

April 15, 1941.

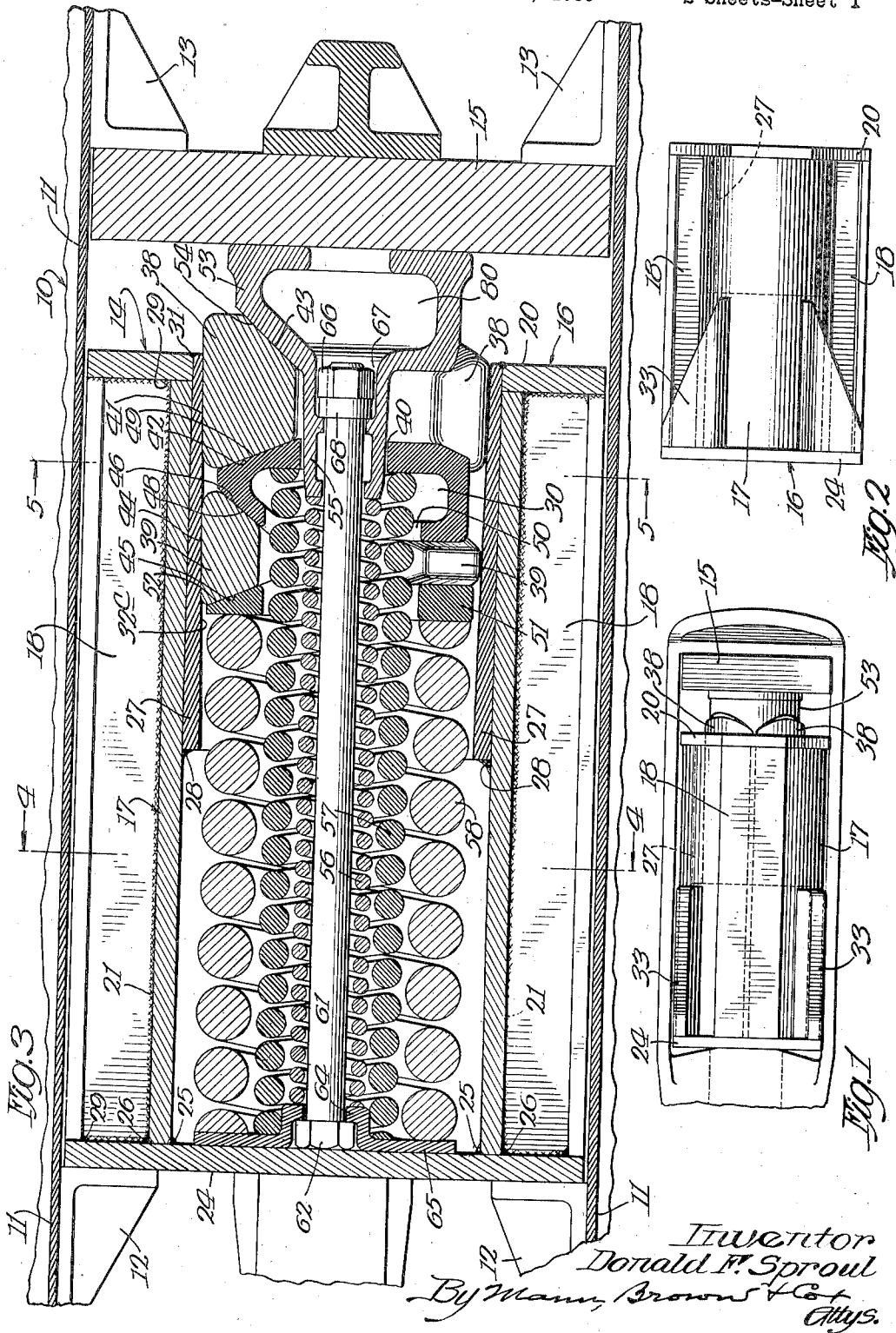
D. F. SPROUL

2,238,083

DRAFT GEAR

Filed Jan. 13, 1939

2 Sheets-Sheet 1



April 15, 1941.

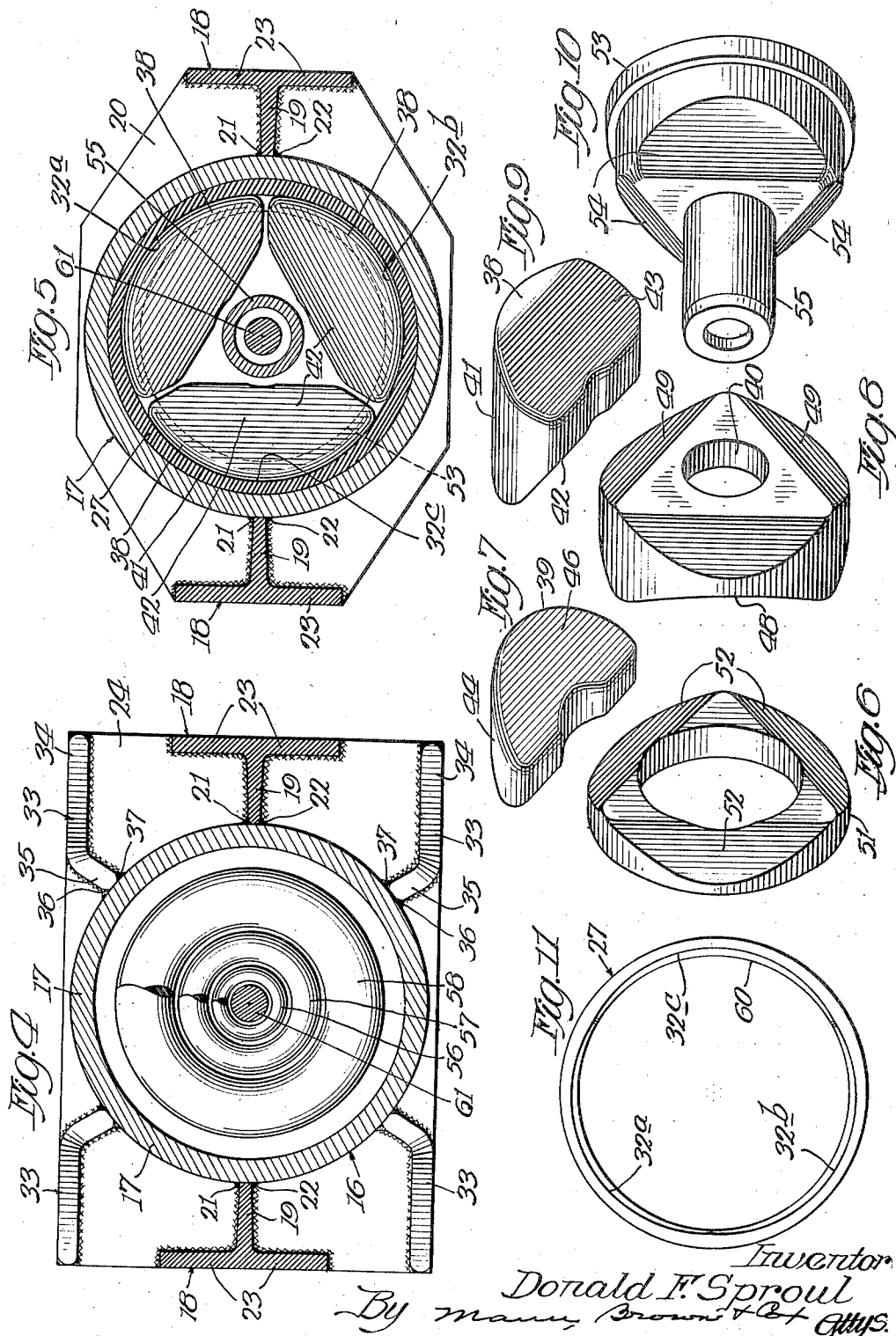
D. F. SPROUL

2,238,083

DRAFT GEAR

Filed Jan. 13, 1939

2 Sheets-Sheet 2



Inventor
Donald F. Sproul
By *manly Brown & Co. Attys.*

UNITED STATES PATENT OFFICE

2,238,083

DRAFT GEAR

Donald F. Sproul, Chicago, Ill., assignor to James
R. Cardwell, Chicago, Ill.

Application January 13, 1939, Serial No. 250,673

5 Claims. (Cl. 213—31)

This invention relates to draft gears and to the method of making the same.

One of the objects of the invention is the provision of a fabricated draft gear having a maximum of strength with a minimum of weight.

Another object of the invention is the provision of a new and improved method of constructing draft gear and of fabricating the parts.

A further object of the invention is the provision of a new and improved wedging mechanism for use in draft gears of the friction type.

A still further object of the invention is the provision of a new and improved draft gear built up from parts, sections or elements welded together to form a rigid unitary structure.

Another object of the invention is the provision of a new and improved draft gear that is simple in construction, easily fabricated, efficient in operation, and that has maximum strength and minimum weight.

Other and further objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a side elevation of the draft gear with the yoke in position thereon;

Fig. 2 is a top plan view of the gear casing;

Fig. 3 is a horizontal section through the center sills of a railway car with the gear in position therein;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 3;

Fig. 6 is a perspective view of the inner spring seat;

Fig. 7 is a perspective view of one of the inner wedge blocks or friction shoes;

Fig. 8 is a perspective view of the outer spring seat;

Fig. 9 is a perspective view of one of the outer wedge blocks or friction shoes;

Fig. 10 is a perspective view of the thrust member; and

Fig. 11 is a rear end view of the friction tubular member.

It will be noted that Figs. 6 to 10 designate an exploded view of a portion of the friction mechanism.

The trend in car building at the present time is toward cars of lighter weight per ton capacity; i. e. cars having a minimum deadweight. In order to accomplish this object, every part of the car has been gone over with a view to reducing the weight of the parts without sacrificing strength or capacity. It is common practice to cast draft gear casings but in order to secure the proper

strength, the casing must be large or massive with a resultant heavy and cumbersome structure.

The present invention seeks to remedy this difficulty by the provision of a fabricated gear casing in which the casing is built up and rigidly welded together thereby eliminating cast parts and greatly reducing the weight of the gear.

Referring now to the drawings, the reference character 10 designates a railway car having the center sills 11 to which are attached the draft lugs 12 and the buffer lugs 13, Fig. 3. A draft gear 14 is adapted to be positioned between the draft and buffer lugs, as shown more clearly in Fig. 3 of the drawings. A follower plate 15 is inserted between the draft lugs 12 and the buffer lugs 13.

The gear 14 comprises a housing or casing 16 that is a fabricated structure. This housing comprises a length of pipe or a tubular member or section 17 which in practice is a section of a tube of sufficient diameter to form the casing. The tube from which the housing is taken may be made in the usual or any well known manner, and is of the seamless type.

Extending the full length of the tubular section 17, at each side thereof, is a positioning or reinforcing angular member 18. This member, as shown, is in the form of a T-bar having its stem portion 19 extending radially from the tube at each side thereof and welded thereto. Preferably, the stem 19 is welded at each side to the tubular member, as shown at 21 and 22, Fig. 4. The flange portions 23 of the T-bar are in a vertical plane and are adapted to position the casing midway between the center sills. These members also constitute reinforcing members for the casing.

A rectangular plate or follower 24 is rigidly connected to, what for convenience of description will be termed, the front end of the casing as by being welded thereto. The plate is also rigidly connected to the positioning or reinforcing bars 18 as by being welded thereto. The casing 17 is welded to the bar 24 on its inner and outer sides, as shown at 25 and 26 in Fig. 3. The weld at 25 being extremely difficult to make, may be, and preferably is, omitted, in practice. A friction member in the form of a tube 27 is pressed into the inner end of the casing 17, Fig. 3, and this tubular member is welded as at 28 to the inner surface of the casing.

An inner plate 20 extends across the rear end of the casing 17, Fig. 3, and is welded thereto, as at 29, in a manner similar to the plate 24. The plate 24 also extends across the positioning T-

bars 18 and is welded to the bars by welds on each side of the bars in a manner already described.

The plate 20 is provided with an axial opening of substantially the same diameter as the exterior diameter of the member 27 and through which the tubular member 27 extends, as shown in Fig. 3. The tubular member is welded at its outer side as at 31 throughout its circumference to the plate 20. The inner surface of the tubular member 27 is in the form of three segments of cylinder forming three friction surfaces 32a, 32b and 32c converging inwardly for engaging the wedging mechanism, as will presently appear. The plate 20 is in the form of an elongated octagon with its major axis extending horizontally as shown in Fig. 5.

Suitable positioning reinforcing members 33 are provided at the end opposite the tubular member 27. These members, of which four are employed, are roughly triangular in form, as shown more clearly in Fig. 2, and have their outer or apex portions 34 extending horizontally and with their inner or base portions 35 bent at an angle to the apex portion and extend radially of the casing to which they are attached as being welded thereon on opposite sides of the base portion. As shown, there are welds 36 and 37, Fig. 4, on each of the portions 35 of the positioning members 33 for rigidly connecting the same to the casing. There are two positioning members 33 at the upper portion of the casing and two below. The outer portions of the positioning members 33 that are attached to the upper portion of the casing extend in opposite directions in the same plane and likewise those secured to the lower portions of the casing have their outer ends extending outwardly in opposite directions in the same plane. The members 33 are of such width and are so arranged that they conform in outline to the length and width of the plate 24, as shown in Fig. 4. These members extend along the casing to a plane adjacent to the inner end of the tubular member 27 whereby the tubular member reinforces the inner end of the casing and the members 33 reinforce the outer end. It will thus be seen that the casing may be fabricated at a minimum of expense and will be much stronger than the conventional casting.

Suitable wedging mechanism is provided for the casing. In the form of the construction shown, the wedging mechanism comprises what may be termed the outer wedge blocks or friction shoes 38 of which there are three arranged substantially 120° apart, inner wedge blocks or friction shoes 39 of which there are also three arranged the same distance apart. Each of the wedge blocks or shoes 38 has curved outer friction surfaces 41 that frictionally engage the inclined friction surface 32 of the tubular member 27 and also have inner inclined wedging surfaces 42 and outer inclined wedging surfaces 43. The inner wedge blocks or friction shoes 39 have outer curved friction surfaces 44 for engaging the inclined inner friction surfaces 32 of the tubular member 27 and are also provided with an inner inclined wedge face 45 and an outer inclined wedge face 46.

An outer spring seat 47 having inner inclined wedging faces 48 and outer inclined wedging faces 49 is positioned between the wedge blocks 38 and 39 and frictionally engages the same. That is, the friction faces 48 of the spring seat 47 engage the corresponding wedge faces 46 of

the inner wedge blocks 39 and likewise, the wedging faces 49 of the spring seat 47 engage the corresponding wedge faces 42 of the outer wedge blocks 38. The spring seat 47 is hollow and as shown at 30 it has an axial opening 40 through its rear wall and an axial opening 50 of larger diameter through its front wall. An inner spring seat 51 having an enlarged axial opening is also provided. This spring seat has three inclined wedging faces 52 for engaging the wedging faces 45 of the inner wedge blocks 39, respectively.

A thrust member 53 is provided for forcing the outer wedge block 38 into frictional engagement with the tubular member 27. This member is provided with three inclined wedging surfaces 54 that engage the corresponding wedging faces 43 of the outer friction blocks 38, respectively. This member is provided with an inwardly extending projection 55 that extends through the opening 40 into the hollow 30 of the outer spring seat 47 as shown more clearly in Fig. 3 of the drawings.

Suitable resilient means are provided for resisting the inward movement of the wedge blocks, spring seats and thrust member. In the form of the construction shown, three springs are employed. An inner spring 56 engages the inner end of the projection 55 for resisting the inward movement of the thrust member 53 and for releasing the same when the compressive force is released. An intermediate spring 57 is provided for engaging the outer wall of the spring seat 47 for resisting the inward movement of this seat upon the compression of the gear and for moving the same outwardly upon the release of the gear. An outer spring 58 is also provided for engaging the inner surface of the inner spring seat 51 and the spring also resists the inward movement of the inner spring seat upon the compression of the gear thereby causing the wedging surfaces to force the wedging blocks 39 into frictional contact with the inner surface of the tubular member 27.

The stem or projection 55 extends through the rear wall of the spring seat 47 a sufficient distance to guide the thrust member and prevent its skewing during compression of the gear. It is however, not extended through the entire wedging and friction mechanism whereby the spring 56 that seats against its forward end may be as long as possible thereby having greater capacity.

The friction surfaces of the tube 27 being inclined or tapered are in the form of segments of a cylinder as indicated at 32a, 32b and 32c in Figs. 5 and 11, whereby the shoes 38 and 39 are free to slide along the surface thereof without binding or wedging. The friction surfaces 32a, 32b and 32c converge inwardly and merge into the circular or cylindrical surface of the interior of the tubular member 27 as shown at 60 in Fig. 11.

It will thus be seen that upon compression of the gear, all of the springs will cooperate to resist the inward movement of the wedging mechanism thereby causing wedging action between the spring seats, friction blocks and thrust member for forcing the friction shoes or blocks 38 and 39 into frictional contact with the inner surface of the tube 27. The inner surface of this tube being tapered inwardly causes increasing wedging action with an increasing resistance to the inward movement of the wedging mechanism.

Suitable means are provided for holding the gear under initial compression. As shown, a rod

or bolt 61 having a head 62 and a threaded end 63 is employed for this purpose. The head 62 is seated in a depression 64 in a spring seat 65. The spring seat 65 engages the forward ends of the springs 56, 57 and 58. The opposite or threaded end of the bolt or rod 61 extends through an axial opening in the extension 55 of the thrust member and is provided with a nut 66 in a counterbore 67 in said extension 55. When the gear is compressed, the nut moves outward into a cavity 80 in the thrust member 53. This is considered an important feature of the invention because the bolt 61 does not extend beyond the gear even when the latter is compressed. In the conventional gear having a bolt to hold the gear under initial compression, the bolt, when the gear is compressed, extends beyond the gear into the follower and is likely to get stuck or caught and hold the gear in its compressed condition. A lead washer 68 is employed beneath the nut 66 whereby the gear is held sufficiently compressed that it may be easily installed and after being used a few times, the washer will flatten to permit the gear to expand to fill the pocket.

It is thought from the foregoing, taken in connection with the accompanying drawings, that the operation and construction of my device will be apparent to those skilled in the art and that changes in size, shape, proportion or details may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In a draft gear, a casing comprising a length of seamless tube, an angular bar extending along opposite sides and welded to said casing along each side of the bar, a front follower extending across the forward ends of said tube and bars and rigidly secured thereto by welds at each side of the bars and along the inner and outer edge of said tube, a rear plate extending across the rear ends of said bars and tube and rigidly connected thereto, a friction tube pressed into the inner end of said seamless tube and extending beyond the end thereof, through an axial opening in said plate and rigidly secured to said plate and seamless tube as by welding, and welds on opposite sides of each angular bar for securing the same to said plate.

2. In a built up draft gear, a casing comprising a length of conventional seamless tubing of circular cross-section, a positioning member of T-shape in cross section extending the full length of said casing at opposite sides thereof and having the base of the T welded thereto throughout the length of the casing, two sets of triangular positioning members having their outer portions extending horizontally and their inner portions extending at an angle to their outer portions radial-

ly of said casing and welded thereto at one end portion thereof, the horizontally extending portions of one set being in a horizontal plane above said casing and those of the other set being in a horizontal plane below said casing, an end plate welded to said end of the casing and to all of said positioning members, and another end plate welded to the other end of said casing and to said T-shaped positioning members, one of said end plates only having an opening therethrough in alinement with that of said casing.

3. A built up draft gear housing comprising a section of conventional cylindrical seamless tube, a rectangular imperforate flat plate extending to one end of said tube, a flat plate welded to the other end of said tube and having a central opening therethrough, an open ended sleeve pressed in said other end, said sleeve having its internal wall tapered outwardly, and a reinforcing member of T-shape in cross section extending longitudinally of said tube at each opposite side thereof having its stem portion welded to said plates and tube whereby the flanges of said reinforcing members cooperate to serve as guides for the housing.

4. A casing for a draft gear comprising a length of seamless tube, a plate secured to each end thereof as by welding, one of said plates being imperforate and the other having an axial opening of a diameter equal to that of the interior of said tube, a friction tube pressed into one end of said seamless tube and extending through the opening in said plate, positioning members generally triangular in form and each having its apex portion extending laterally outwardly at an angle to its base portion and with the base portion engaging said seamless tube and extending radially therefrom, welds on the inner and outer sides of said base portion for securing the same to said seamless tube, and welds securing said base and apex portions to the adjacent plate, said apex portions extending along the top and bottom edges of the adjacent plate and flush therewith.

5. In a draft gear for railway cars, a casing comprising a length of conventional seamless tube, a plate welded to each end thereof, one of said plates being imperforate and the other having an axial opening in alinement with the bore of said tube, reinforcing bars extending longitudinally of said tube and welded thereto, said bars having their ends engaging said end plates and welded to said end plates, and supporting bars welded to one end portion of said tube radially thereto and to the adjacent plate and having their outer portions turned in opposite directions in a common plane extending beneath said tube for supporting said gear.

DONALD F. SPROUL.