Nov. 20, 1951 E. DONNELLEY 2,575,751

ADJUSTABLE DUNNAGE APPARATUS

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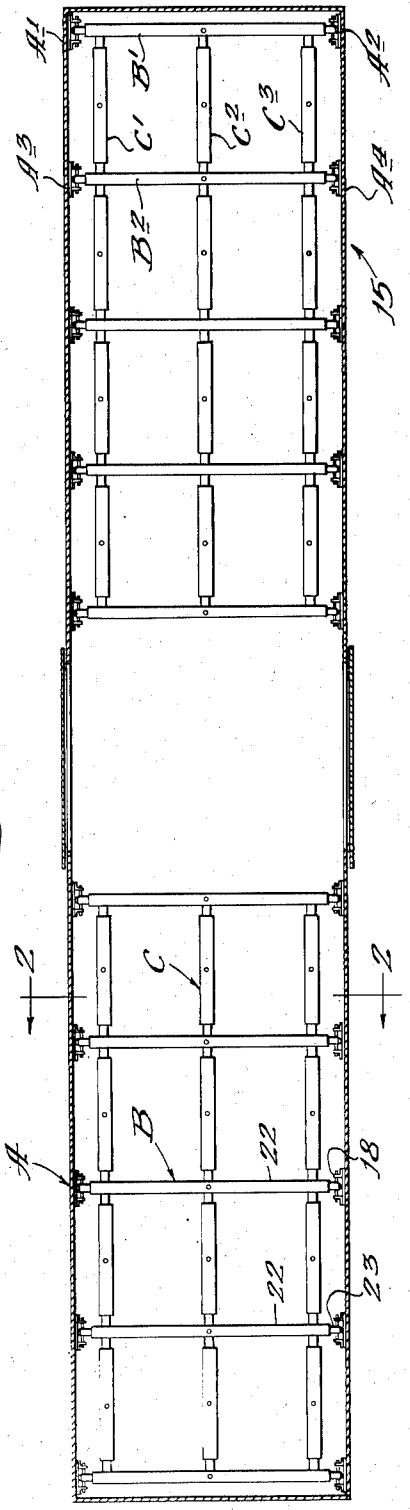

Fig. 1.

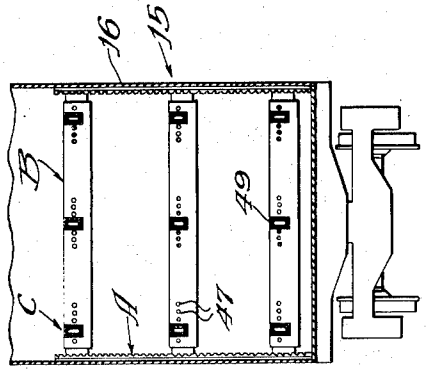

Fig. 2.

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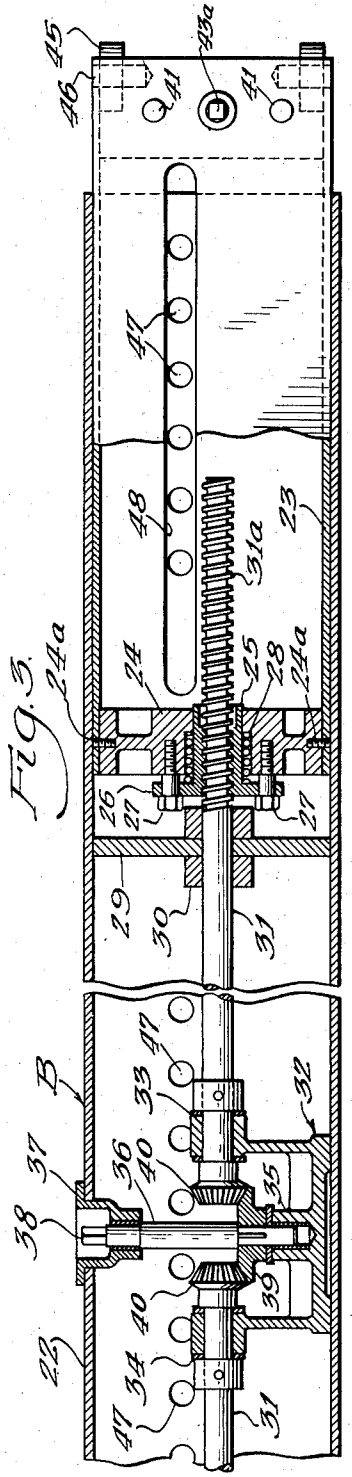

Fig. 3.

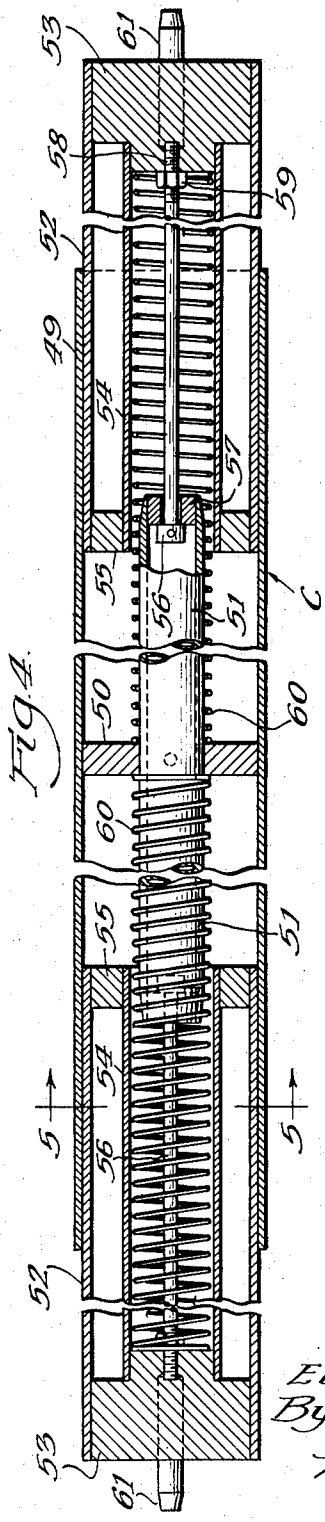

Fig. 4.

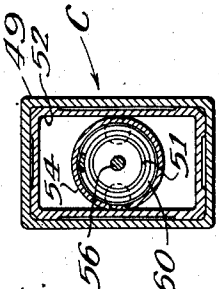

Fig. 5.

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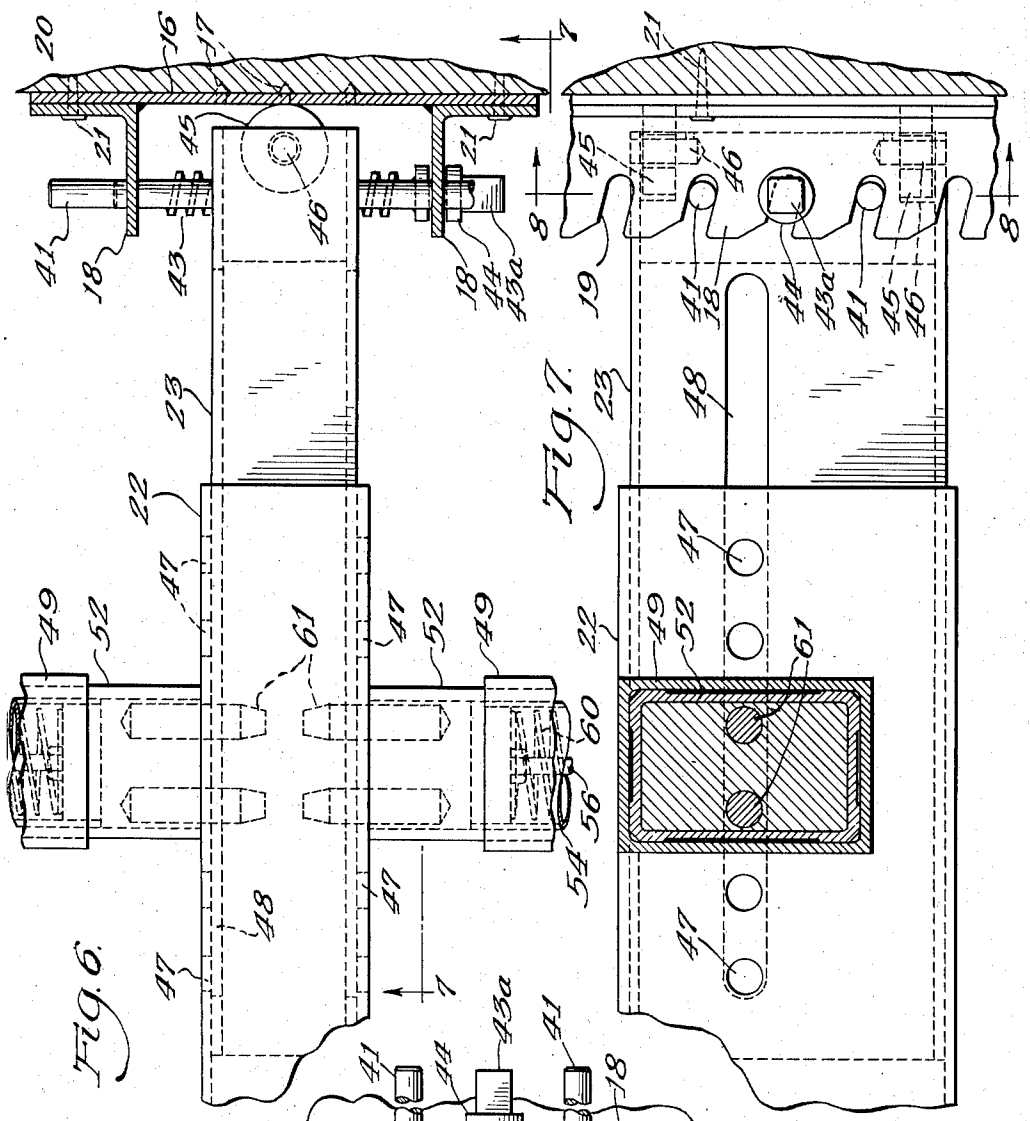

Fig. 6.

Fig. 7.

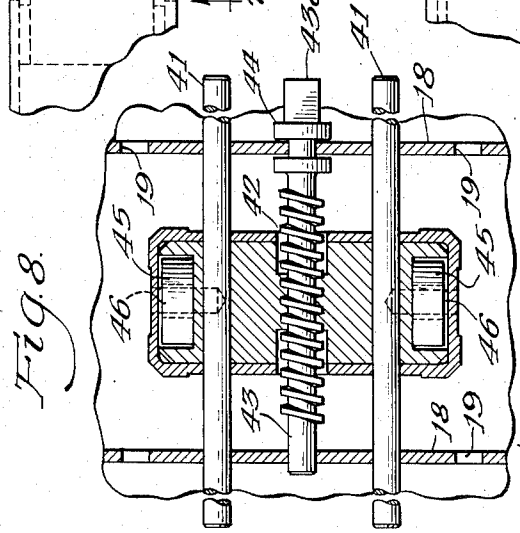

Fig. 8.

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ADJUSTABLE DUNNAGE APPARATUS

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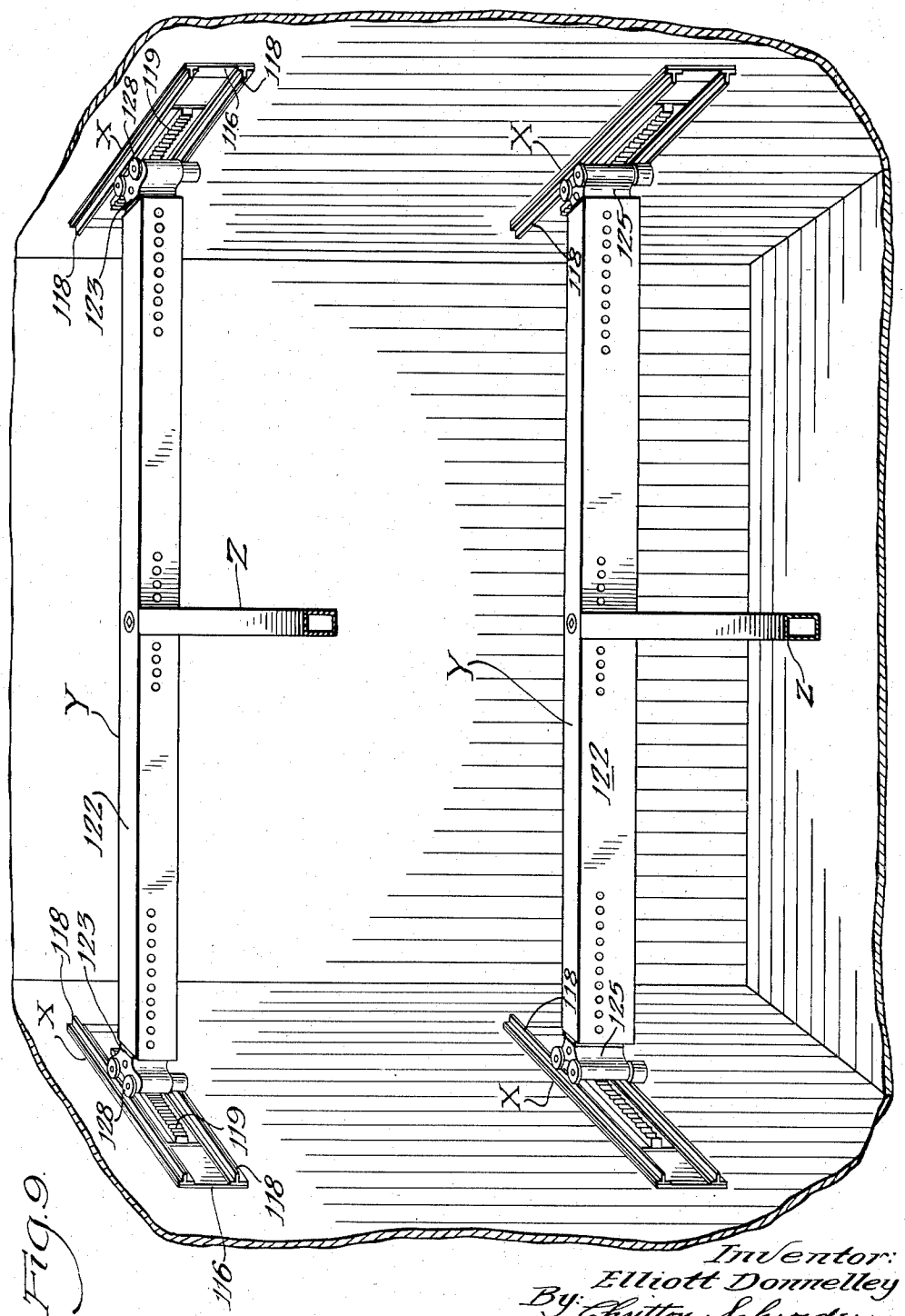

FIG. 9.

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Fig. 10.

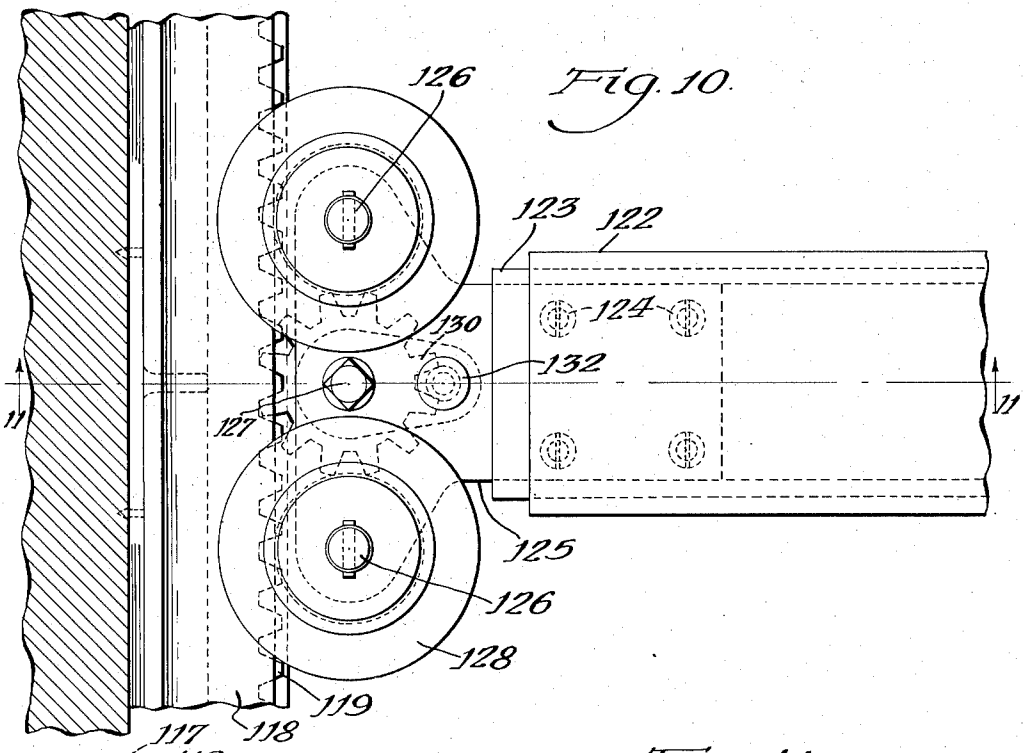
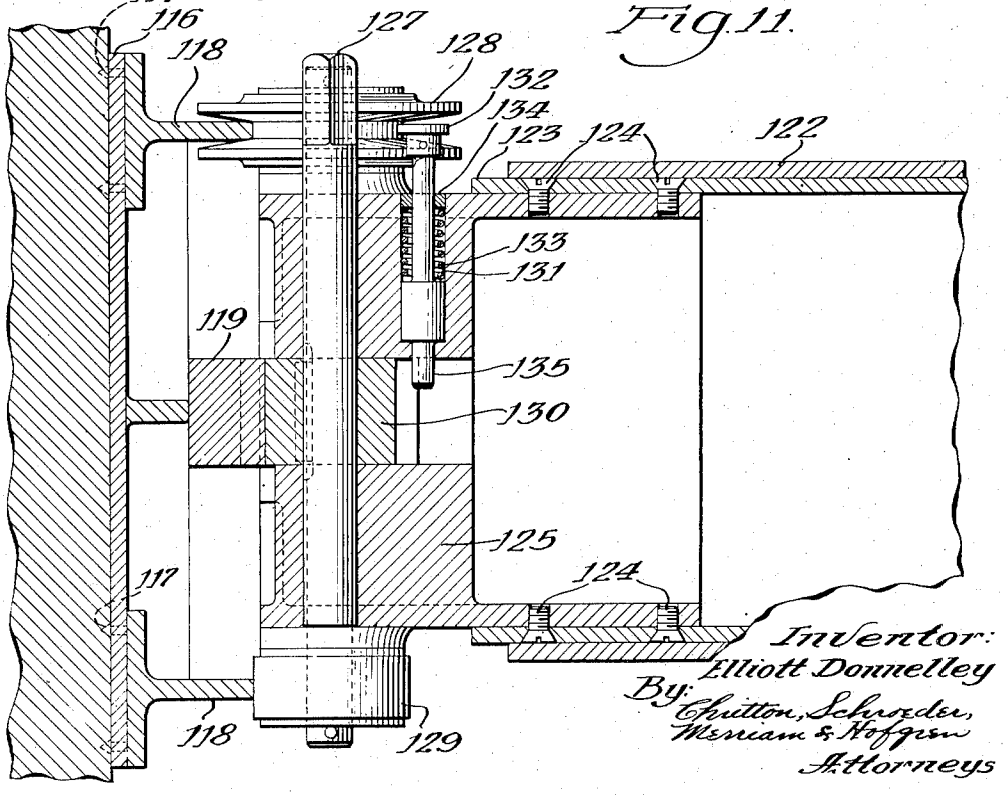


Fig. 11.



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2,575,751

ADJUSTABLE DUNNAGE APPARATUS

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Application December 1, 1948, Serial No. 62,926

22 Claims. (Cl. 105—369)

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This invention relates to adjustable dunnage apparatus which may be used in box cars or vans to replace the customary wooden bracing and similar temporary dunnage.

The principal object of the invention is to provide lightweight dunnage members which may be temporarily secured within a box car or van.

A further object is to provide an arrangement of adjustable dunnage in which the supporting members are retained in position against the walls of the car principally by endwise thrust of main braces disposed therebetween.

A further object is to provide dunnage apparatus in which cross-arms may be readily disposed between adjacent main braces so as to give lateral stability to a load.

The invention is illustrated in a preferred embodiment and an alternative embodiment in the accompanying drawings, in which:

Fig. 1 is a plan view of the preferred form of the invention installed in a railway box car, the top of the car being removed for clarity of illustration; Fig. 2 is a section taken as indicated at 2—2 of Fig. 1; Fig. 3 is a fragmentary elevational view of a main brace partly in section; Fig. 4 is a fragmentary vertical sectional view of a cross-arm; Fig. 5 is a section taken as indicated at 5—5 of Fig. 4; Fig. 6 is a fragmentary plan view of a main brace with the flanking cross braces in position; Fig. 7 is a section taken as indicated at 7—7 of Fig. 6; Fig. 8 is a section taken as indicated at 8—8 of Fig. 7; Fig. 9 is a fragmentary perspective view of one end of a box car illustrating a modified form of the invention; Fig. 10 is a fragmentary plan view of the modified form of supporting member and main brace; and Fig. 11 is a section taken as indicated at 11—11 of Fig. 10.

Referring to the drawings in greater detail, the invention is illustrated as applied to a box car, indicated generally at 15 and consists of three principal elements—supporting members A, main braces B, and cross-arms C.

As best seen in Figs. 2 and 6 to 8, inclusive, each supporting member A in the preferred embodiment comprises a main plate 16 which is of sufficient length to extend from the floor to the top of the normal loading zone of a box car, said plate being provided on its rear surface with a plurality of short, spaced teeth 17 to engage the wall of the car and resist lateral displacement of the supporting member. Welded to the front of the main plate and extending the length thereof are a pair of spaced angle irons 18 provided along their projecting edges with a series

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of registering pairs of hook-like serrations 19. With respect to the body of the box car, therefore, the serrations face inwardly. A few holes 20 extend through the angle irons and main plate to accommodate nails 21 by which the supporting member A may be lightly secured to a wall of the box car. The supporting members are ordinarily disposed in opposed pairs as seen in Fig. 1, and the nails 21 are employed only for a temporary mounting while the main braces B are being put into place, the principal retaining means for the supporting members being the endwise thrust of the main braces as will be more fully explained hereafter.

As best seen in Fig. 3, each main brace B comprises a rectangular metal tube 22 which has an extension member 23 telescopically mounted in each of its ends. Preferably the main braces are fabricated from extruded aluminum or magnesium, to minimize deadweight. Inasmuch as the two ends of a main brace are identical, only one-half of such a brace is illustrated in detail and will be described.

Since the supporting members are held in place principally by the thrust of the main braces, the latter must be extensible, and readily retained in any predetermined position. To this end, the inner end of the extension member 23 is provided with an adjusting head 24 held in place by a plurality of set screws 24a. A center bore in the adjusting head 24 carries a threaded insert 25 which has an annular flange 26 by which it is fastened to the adjusting head 24 by means of a plurality of screws 27, the flange also serving to confine a compression spring 28 which surrounds the threaded insert 25. Thus, the threaded insert 25 may be adjusted longitudinally of the main brace by proper setting of the screws 27, and is maintained against displacement by the thrust of the spring 28.

A cross head 29 in the tube has at its center a bearing 30 through which is passed a rotatable shaft 31 having a thread 31a at its outer extremity so as to engage the threaded insert 25 of the adjusting member. The cross head 29 also serves as a stop to limit the retraction of the extension member 23. A bearing block 32 is mounted at the middle of the tube 22 and is provided with lateral bearings 33 and 34 for the threaded shafts 31 and also with a center well 35 to receive a crank shaft 36 which has its upper end rotatably carried in a flanged well 37 mounted in the top surface of the tube 22. The shaft 36 has a projecting square end 38 so that it may be manipulated by a crank and is pro-

vided adjacent its lower end with a bevel gear 39 which meshes with bevel gears 40 on the threaded shafts 31 so that rotation of the crank shaft 36 will cause extension or retraction of the telescoping extension members 23.

As best seen in Figs. 6 to 8 inclusive, the main braces B are provided at their ends with a plurality of spaced projecting pins 41 which are positioned to rest in the hook-like serrations 19 of the supporting members A. Since the main braces B must be set snugly against the adjoining portions of a load, they must be laterally adjustable over a small area. Accordingly, each end of a main brace is provided with a threaded bore 42 through which extends a threaded screw 43 having a peripherally grooved collar 44 adjacent one of its ends, the collar being an appropriate width to engage the angle member 18 immediately adjacent the hook-like serration 19 into which the threaded screw 43 fits. The end 43a of the screw 43 is square to accommodate a crank by which the screw may be manipulated. Thus, the main braces may be laterally adjusted with respect to the angle members 18; and in order that such adjustment may be readily made even when the main braces are thrusting against the supporting members A, the ends of the main braces are provided with rollers 45 mounted on vertical spindles 46 in such a fashion that the rollers project from the ends of the main braces and form the thrust element thereof.

The cross-arms C extend between adjacent main braces B and accordingly the main braces are constructed to accommodate the cross-arms and to retain them against displacement longitudinally of the brace. Ordinarily, proper bracing of a load in a box car or truck will require a cross-arm at each side of the load and one substantially in the center. Accordingly, the tubes 22 of the main braces are provided at the center and adjacent each end of the sidewalls with a series of spaced apertures 47, and the extension members 23 are provided with slots 48 which register with the end series of apertures 47.

As best seen in Figs. 4 and 5, a cross-arm C is formed from a rectangular tubular member 49 having a central cross head 50 from each side of which projects a tubular spring guide 51. A thrust element 52 is telescopically mounted in each end of the tube 49 and has its outer end closed by a headed plug 53 which serves as a seat for a spring well 54. The inner end of the spring well 54 is supported in an annular plug 55 at the inner end of the thrust element 52.

The telescoping elements of a cross-arm C are retained against accidental separation by a long screw 56 which extends through an apertured plug 57 in the end of the spring guide 51. The head of the screw 56 seats on the plug 57 while the threaded end 58 thereof screws into an appropriately located socket in the headed plug 53 of the extension member 52 and is retained by a lock nut 59. A compression spring 60 has one of its ends abutting against the cross-head 50 and has its other end abutting against the top surface of the headed plug 53, the body of the spring being carried on the spring guide 51 and in the spring well 54. A suitable spring will be of sufficient strength to require approximately 20 lbs. compressive force in order to retract the thrust members 52 in the tubular member 49. The end of each cross-arm is provided with a pair of spaced projecting pins 61 which are positioned to penetrate an adjoining pair of spaced apertures 47 in the main braces B.

It is seen from the foregoing description that the adjustable dunnage apparatus may be readily accommodated to various loads and loading conditions. Thus, as seen in Fig. 1, a pair of supporting members A1 and A2 may be placed in opposed positions immediately adjacent the corners of a box car. Main braces B1 are then placed at appropriate intervals along the length of the supporting members A1 and A2—the spacing between main braces being determined principally by the height of the individual units making up the load. A first group of elements forming the load will then be put into position with the back sides of the elements flush against the main braces B1. Supporting members A3 and A4 may then be nailed lightly into position adjacent the forward side of the first portion of the load, and secured in place by means of appropriately distributed main braces B2. In order that the main braces B2 may hold the first portion of the load securely in place they may be adjusted with respect to the supporting members A3 and A4 by means of the threaded screws 43.

Cross-arms C1, C2 and C3 may then be placed between the adjacent main braces B1 and B2 at appropriate intervals to retain the elements forming the first portion of the load against lateral displacement. The cross-arms are readily put into position by inserting the pins 61 into a suitable pair of the holes 47 in the main brace, putting sufficient pressure upon the cross-arms to compress the springs 50, and engaging the pins 61 at the opposite end of the cross-arm with the apertures 47 in the adjoining main brace B2 which are directly opposite those in the main brace B1.

The several groups of elements making up the entire load may thus be strongly braced against lateral or longitudinal displacement by appropriately spaced additional supporting members A, main braces B and cross-arms C.

In the modified form of dunnage apparatus illustrated in Figs. 9, 10 and 11, supporting members "X" are retained in place by the longitudinal thrust of main braces "Y," and the cross-arms "Z" are disposed between adjacent main braces. The cross-arms "Z" are identical with those described for the preferred form, and thus their description will not be repeated here.

Each supporting member "X" consists of a plate 116 provided on its rear surface with a plurality of short, spaced teeth 117, to engage the wall of the car and resist longitudinal displacement of the supporting member. The forward surface of the plate 116 is provided with a pair of spaced horizontal rail members 118 and a gear rack 119 disposed between said rails. The main braces "Y" are similar to the main braces "B" of the preferred embodiment of the invention, except for the engaging elements at the ends of the main braces which make engagement with the supporting members "X." Thus, the main braces "Y" are formed from a plurality of telescoping elements 122 and 123.

Secured to the outer end of each telescoping member 123, as by screws 124, is a yoke element 125 which carries wheel spindles 126 and gear wheel spindle 127, the latter spindle having a square upper end to receive a crank.

Rotatably mounted at the upper end of each of the spindles 126 is a peripherally grooved roller 128 which is adapted to span the upper rail 118, and at the lower end of each spindle 126 is rotatably mounted a roller 129, positioned to bear against the lower rail 118. Mounted on the

spindle 127 is a gear wheel 130 which is positioned to engage the teeth of the gear rack 119.

It will be seen that each main brace may be put into place adjacent a portion of the load in a box car, and its engaging elements brought into thrusting engagement with the supporting members "X" by cranking the telescoping members 122 and 123 to an appropriately extended position, in the same manner as was described for the main braces "B." The main braces "Y" may then be driven close against the adjacent portion of the load by engaging a crank with the upper end of spindle 127 and turning it to drive the gear wheel 130 across the rack 119.

In order to retain the main brace "Y" in the above described position, each yoke member 125 has a central vertical bore 131 above the inner edge of the gear wheel 130 and a pin 132 extending through said bore is pressed downwardly by a spring 133 confined beneath a plug cap 134. The lower end 135 of the pin 132 is shaped to extend between two adjacent teeth of the gear wheel 130 and lock it against rotation. When the gear wheel is being turned by the crank, the spring pressed pin may be held out of engagement by gripping the head thereof and drawing it upwardly against the tension of the spring 133.

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

I claim:

1. Adjustable dunnage apparatus comprising: supporting members adapted to be temporarily secured to the inner walls of a box car in opposed pairs and bearing against structural members thereof, said members having inwardly facing serrated portions; main braces comprising a plurality of telescoping members and having projecting elements at their ends to engage the serrated portions of an opposed pair of supporting members; screw and nut means in said main braces for effecting longitudinal adjustment thereof to provide an outward retaining thrust against the supporting members tending to retain said members against displacement; and cross-arms adapted to be disposed between adjacent main braces, said cross-arms being longitudinally adjustable and having their ends provided with means for engaging said main braces.

2. Apparatus of the character described in claim 1 wherein the main braces are constructed to retain the cross-arms against lateral displacement.

3. Apparatus of the character described in claim 1 wherein the main braces are provided on each side with a plurality of spaced apertures, and the means on the cross-arms for engaging the main braces comprises a plurality of pins adapted to penetrate said apertures.

4. Apparatus of the character described in claim 1 wherein the cross-arms comprise a plurality of telescoping members, means to prevent accidental separation of said members, and springs urging said telescoping members to their most extended positions.

5. Apparatus of the character described in claim 1 wherein the supporting members are normally retained in place principally by the thrust of the main braces and have wall engaging teeth on their rear surfaces to resist lateral displacement.

6. Apparatus of the character described in claim 1 wherein each main brace comprises an elongated metal tube and an extension member telescopically engaging said tube; and the screw and nut means comprises a threaded nut mounted at the inner end of the extension member; a rotatable shaft mounted transversely of the tube and adapted to be turned by a crank, and a longitudinal screw engaging the threaded nut, said screw being operatively connected to the shaft.

7. Adjustable dunnage apparatus, comprising: supporting members adapted to be temporarily secured to the inner walls of a box car in opposed pairs and bearing against structural members thereof, said members having a vertical series of spaced pairs of inwardly facing hook-like serrations; main braces comprising a plurality of telescoping members and having a plurality of laterally projecting studs adjacent their ends adapted to support the braces on the hook-like serrations of the supporting members; means in said main braces for effecting longitudinal adjustment thereof to provide an outward retaining thrust against the supporting members tending to retain said members against displacement; and cross-arms adapted to be disposed between adjacent main braces, said cross-arms being longitudinally adjustable and having their ends provided with means for engaging said main braces.

8. Apparatus of the character described in claim 7 wherein each main brace has a threaded lateral bore adjacent each end with a threaded screw extending therethrough, each screw having a peripherally grooved collar adjacent one of its ends to engage a serration on the supporting member so that rotation of the screw will cause lateral adjustment of the brace in the supporting member.

9. Apparatus of the character described in claim 8 wherein each main brace has a vertically spindled roller projecting from each of its ends so as to permit substantial pressure of the ends of the brace against the supporting members without hindering its lateral adjustment.

10. A main brace for use in adjusting dunnage apparatus having supporting members adapted to be temporarily secured to the inner walls of a box car in opposed pairs and bearing against structural members of the box car, and which supporting members have inwardly facing serrated portions, comprising: a plurality of telescoping members; screw and nut means for effecting relative longitudinal adjustment of said members whereby the brace is adapted to exert a retaining thrust tending to prevent displacement of said supporting members; and projecting elements at the ends of the brace to engage with said serrated portions.

11. A main brace of the character described in claim 10 wherein means are provided at intervals along the length of the brace for interlocking with the ends of a cross-arm so as to retain the cross-arm against movement longitudinally of the brace.

12. A main brace for use in adjustable dunnage apparatus having supporting member adapted to be temporarily secured to the inner walls of a box car in opposed pairs and bearing against structural members of a box car and which supporting members have inwardly facing serrated portions, comprising: an elongated metal tube; an extension member telescopically engaging said tube; a threaded nut mounted at the inner end of said extension member; a rotatable shaft mounted transversely of the tube and adapted to be turned by a crank; a rotatable screw extending longitudinally of the tube

and engaging the nut on the extension member; intermeshing members for transmitting rotary motion from said shaft to said screw whereby when the brace is placed between two supporting members it may be elongated to exert a retaining thrust tending to prevent displacement of said supporting members; and projecting elements at the ends of the brace to engage said serrated portions.

13. A main brace for use in adjustable dunnage apparatus having supporting members adapted to be temporarily secured to the inner walls of a box car in opposed pairs and bearing against structural members of a box car and which supporting members have a vertical series of spaced pairs of inwardly facing hook-like serrations, comprising: a plurality of telescoping members; screw and nut means for effecting relative longitudinal adjustment of said members whereby when the brace is placed between two supporting members it may be elongated to exert a retaining thrust tending to prevent displacement of said supporting members; and a plurality of laterally extending studs adjacent each end of the brace adapted to support the brace upon the spaced pairs of hook-like serrations of the supporting members.

14. A main brace of the character described in claim 13 wherein a threaded lateral bore is provided adjacent each end and a rotatable screw extends therethrough, said screw having a peripherally grooved collar adjacent one of its ends to engage a serration on the supporting member so that rotation of the screw will cause lateral adjustment of the brace in the supporting member.

15. A main brace of the character described in claim 14 which has a vertically spindled roller projecting from each of its ends so as to permit substantial pressure of the ends of the brace against the supporting members without hindering said lateral adjustment.

16. A cross-arm adapted for mounting between parallel, transversely extending main braces in adjustable dunnage apparatus of the character described, comprising: a plurality of telescoping body members; means to prevent accidental separation of said body members; springs urging said telescoping body members to their most extended positions; and means at the ends of the cross-arm to engage the main braces.

17. A cross-arm of the character described in claim 16 wherein the means to engage the main braces comprise a plurality of pins adapted to penetrate spaced apertures in the main braces.

18. Adjustable dunnage apparatus, comprising: supporting members adapted to be tempararily secured to the inner walls of a box car in opposed pairs and bearing against structural members thereof, each supporting member comprising a plate having on its inner surface in spaced relation a pair of horizontal rail members and a horizontal gear rack; main braces comprising a plurality of telescoping members having adjustment means arranged to provide

longitudinal outward thrust of the main braces against the supporting members tending to retain said members against displacement; engaging elements at the ends of said main braces comprising a peripherally grooved roller adapted to span one of the rails on the supporting member, a roller adapted to bear against the other rail, a gear wheel adapted to engage the gear rack, and means for locking the gear wheel against rotation; and longitudinally adjustable cross-arms adapted to engage adjoining main braces.

19. Apparatus of the character described in claim 18 wherein the two rollers are on one spindle and the gear wheel is on a second spindle provided with a projecting end adapted to receive a crank member, and the means for locking the gear wheel against rotation consists of a spring-pressed pin shaped to seat between two adjacent teeth of the gear wheel.

20. A main brace for use in adjustable dunnage apparatus having supporting members adapted to be temporarily secured to the inner walls of a box car in opposed pairs bearing against structural members of the box car and in which each supporting member comprises a plate having on its inner surface in spaced relationship a pair of horizontal rail members and a horizontal gear rack, comprising: a plurality of telescoping members having adjustment means arranged to provide an outward longitudinal thrust of the main braces against the supporting members tending to retain said members against displacement; a peripherally grooved roller adapted to span one of the rails on the supporting members; a second roller adapted to bear against the other roller; a gear wheel adapted to engage the gear rack; and the means for locking the gear wheel against rotation.

21. A main brace of the character described in claim 20 wherein the two rollers are on one spindle, and the gear wheel is on a second spindle provided with a projecting end adapted to receive a crank member, and the means of locking the gear wheel against rotation consists of a spring-pressed pin shaped to seat between two adjacent teeth of the gear wheel.

22. Apparatus of the character described in claim 21 which is provided with a pair of spaced spindles each having mounted upon it a peripherally grooved roller and a second roller.

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