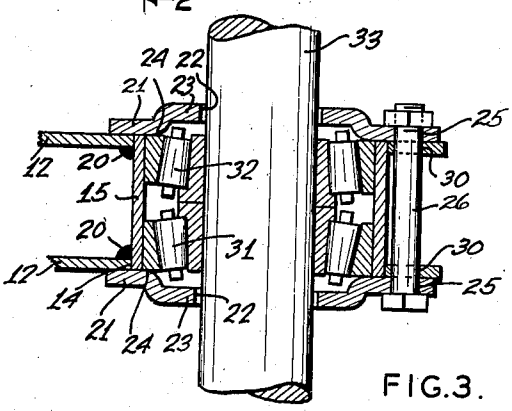

FIG. 3.

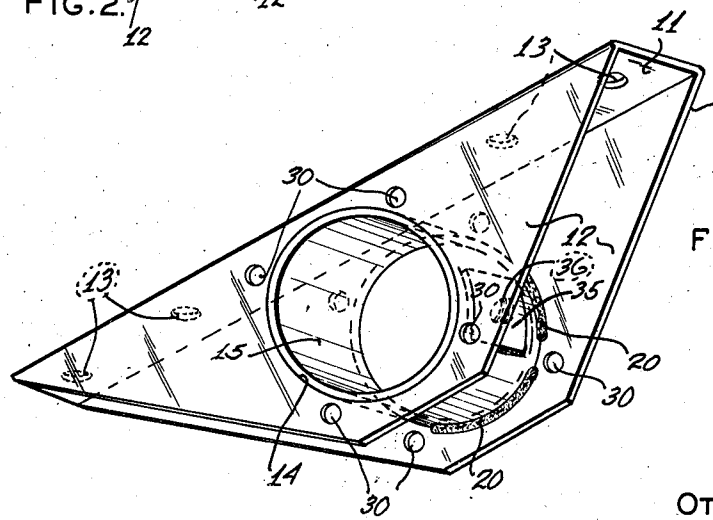

FIG. 4.

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SHEET METAL JOURNAL BOX

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4 Claims. (Cl. 308—180)

This invention relates to sheet metal journal boxes, and more particularly to an improved journal box construction which is adapted for embodiment in axle bearings for light railway rolling stock, for example, motor-driven railway inspection cars or the like. The invention is however fully adaptable to the construction of shaft journals for a wide variety of uses.

Journal boxes for vehicle axles, and most other usual forms of shafting, have heretofore been formed entirely or substantially so, to consist of or include a cast journal element, such as a malleable steel casting. The cost of such elements is considerably more than twice that of a fabricated sheet steel and tubing assembly such as herein disclosed, and particularly for the lighter types of service, offers a number of advantages in use. It is accordingly a primary object of the invention to reduce the costs of construction of journal boxes for shafting and axles in certain fields of service.

Ancillary to the object above stated, the present development has as a further objective, the production of a low cost yet light weight, rugged journal box, which is or may be formed of standard, readily obtainable stock sheet and tubing elements, the latter being formed up by inexpensive pressing, shearing and similar operations.

Yet another object of the invention is attained in a structure of the type referred to in the foregoing object, and in which the parts are or may be assembled entirely by welding, and without necessitating any expensive machining operations.

Because of the facilities above briefly mentioned for forming the device of the present invention entirely of sheet and tubular materials of standard or stock types, the manufacturing inventories of materials may be considerably reduced, similarly objectively attaining a much lower cost than possible by the use of cast journal elements, a larger production inventory of which is generally required.

The foregoing and numerous other objects will appear from the following detailed description of a preferred embodiment of the invention as incorporated in a journal assembly for railway motor car axles or the like.

In the accompanying drawing, Fig. 1 is a side elevation of a journal box assembly constructed in accordance with the present improvements, portions of the box being broken away and showing in section some of the parts internally thereof; Fig. 2 is a section taken transversely of the journal box assembly along staggered planes, particularly along the line 2—2 of Fig. 1; Fig. 3 is a section of a portion of the assembly as viewed along line 3—3 of Fig. 1, and Fig. 4 is an elevation in perspective of the journal box or housing assembly with bearings, closure plate and shafting removed therefrom.

Referring now by characters of reference to the drawing, a journal box, housing or body element may be formed up say of ⅛" sheet steel to constitute a blank of generally rectangular shape, triangular portions of which are cut from the corners. Along a pair of parallel rectilinear zones the sides of this blank are bent or folded at right angles to its remaining intermediate portion, from which the latter portion results in a bridge or securement portion of the journal box, indicated generally at 10, while the bridge portion is shown at 11. From the substantially right angle bend imparted to the side elements, results the flanges 12 which, in assembly, constitute vertical plate members spaced apart in accordance with the width of the bridge 11. Due to the removal of the triangular portions on the corners of the original rectangular blank, there results a housing structure or box which may be designated as having a truss shape, being of tapered depth or vertical dimension from its center portion to each of its ends. For assembly of the journal box to its operative position beneath the car frame or sill, the bridge 11 is provided with a row of openings 13 adapted for the reception of bolts or rivets.

Through the center portion, or part of greatest depth of each of the flanges 12, there is drilled or cut, an opening of substantial size indicated at 14, these openings serving, as will later appear, to permit the introduction of the shaft or axle with the bearing thereon, to the central portion of the box.

Bridging the side flanges 12 of the box or housing 10, is a length of preferably seamless metal tubing, which may be of a standard stock type, and thus readily available at a low cost. The tubing element is selected as to dimensions, in accordance with the size of the bearing element to be carried thereby, and is generally indicated at 15. By further preference the section of tubing 15 is of such length as not only to bridge the opposite flange elements 12 of the housing, but to project at least therethrough, the diameter of openings 14 being such that the tubing is closely embraced at its ends by the metal about the openings, preferably with a driven fit, yet without any distortion of either the flanges or

tubing section. Securement of the tubing into permanent assembly with the housing, specifically the flanges 12 thereof, is effected through lines of welding metal in the form of fillets 20. These lines of welding metal are of arcuate trend, and are preferably built up on the inside surfaces of the flanges 12, where the latter corners with the outside surface of the tube 15. It will appear that this arrangement makes for a sturdy, low-cost, rugged construction and one which is excellent in appearance since the fillets are normally concealed from view. The arrangement also has a distinct advantage in that since the tube 15 bears directly against the metal of the flanges 12, the flanges proper receive the load from both sides of the bearing, so that little or no direct strain is imparted to fillets 20, which serve primarily an assembly purpose.

It will have appeared that the assembly thus far outlined serves to provide a box or receptacle for the bearings proper and the shaft or axle portion therein; otherwise expressed, the cylindrical chamber within the tube 15 constitutes a bearing pocket. In case the wall of the tubing stock is not of sufficiently uniform thickness to provide a bearing pocket of uniform dimensions for the intended usage or service, it is desirable, and usually preferred, to machine the inside surface of the tube to a substantially uniform circular contour, and at the same time give assurance of rounding off the inner surface of the bearing pocket to remove any uneven portions which might exist in standard tubular stocks.

The arrangement described has been designed particularly for, although not restricted to, use with a double tapered roller bearing assembly, substantially of the type illustrated, and to complete the closure of the bearing pocket at its ends and about the axle or shaft, there are provided a pair of detachable closure plates indicated generally at 21. These plates may be formed of pressed or punched sheet metal stock, and each is characterized by a central shaft opening 22, and about this opening, an annularly depressed portion, projecting in a direction outwardly of the bearing pocket, and indicated at 23. The resulting shoulder 24 interiorly of the end closure plates, aids in positioning the assembly of roller bearings within and axially of the bearing pocket. For detachable assembly of the end closure plates 21 there are provided a plurality, preferably four, bolt openings 25 for the reception of holding bolts 26. To effect attachment of the closure plates to the flanges 12 of the journal box or housing, the flanges 12 are provided with a series of bolt openings 30 formed by drilling or punching, the arrangement and preferably the size of openings 30 being such that they register and cooperate with the openings 25 for reception of the bolts 26.

The paired roller bearing assemblies including their inner and outer race elements, etc. are indicated generally at 31 and 32. Since these are or may be of standard form and of types readily obtainable on the market, constituting of themselves no part of the invention, they need not be described in detail. Their assembly and relation to the shaft or axle 33 being conventional, similarly needs no description.

The manner of fabricating the journal box heretofore described by parts, is believed to have been rendered fully apparent. It may, however, be noted for completeness that as to final assembly, the roller bearing assemblies are inserted over the shaft or axle 33 which, with the bearings, are then extended through the bearing pocket and the bearings brought to position therein. The closure plates 21, then or previously having been inserted over the opposite ends of the axle or shaft 33, are brought into position so that their bolt openings register with those in the flanges 12, following which the bolts 26 are introduced through the mating openings and the nuts threaded up thereon.

Although any suitable or desired provision for lubrication may be made, it is a preference to form on the external cylindrical surface of the tube 15 and intermediate the side flanges 12 of the housing, a boss for the reception of a grease fitting which may be and by preference is of standard type. Provision for the boss is made, for example, by bending up one or more rectangular elements of sheet steel on a radius to conform with the surface of the tube, these pieces being of the thickness approximately desired for the boss. A convenient arrangement and location of boss is as indicated at 35. After welding the patches or boss-forming sheets 35 into securement with the tube 15, the boss-forming metal and the wall of the tube 15 are drilled to provide an opening 36, the latter subsequently being tapped to receive the grease fitting. It is preferred that, in case the boss is provided, it be formed on the tubing element 15 for convenience prior to assembly of the tube to the flanges 12, and by great preference, prior to any internal machining of the tube.

It will have appeared from the foregoing description that the features of the present design serve fully to attain each of the objects hereinabove expressed, as well as those implied from the more detailed description.

Although the invention has been described by making specific reference to a preferred embodiment designed for a specific use, the detail of description is to be understood solely in an illustrative, and not in a limiting sense, as many changes may be made within the scope of the claims hereunto appended.

I claim:

1. In a journal and journal box assembly for an axle of a light railway vehicle, an inverted channel member formed of a sheet steel stock, the opposite flanges thereof being substantially parallel, and being provided with substantially large registering journal-receiving apertures, a length of tubing bridging the flanges, extending substantially through the apertures, and being secured to the flanges by lines of welding metal along the zones of juncture of the tubing and flanges, a pair of opposed tapered roller bearing assemblies in the tubing element, and a pair of centrally and circularly shouldered plates provided with central apertures to receive the axle, said plates and flanges being provided with registering bolt openings and bolts therein for detachably securing the plates in assembly to the flanges as closure elements for the opposite ends of the journal assembly, the bolts each extending through both plates and both flanges in regions adjacent the tubing element.

2. In a journal box and bearing assembly of fabricated type, for an axle of a motor-driven railway inspection car or the like, an inverted channel-shape journal housing formed of sheet steel stock and characterized by an upper bridge and flange elements depending therefrom, the bridge being apertured for the reception of rivets or the like, for securement to the car frame, the flanges being provided with apertures of substantial size for reception of a journal assembly, a length of seamless metal tubing bridging the

flanges, extending through said apertures and having a driven fit therein, lines of welding metal securing the tubing near its opposite ends, to the flanges, an axle and bearing within the tubing, closures for the ends of the tubing serving to complete the closure of the bearing, the flanges and both closures being provided with a series of registering bolt openings, and bolts extending therethrough, each bolt being in holding engagement with both closures, and coacting with the closures and flanges as a transverse reinforcing element near the tubing.

3. A journal box for an axle of a railway motor car or the like, the journal box consisting of an inverted U-shaped or channel member including a bridge element and parallel spaced flange elements arranged for mounting below a frame member or sill of the car, the bridging element being provided with a row of bolt or rivet openings lengthwise thereof for assembly elements, the center portions of the flange elements being of greater depth than the end portions and provided in such center portions with large registering openings, a length of seamless tubing extending through and tightly fitted at its ends in both of said openings, and fillet welded to the flanges along arcuate zones of their juncture interiorly of the journal box, the length of tubing being machined internally to provide a bearing pocket of substantially regular and uniform circular section, journal cover plates having a plurality of matching bolt openings, the flanges being provided with similar registering openings, and bolts securing the covers to the flanges over the ends of the tubular journal pocket constituted by said length of tubing, the bolts being located exteriorly of and adjacent to the tubing element, and extending through the covers and said flange elements and serving transversely to reinforce the length of tubing and the channel member.

4. A journal box structure formed entirely of sheet steel and tubing stock, and essentially characterized by a pair of spaced vertical flange elements apertured and bridged in their apertured zones by a length of tubing welded to the flanges to provide a journal pocket, together with closure plates for said pocket, substantially as herein shown and described.

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