Sept. 2, 1958 F. H. KAYLER ET AL 2,850,180

ROTARY RAILWAY COUPLER

Filed June 2, 1954 2 Sheets-Sheet 1

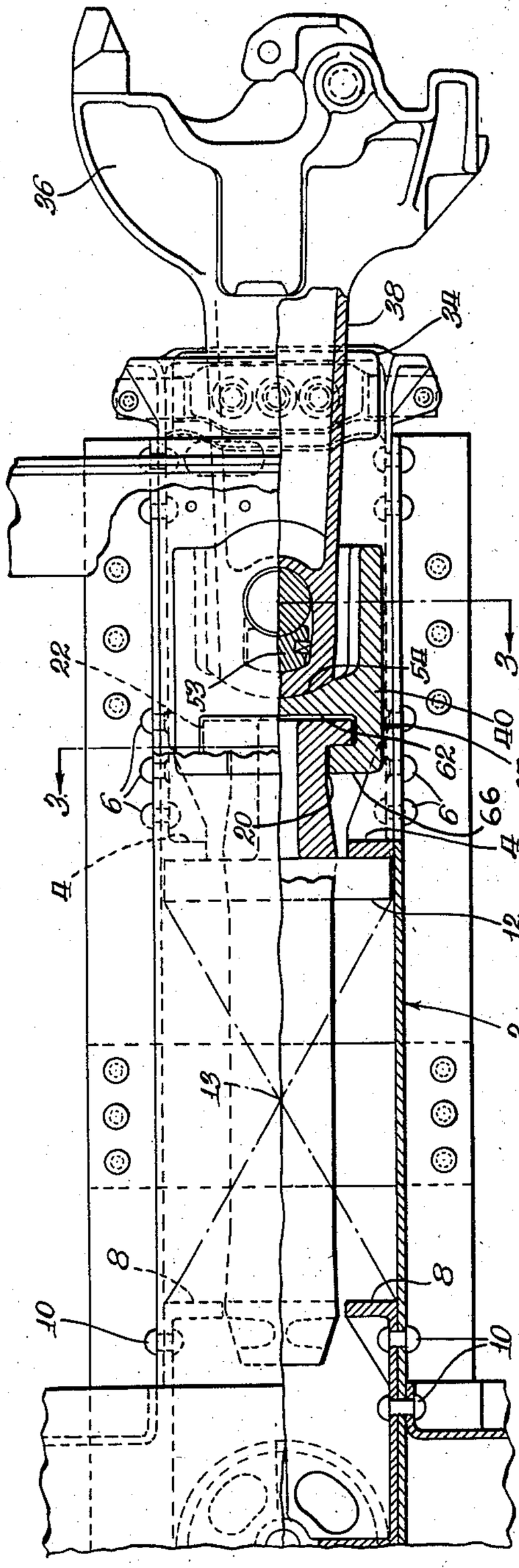

Fig. 1.

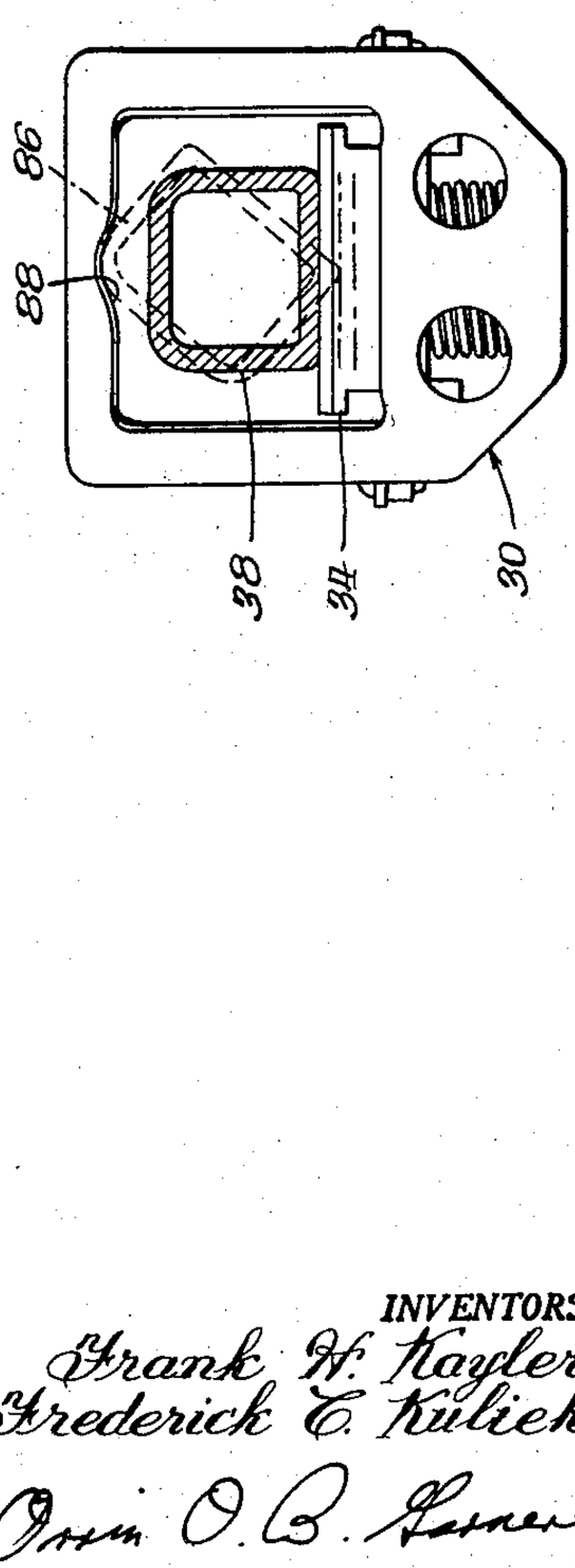

Fig. 4.

INVENTORS.
Frank H. Kayler
Frederick C. Kulieke

By Owen O. B. Turner Atty.

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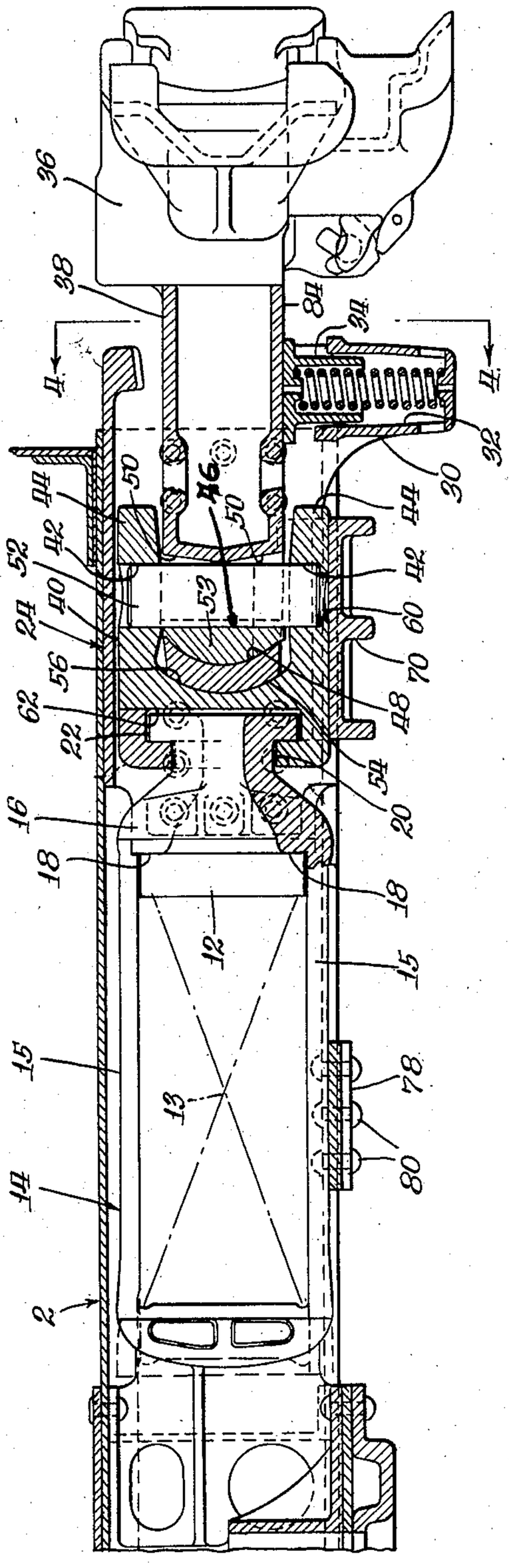

Fig. 2.

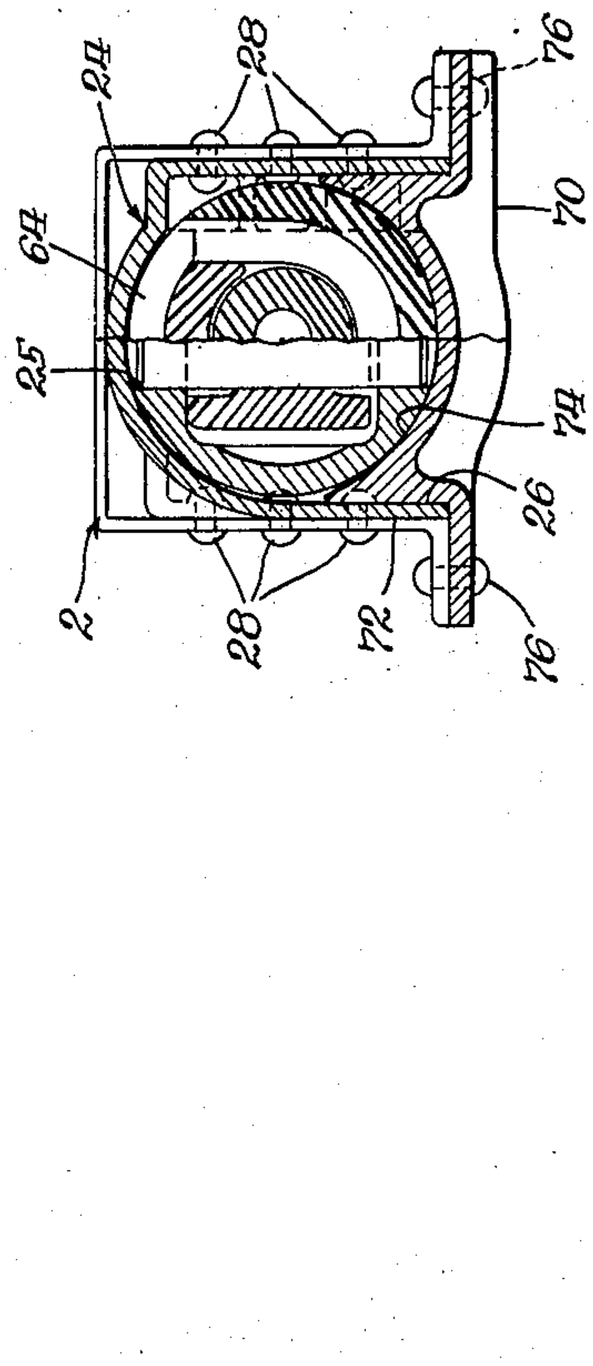

Fig. 3.

INVENTORS.
Frank H. Kayler
Frederick C. Kulieke

By Otto O. B. Lozier Atty.

United States Patent Office

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ROTARY RAILWAY COUPLER

Frank H. Kayler and Frederick C. Kulieke, Alliance, Ohio, assignors to American Steel Foundries, Chicago, Ill, a corporation of New Jersey

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9 Claims. (Cl. 213—72)

The invention relates to car couplers for dumping cars and more particularly to an arrangement wherein the couplers permit rotation of connected cars for dumping when used in rail vehicles employed in mining operation.

The invention comprehends the application of a type of coupler known in the railway art as the A. A. R. Alternate Standard Type F coupler to a novel draft coupler arrangement employed on mining cars. The novel coupler draft gear arrangement comprehends the rotation of each car approximately 180° to dump same while the rest of the cars in the train remain in vertical position. The novel arrangement brings all the well known advantages of the type F coupler in addition to offering the rotating feature described above whereby improved mine car operation results.

Accordingly, it is the principle object of the invention to provide a novel coupler draft gear arrangement wherein an Alternate Standard F type coupler may be applied to a dumping mining car.

It is another object of the invention to provide a coupler for mining car operation with improved horizontal and vertical angling characteristics.

It is an additional object of the invention to provide a coupler draft gear combination where initial compression of the draft gear does not affect freedom of rotation.

It is a specific object of the invention to provide a coupler with a flat width shank supported by a compressible coupler carrier to aid in holding the coupler in a level position when not coupled.

It is a specific object of the invention to provide an F type coupler with a rotary yoke head pivotally attached thereto, said yoke head being rotatably mounted or associated with a flanged stem on the front end of a draft gear yoke.

These and other objects of the invention will become apparent in the course of the following description and from an examination of the concerned drawings, wherein:

Figure 1 is a top plan view partially in section of the novel coupler draft gear arrangement,

Figure 2 is a fragmentary side elevational sectional view of the arrangement shown in Figure 1,

Figure 3 is a sectional view taken along lines 3—3 of Figure 1, and

Figure 4 is a sectional view taken along lines 4—4 of Figure 2.

Describing the invention in detail in referring to the figures, it will be seen that the coupler draft gear arrangement comprises a housing indicated generally at 2, which is normally attached to the underside of the car, as is well understood by those skilled in the art. The housing 2 may be and is preferably of rectangular form as is best seen in Figure 3. Internally thereof the housing presents front stop lugs 4, 4, rigidly secured to said housing in any suitable manner, for example, by rivets 6. Rear stop lugs 8, 8 are positioned internally of the

housing 2 and spaced rearwardly from the first mentioned front stop lugs 4, 4. The rear stop lugs are also secured to the housing 2 in any suitable manner, for example, as by rivets 10. A conventional follower 12 is disposed to abut the rear edge of the front stop lugs 4, 4 as is best seen in Figures 1 and 2. A resilient unit 13, of any conventional design, is compressively disposed intermediate the front follower 12 and the rear stop lugs 8, 8 said resilient unit 13 being compressible to absorb shocks under the action hereinafter described.

A yoke 14 is disposed internally of the housing 2 and comprises upper and lower straps 15, 15 which surround the resilient unit 13, said yoke extending longitudinally of the housing and disposed intermediate the front and rear stop lugs 4 and 8, respectively. Forward edges of the straps 15 of the yoke 14 are interconnected by an integrally formed band 16. The rearward edges of the band 16 are formed with abutments 18, 18, said abutments being arranged to engage the front face of the follower 12, as is best seen in Figure 2. The band 16 additionally tapers sharply toward the central axis of the yoke 14 to form a cylindrical neck portion 20. The cylindrical necked portion 20 extends forwardly and has integrally formed thereon a cylindrical flange shown at 22. Thus it will be seen that the neck portion 20 and the flanges 22 could reasonably be termed a flanged stem.

A guiding striker casting indicated generally at 24 is disposed internally of the housing 2 adjacent the front end thereof. Referring to Figure 3, it will be seen that the striking casting 24 is generally U-shaped in cross section and presents a semi-cylindrical internal face as at 25 at the upper portion thereof and, as seen, in the assembled view of Figure 3. The lower segment of the striker casting 24 faces downwardly and is open as shown at 26 in Figure 3. The casting 24 may be secured to the housing 2 in any suitable manner, as for example, by the rivets 28. Referring to Figures 2 and 4, it will be seen that the striker casting projects forwardly of the unit and forwardly of the housing 2 whereat it forms a depending coupler carrier indicated generally at 30. The coupler carrier 30 connects the left and right hand edges of the striker casting and defines a hollow recess 32 which serves as a mounting and carrier unit for the spring loaded carrier 34.

An Alternate Standard F type coupler 36 projects forwardly of the unit and comprises a shank 38 which is preferably rectangular as seen in cross section of Figure 4. The shank projects rearwardly of the coupler 36 into the striker casting 24 as is best seen in Figures 1 and 2. A rotating yoke head 40 is disposed internally of the striker casting 24 and is provided with aligned pin holes 42, 42 in the flanges 44, 44 formed on the rotating yoke head 40. The coupler shank 38 projects into the flanges 44, 44 formed on the rotating yoke head 40 and is provided with an aperture 46, which in the assembled condition of the arrangement, aligns itself with the holes 42, 42 formed in the rotary yoke head 40. The rearward limit of the aperture 46 formed on the coupler shank 38 is spherical as best seen at 48 in Figure 2, while the forward limit of the aperture 46 is tapered from the central position thereof as at 50, 50. A pin 52 is disposed in the holes 42, 42 of the rotary coupler head 40 and is disposed to extend through the aperture 46 formed in the coupler shank. A filler block 53 having a forward arcuate surface complementally engaging the adjacent surface of the pin 52 and a rearward spherical surface complementally engaging the surface 48 on the coupler shank fills the portion between the pin 52 and the rear extremity of the aperture 46 of the shank. The rear edge of the shank 38 is formed with a spherical surface 54, said surface 54 engaging a

complementally formed surface **56** formed on the rotary yoke head **40**. Those skilled in the coupler art will be generally familiar with the surface construction of the connection between the coupler shank and the rotary yoke head inasmuch as similar construction is employed on conventional couplers, and it is through this construction that both vertical and horizontal angling of the coupler **36** is accommodated. It will also be noted that the lower hole **42** and the flange **44** on the rotary yoke head **40** is provided with a peripheral lug **60**, said peripheral lug **60** serving as a bottom abutment for the pin **52** and preventing said pin from falling through the aperture **42** to engage the asscciated mounting unit.

Considering the rear extremity of the rotary yoke head **40**, as seen in Figures 1 and 2, it will be seen that a cylindrical cavity **62** is formed therein. The yoke head **40** additionally has upstanding and inturned flanges **64** and **66** thereon which serve to define the rearward limit of the cavity **62**. The flanges **64** and **66** also present an aperture which accommodates the neck **20** on the front of the yoke **14**. It should be noted that the top portion of the flange **64**, as seen in Figures 2 and 3, may preferably be made of a separate piece which is weldable into position after assembly of the yoke **14** to the yoke head **40** thus affording convenient means to assemble the parts while having an integral operating unit when assembly is completed.

Referring to Figures 2 and 3, it will be remembered that the striker casting **24** is open at its lower end as seen at **26** in Figure 3. A carrier casting **70** having an upstanding segment **72**, which is defined by an upwardly facing cylindrical surface **74**, may be positioned with the abutments **72** inserted into the casting **24** and may be bolted to the housing **2** or otherwise secured thereto as for example by rivets **76**. Thus the carrier casting **70** rotatably supports the yoke head **40** within the striker casting **24**. Additionally, a yoke support strap **78** may be secured to the housing by rivets **80** at a point immediately below the yoke **14**, hence serves to retain the yoke **14** within the housing **2**. It will thus be noted that both the striker casting **24** and the housing **2** are open at their lower ends permitting easy assembly of the subassembled coupler yoke unit.

Directing attention to Figures 2 and 4 it will be noted that the coupler shank is of generally rectangular form as seen in cross section and that the lower side thereof indicated at **84** is supported by flat engagement with the upper surface of the coupler carrier **34**. The engagement of these two flat surfaces has a tendency to maintain the coupler **36** in its normal coupling position when the coupler is not coupled. However, it will be understood that the spring loaded coupler carrier **34** and its engagement with the lower side of the coupler shank **38** is not sufficient to resist the rotary motion hereinafter described and, referring to Figure 4, it will be seen that the coupler carrier **34** is depressible by the corners of the coupler shank **38** when the coupler shank is rotated to its extreme position as is shown in phantom at **86** in said Figure 4. It will also be noted that the striker casting **24** is hollowed at **88** immediately above the shank **38** to accommodate the rotation of the shank.

It will be readily understood that it is only necessary to associate a rotary coupler as above described with one end of a mine car only and that a nonrotatable coupler may be mounted on the other end of each car. As is usual in this type of operation, the cars will always be pulled in the same direction and a rotary coupler on one car will always be mated with a nonrotary coupler on the other car. The dumping operation is accomplished by consecutively pulling each car into the dumper and rotating same individually to dump its contents, it is then righted again and the train of cars is moved until the next car is in dumper position whereupon it is rotated and its contents dumped. Thus the relative movement of the rotary coupler during successive dumping operations on immediately adjacent coupled cars will be in one direction on the first car and in the opposite direction on the car coupled to it. Hence the rotary coupler must be rotatable through 360°, said rotary motion being accomplished by 180° rotation in one direction and 180° rotation in the other direction for successive dumps on coupled cars.

Assuming that the coupler disclosed is attached to the trailing end of each car and thus is coupled with a nonrotatable coupler on the leading end of the adjacent car, it will be readily seen that when the first car is brought into dumping position and rotated 180° the coupler **36** is maintained in a fixed position by the nonrotatable coupler on the immediately adjacent car. The result is that the housing **2** and the fixedly attached striker casting **24** rotates about the cylindrical rotary yoke head **40**. Of course, the yoke **14** and resilient unit **13** being nonrotatably fixed in the housing **2** will rotate therewith the flange connection at **22** within cavity **62** accommodating the relative rotary movement between the yoke and the rotary yoke head **40**. The action of course is reversed as the instant car is brought back into upright position. The preceding has described the action of the trailing end of one car in the dumper wherein the couplers did not rotate but were held stationary by the adjacent car. At the forward end of the same car in the dumper is a nonrotatable coupler which would be coupled to a rotatable coupler on the leading car. When the dumper rotates, the nonrotatable coupler at forward end rotates in a fixed manner with the car thus rotating the coupler **36** and yoke head **40** in the leading car when the edges of shank **38** depress carrier **34** also in leading car as previously described. Reverse rotation after contents of car are emptied returns coupler and car to upright position. The car train then moves forward to position the next car for dumping.

We claim:

1. In a rotary coupler arrangement, a housing, a draft unit disposed within the housing comprising a yoke having resilient means therein, a striker casting at least a part of which is in the housing and secured thereto, a rotatable yoke head in the casting, a coupler having a shank, said shank being telescoped into a recess provided in said yoke head, a non-rotatable connection between the shank and the yoke head accommodating anngular movement of the shank, and a connection between the yoke head and yoke accommodating relative rotational movement of 360° therebetween.

2. A rotary coupler arrangement according to claim 1, wherein the second mentioned connection comprises a flanged head on the yoke and a flanged recess on the yoke head receiving said flanged head.

3. A rotary coupler arrangement according to claim 2, wherein said shank is rectangular as seen in vertical transverse cross section, and wherein said striker casting presents a semi-cylindrical surface permitting rotational movement of the shank 360° about its longitudinal axis and is provided with a resilient coupler carrier having a flat surface which engages the lower side of said shank to yieldably resist rotational movement of the shank.

4. In a rotary coupler arrangement, the combination of: a housing, a draft gear member disposed within the housing, a coupler member having a portion disposed within the housing, and a yoke head disposed within the housing and interconnecting said members to accommodate therebetween relative rotational movement of 360° about the longitudinal axis of the coupler arrangement, said yoke head presenting recesses at the opposite ends thereof receiving the respective members, one of said members being rotatably mounted in its related head recess, and the other of said members being non-rotatably mounted in its related head recess.

5. A rotary coupler arrangement according to claim 4, wherein said housing presents an internal semi-cylindrical surface guidably engageable with an outer cylindrical surface presented by the yoke head.

6. A rotary coupler arrangement according to claim 4, wherein the mounting of the gear member in the head comprises a cylindrical neck on the gear having a flange on the end thereof extending radially away from the peripheral surface at the neck and disposed within the related recess of the head, and abutments on the head surrounding the neck and overlapping the flange to retain the flange in the recess.

7. In a rotary coupler arrangement, the combination of: a draft gear having a cylindrical neck with a flange thereon extending radially away from the neck, a coupler, a yoke head being rotatable about the longitudinal axis of the coupler arrangement and having a recess receiving said flange, and abutments surrounding the neck and overlapping the flange to retain it in the recess, and a pivotal connection between the coupler and the head, said connection comprising a shank on the coupler partly disposed within a cavity in the head, aligned pin holes in the head on opposite sides of the cavity, a hole in the shank, and a pin positioned in all of said holes.

8. In a coupler arrangement, a housing connected to a car body, said housing being open along the lower side thereof, a striker casting at least a part of which is within the housing and secured thereto, said casting being open along the lower side thereof, a unit comprising a coupler and draft gear disposed within the housing and casting, a support plate secured to opposite sides of the housing and spanning the lower opening thereof, said plate engaging the draft gear and retaining it in the housing, a carrier casting secured to opposite sides of the housing and disposed to span the lower opening of the striker casting, said carrier casting engaging a portion of the coupler

in the striker casting and retaining it therein, a yoke head mounted for rotational movement within said housing, said yoke head being of cylindrical form as seen in vertical transverse cross section and acting as a connection between the coupler and draft gear to accommodate relative rotational movement therebetween, said striker casting having a semicylindrical internal surface embracing the yoke head and the carrier casting having a semicylindrical internal surface embracing a portion of the coupler, whereby the striker casting and carrier casting serve to guide rotational movement of the yoke head and coupler through an arc of 360°.

9. In a coupler arrangement, a housing connectable to a car body, a unit comprising a coupler and a draft gear disposed in said housing presenting an internal semicylindrical surface, means to support said unit in said housing, a yoke head of cylindrical form as seen in vertical transverse cross section arranged to rotate through an arc of 360° in the housing and having a pivot connection to the coupler and a relatively rotatable connection to the draft gear, said yoke head presenting an outer cylindrical surface guidably engageable with the surface of said housing.

References Cited in the file of this patent

UNITED STATES PATENTS

2,055,473	Barrows	Sept. 29, 1936
2,282,146	Mealing et al.	May 5, 1942
2,327,240	Barrows et al.	Aug. 14, 1943
2,604,215	Kayler	July 22, 1952
2,727,635	Blattner	Dec. 20, 1955