HINGE AND ROLLER CARRIER ASSEMBLY
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This invention relates to overhead door hardware, and particularly to the brackets and hinges affixed to a sec-
tional overhead door for supporting rollers adapted to ride in guide tracks.
An object of the present invention is to provide an im-
proved hinge and roller carrier assembly which simplifies assembly of overhead sectional doors and also reduces the number of different hinge parts required for a given door assembly.
Other objects as well as features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accom-
panying drawings wherein:
FIG. 1 is a vertical center section through a portion of an overhead sectional door assembly shown in closed position relative to a door opening and supported on guide tracks, with the hinge and roller carrier assembly of the present invention shown installed on the door.
FIG. 2 is a fragmentary perspective view of a hinge and roller carrier assembly constructed in accordance with the present invention mounted on an overhead door in as-
sembled and installed relation with a roller and guide track for the door.
FIG. 3 is a perspective view of a roller carrier subassembly of the hinge and roller carrier assembly.
FIG. 4 is a perspective view, similar to that of FIG. 2, but with the roller carrier removed to illustrate the upper and lower leaves of the hinge assembly positioned for installation on their respective door sections.
FIG. 5 is a vertical sectional view taken on the line 5—5 of FIG. 2, and further illustrating in phantom the roller carrier positioned for assembly to the door leaves of the hinge and roller carrier.
FIG. 6 is a plan view of a mounting bracket component of the roller carrier subassembly.
FIG. 7 is a plan view of the lower leaf of the hinge and roller carrier assembly.
FIG. 1 illustrates a typical overhead door installation which includes a framed door opening defined by side jambs 10 and a head jamb 12. A sectional overhead door 14 comprises a plurality of successively adjacent panels 16, 18 and 20 mounted for operation in support tracks 22, the tracks 22 being disposed one at each side of the door opening and rearwardly adjacent the confronting side jambs 10. The individual door panels 16, 18 and 20 are hinged together in horizontal edge-to-edge relation for articulated operation by hinge structure which, along the opposite vertical side edges of the panels, comprises hinge and roller carrier assemblies 24 and 26 of the present in-
vention. Assemblies 24 and 26 are each adapted to receive a track roller unit 28 comprising a round axle or shaft 30 to which a roller 32 is mounted, as shown in FIG. 2, the roller being confined for rolling, guided movement in the associated track 22. A roller support bracket 34 (FIG. 1) of conventional construction may be secured to the uppermost door panel 16, and a similar bracket secured to the lowermost door panel, one at each of the opposite side edges thereof, in order to complete the roller sup-
ports for door 14. Track 22 is inclined slightly rearwardly from jambs 10 and traverses an arc adjacent head jamb 12 before progressing inwardly from the door opening. To accommodate this conventional arrangement, roller support structures 26, 24 and 34 are adapted to support their respective roller units 28 at progressively greater dis-
tances from the door so that it is supported vertically as it comes to closed position against side jambs 10. Suitable door counterbalance structure (not shown) is provided to complete the door installation in accordance with well
known practice.
Referring to FIG. 2, an exemplary but preferred em-
bodyment of the hinge and roller carrier assembly 24 of the present invention is shown in assembled relation with the door, track and roller unit. Assembly 24 comprises four principal parts; an upper hinge leaf 36, a lower hinge leaf 38, a roller carrier 40 and a plate 42. As best seen in FIGS. 4 and 5, leaf 36 comprises a generally rectangu-
lar plate 44 preferably stamped from sheet steel or the like to first form a pair of extensions at the lower edge thereof which are then curved back upon themselves to provide a pair of integral hinge eyes 46 and 48. A suitable array of holes 50 are punched in plate 44 for receiving fasteners such as rivets or, as shown herein, bolts 52, 54 and 56 (FIGS. 2 and 5) therethrough which receive nuts for mounting leaf 36 to the rear face of the end stile 58 of panel 16 with the axis of eyes 46 and 48 aligned with the junction point of panels 16, 18.
As best seen in FIGS. 4, 5 and 7, leaf 38 also has a generally rectangular flat plate portion 60 which is pro-
vided with three holes 61 adapted to receive suitable fasteners such as rivets in the case of metal or plastic doors, wood screws in the case of wood doors or, as shown herein, screw head bolts 64 individually ther-
rough for mounting leaf 38 to the rear face of end stile 62 of panel 18. A curled back integral hinge eye 64 is
provided at the center of the upper edge of leaf 38 which preferably has an axial dimension greater than that of eyes 46 and 48, for example three-quarters of an inch as compared to one-half inch. Eyes 46 and 48 are spaced axially apart a distance sufficient to provide a gap of say one-half inch on either side of eye 64 when the latter is coaxially aligned between eyes 46 and 48 when panels 16, 18 are brought into edge-to-edge assembled relation.
The lower edge of leaf 38 is bent out from the plate of plate 60 at a bend line 68 and then reversely bent at 70 (FIGS. 4 and 5) to provide an offset portion 72 which is disposed parallel to and spaced from the surface of style 62 by a distance of, for example, one-eighth of an inch. A pair of laterally spaced rectangular holes 74 and 76 are punched through portion 72, preferably in vertical align-
ment with the aforementioned spaces between eyes 64, 46 and 48.
Roller carrier 40 preferably comprises a two part sub-
assembly (FIG. 3) made up of a mounting bracket 80 and a sleeve 82. Bracket 80 is shown by itself in FIG. 6 and consists of a flat rectangular base portion 84 and a spaced pair of triangular ears 86 and 88 bent up perpen-
dicularly from the side edges of base 84. If desired, a pair of suitable stiffening beads 90 and 92 (shown only in FIGS. 3 and 6) may be die formed at the junction of ears 86, 88 and base 84. Ears 86 and 88 are provided with coaxially aligned holes 94 and 96 respectively (FIG. 6) for receiving sleeve 82 therethrough (FIGS. 2 and 3). Sleeve 82 is secured in place by a flange 98 which overlaps the outer face of the outboard ears 88, and by ex-
panding the inner end of sleeve 82 into hole 94. The upper edge of the base 84 has a pair of coaxial hinge eyes 100 and 102 formed from extensions thereof which are curved back under themselves as best seen in FIG. 3. Ears 100 and 102 are spaced apart a distance slightly greater than the axial dimension of ear 64 and are adapted to closely interfit between ear 64 and ears 46 and 48 as best seen in FIG. 2. A pair of tongues 104 and 106 extend from the lower edge of base 84, apposing from ears 100 and 102, the tongues being formed from extensions which are bent downwardly in the opposite direction from ears 86 and 88 and reversely bent to project at their ends parallel to plate
portion 84. Tongues 104 and 106 are suitably spaced and dimensioned to be received in holes 74 and 76 respectively of leaf 38 as illustrated in FIGS. 2 and 5, the ears being offset from base 84 for a distance slightly greater than the thickness of portions 72 and portions 84 (FIG. 5).

Preferably, the above-described hinge and roller carrier assembly of the present invention is assembled with the components of an overhead door assembly in a two stage operation. The first stage occurs during manufacture of the individual door panels 16, 18, and 20 at the factory where the end styles 88 and 82 are drilled or otherwise prepared to receive the fasteners which mount leaves 44 and 38 respectively to leaflets. From the foregoing description, it will be seen that a pair of upper hinge leaves 44 are mounted one on each end style at the lower edge of panel 18, and a pair of upper hinge leaves 38 are mounted one on each end style at the upper edge of panel 18. Intermediate hinge leaves of a conventional nature (not shown) are also mounted as required along the lower and upper edges of panel 18 between the end hinge assemblies. The top and bottom panels are similarly equipped but only with upper leaves 36 at the lower edge of the top panel and lower leaves 38 at the upper edge of the bottom panel. The door panels with the aforementioned hardware mounted thereon are then packaged for shipment to the erection site along with the remaining hardware components required for a complete door installation, this loose hardware including a set of roller carriers 40 and pintles 42.

The second stage of assembly occurs at the place where the door is to be installed by a field erection crew. Panels 20 and 18 with the aforementioned factory installed hardware thereon are brought into edge-to-edge relation for assembly as illustrated in FIG. 4 with the eyes 46 and 48 of the upper leaf in coaxial alignment with the eye 64 of the lower leaf. An appropriate roller carrier 40 is then assembled to leaves 36 and 38 by first inserting tongues 104 and 106 into holes 74 and 76 of leaf 38, this being done by positioning portion 84 in the upwardly inclined position illustrated in phantom in FIG. 5. As tongues 104 and 106 are passed through holes 74 and 76, carrier 40 is pivoted upwardly until base 84 and eyes 100 and 102 are brought into interdigital and coaxial registry with eyes 44 and 48. Then a standard hinge pintle 42 is inserted endwise through the five aligned eyes 46, 100, 64, 102 and 48, thereby positively interconnecting the three main parts of the hinge assembly and forming a hinge connection between panels 16 and 18. Shaft 30 of the roller unit 28 may then be inserted into the overhead end of sleeve 82. The conventional hinges intermediate the side edges of the panels are interconnected by slipping the associated pintles therein. The above procedure is then repeated as succeeding panels are brought into associated relation with their associated adjacent panels to complete the assembly of the sectional overhead door.

In some instances, a special bracket 34 (FIG. 1) is installed in the field adjacent the upper edge of the upper door panel 16 to support the uppermost roller unit 28. Alternatively, a lower hinge leaf 38 may be mounted in place of bracket 34 and an appropriate roller carrier 40 mounted thereto as described above, a pintle 42 being inserted through the eyes 100, 64 and 102 of these two parts to merely form a roller support rather than a combined hinge and roller assembly. The track sections 22 may then be slipped over the protruding rollers 30 of the assembled door and mounted in a conventional manner.

From the foregoing description, it will now be understood that the hinge and roller carrier assembly of the present invention greatly simplifies field assembly of overhead sectional doors and the like. The work of drilling the door panels and mounting the upper and lower hinge leaves thereto may be all performed in the factory and much fastening work may be performed by automated machinery rather than by expensive and time consuming hand procedures customarily employed in the field. In addition, the amount of skill required to assemble the door in the field is reduced since no tools, or at most only a hammer, may be needed to insert the pintle into the hinge eyes. The economy provided by the hinge assembly of the present invention is illustrated by the fact that in the case of an average 12 ft. by 12 ft. commercial sectional door, the field labor involved in handling and working with 100 nuts and bolts is eliminated. Moreover, machine installed fasteners such as rivets or spot welds may be employed to mount leaves 36 and 38, procedures which are not possible in the case of field fastened hinges.

In addition to simplifying and reducing the cost of field installation, the hinge assembly of the present invention provides substantial economy in manufacture since, for a given door, identical upper and lower leaves 36 and 38 may be used in each of the hinge and roller carrier assemblies. The only part which must be made in different sizes is the roller carrier 40, the variation in this part being ears 86 and 88 which are made progressively longer for each higher hinge assembly to progressively increase the spacing of shafts 30 from the door to thereby accommodate the inclination of tracks 22 from the vertical plane of the door jamb 10.

What is new is,

1. A combined hinge and roller carrier assembly adapted for use with overhead doors of the articulated panel type comprising a first hinge leaf adapted to be secured to the inner face of a door panel, a second hinge leaf adapted to be secured to the inner face of an adjacent door panel, a roller carrier juxtaposed on said second leaf, said leaves and roller carrier having hinge eyes adapted for interdigital and coaxial registration and a hinge pintle inserted through said hinge eyes to thereby articulately interconnect said first leaf to said second leaf and said roller carrier, said carrier and said second leaf having means for engaging a tongue and slot connection spaced from said hinge eyes whereby said pintle and said tongue and slot connection cooperate to secure said carrier in fixed relation to said second leaf.

2. The assembly as set forth in claim 1 wherein said second leaf has a plate portion adapted to lay flat against the door panel and said means for engaging a tongue and slot connection comprises an edge portion of said second leaf disposed remote from said hinge eyes, said edge portion being parallel to and offset from said plate portion of said second leaf in a direction away from the door panel, said edge portion having a pair of holes therein, and a pair of S-shaped tongues extending from an edge of said roller carrier remote from said hinge eyes and offset toward said second leaf such that said tongues are adapted for insertion through said holes when inclined to said second leaf and are thereafter trapped in the space between said offset portion and the adjacent door panel when said carrier is brought into assembled juxtaposed relation with said leaves with said hinge eyes registered.

3. The combination set forth in claim 2 wherein said carrier comprises a rectangular base, a pair of ears extending perpendicularly one from each of a pair of opposite side edges of said base, said ears each having a hole therein, said holes being coaxially aligned, and a sleeve inserted through said holes for journaling an axial shaft of a roller assembly therein.

4. The combination set forth in claim 1 wherein said first leaf comprises a flat generally rectangular plate having a pair of curved back extensions at one edge thereof to form first and second axially spaced hinge eyes, whereupon said second leaf comprises a generally rectangular flat plate having a curved back extension forming a third hinge eye extending centrally from an edge thereof and having an offset portion at an edge thereof remote from said third hinge eye with a pair of holes therein, and wherein said roller carrier comprises a flat generally rectangular base with an ear bent up along each side thereof, a pair of curved under extensions forming fourth and fifth
In a sectional overhead door installation, the combination comprising track means, an overhead sectional door comprising a plurality of successive and adjacent disposed door panels supported along the side edges thereof by said track means, and hinge means connecting adjacent panels for articulated operation thereof, said hinge means including at the side edges of said door panels a combined hinge and track roller supporting assembly including a first hinge leaf secured to the inner face of a door panel, a second hinge leaf secured to the inner face of an adjacent door panel, a roller carrier fixed on said second hinge leaf and having a sleeve spaced outwardly from said second hinge leaf and extending parallel to the articulation axes of the door panels, a roller unit including an axle shaft journaled in said sleeve and a roller guided by said track means, said leaves and said roller carrier having hinge eyes interdigitally and coaxially registered, a common pintle removably received axially through said hinge eyes, said carrier and said second leaf having means forming a disconnectable tongue and slot connection therebetween spaced remote from said hinge eyes whereby said carrier is secured in removably fixed relation to said second leaf by said hinge eyes and pintle and by said tongue and slot connection.

The combination set forth in claim 5 wherein said track means are inclined downwardly and forwardly relative to a door opening closed by said door and said door comprises at least three of said panels consisting of lower, middle and upper panels in successive superadjacent relation, and wherein said hinge means comprises a first pair of said assemblies disposed at the articulated connection of said lower and middle panels, one at each of the opposite side edges of said lower and middle panels, a second pair of said assemblies disposed at the articulated connection of said middle and upper panels, one at each of the opposite side edges of said middle and upper panels, said first leaves of said first and second pairs of assemblies being identical to one another and said second leaves of said first and second pairs of said assemblies being identical to one another, said carriers of said first pair of said assemblies having said sleeves thereof spaced a shorter distance from the associated second leaf than said sleeves of said second pair of assemblies to thereby support said panels in a vertical array on said inclined track means in the closed position of said door.