(No Model.)

4 Sheets—Sheet 1.

M. CONRAD & C. HOTZ.

WAGON GEAR.

No. 409,829. Patented Aug. 27, 1889.

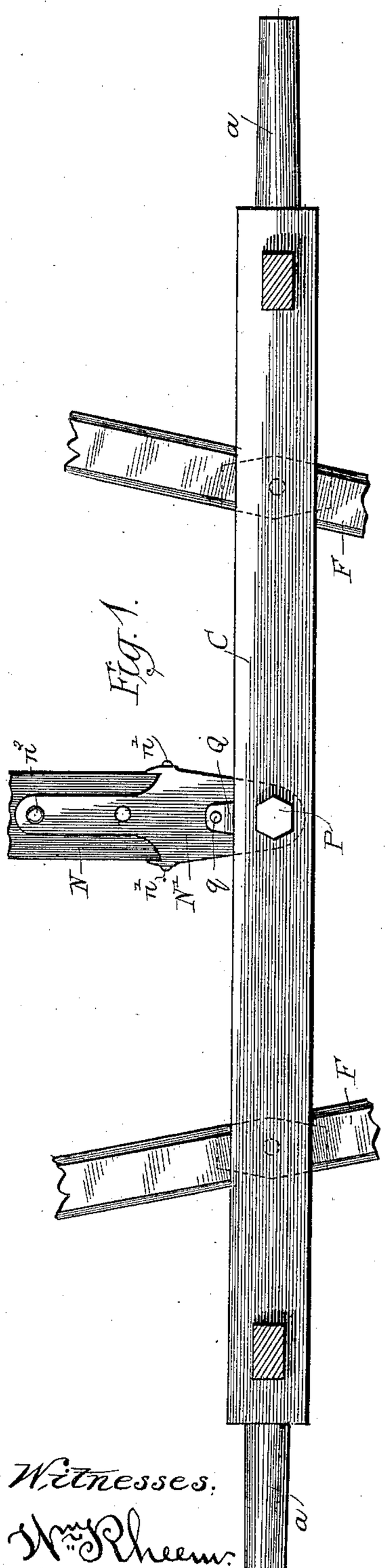


Fig. 1.

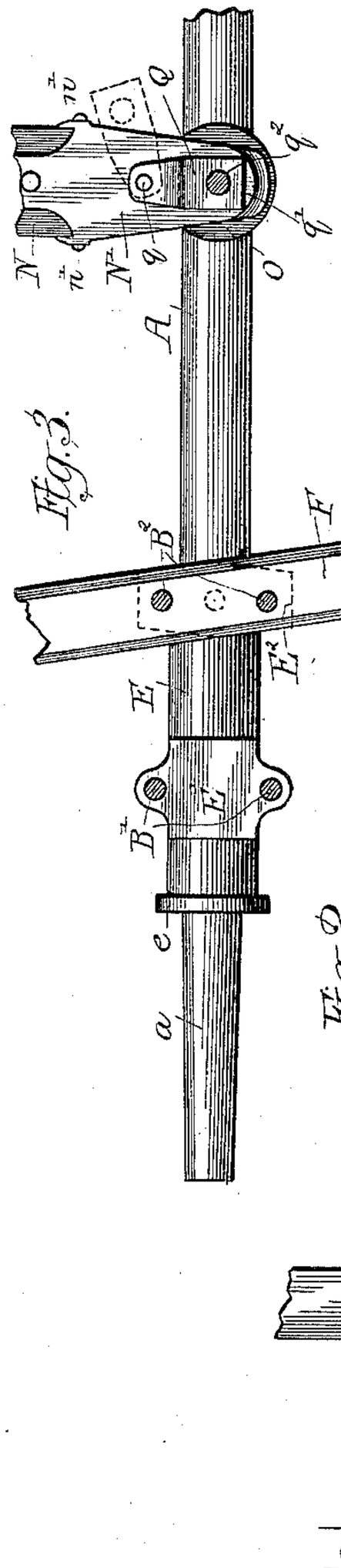


Fig. 3.

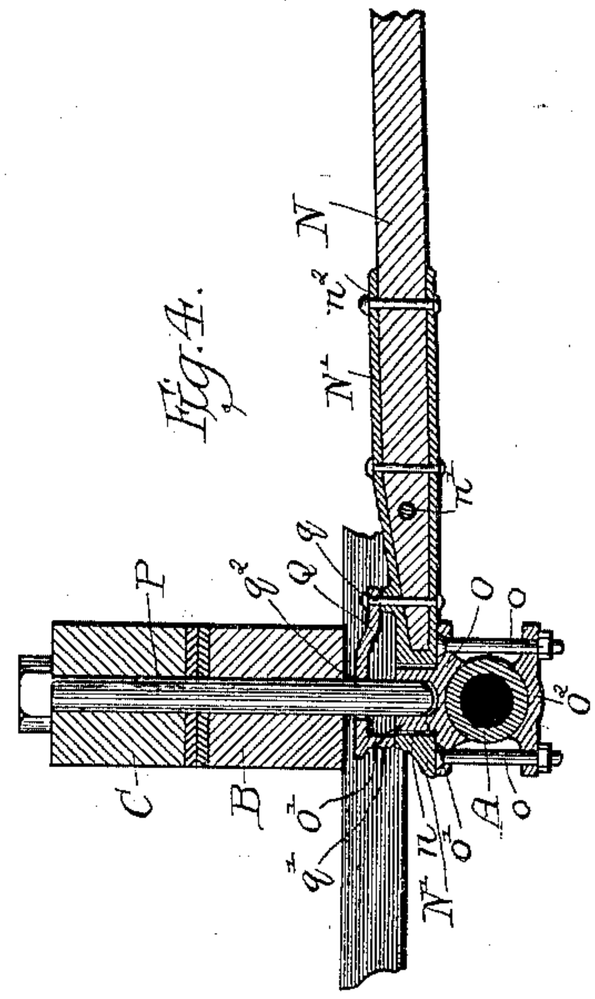


Fig. 4.

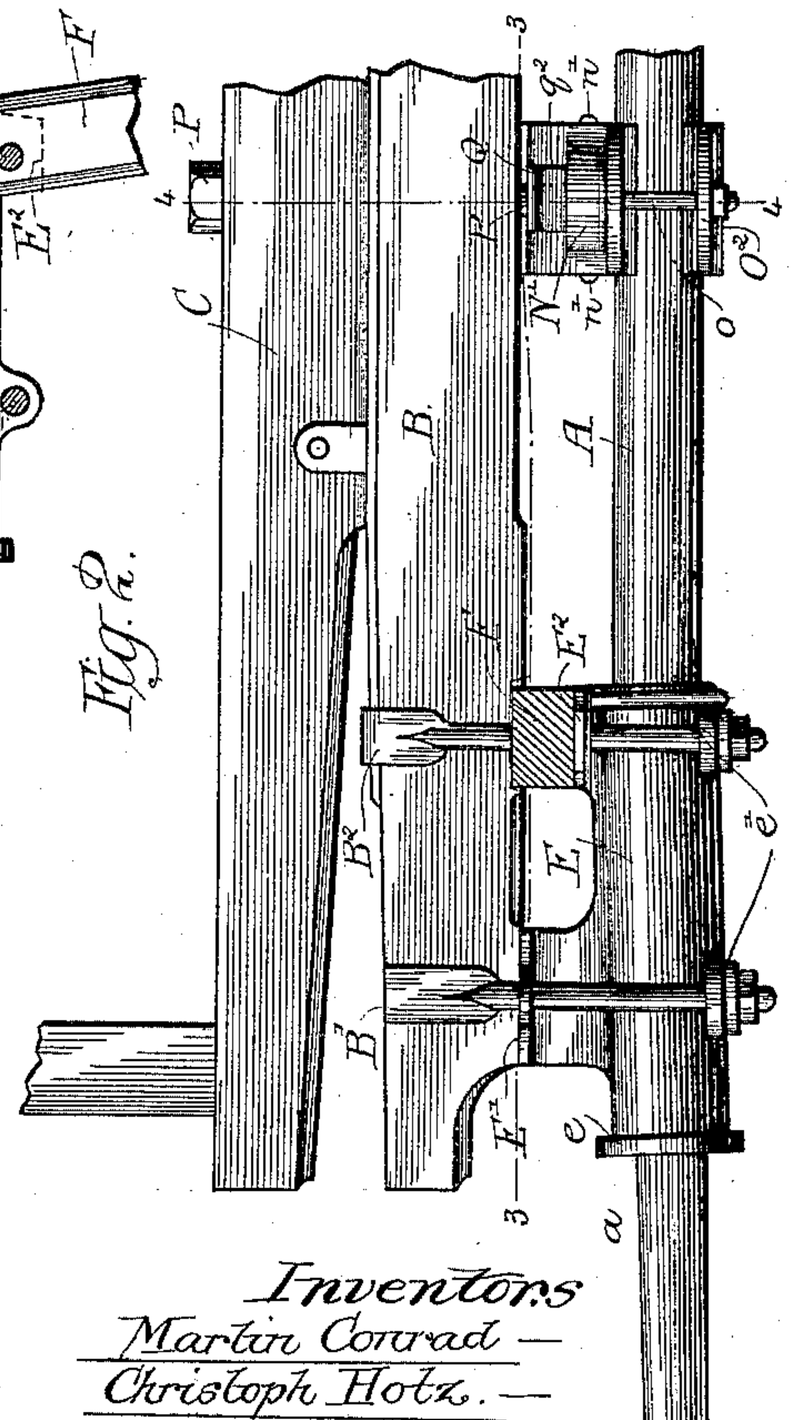


Fig. 2.

Witnesses.

Wm. Rheem.

Louis M. Whitehead.

Inventors

Martin Conrad —

Christoph Hotz. —

By Dayton. Poole & Brown

Atty's.

(No Model.)

4 Sheets—Sheet 2.

M. CONRAD & C. HOTZ.

WAGON GEAR.

No. 409,829. Patented Aug. 27, 1889.

Fig. 5.

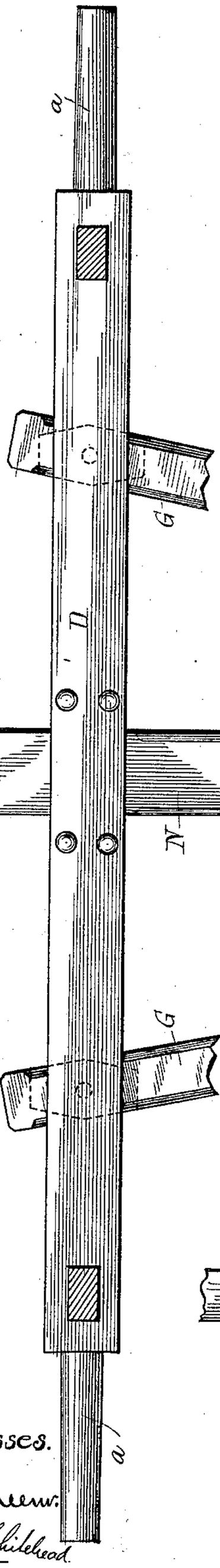


Fig. 8.

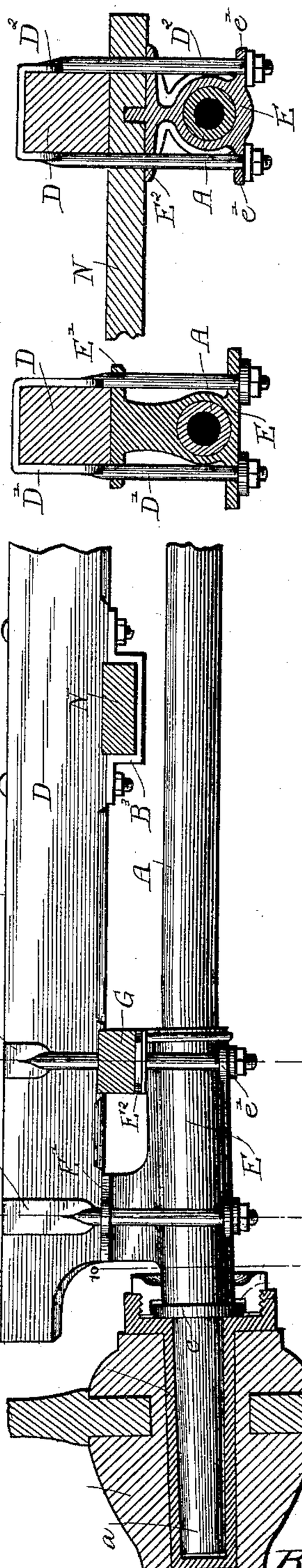


Fig. 7.

Fig. 10.

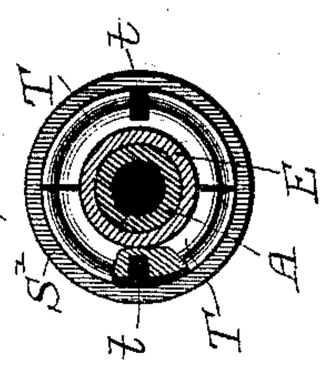
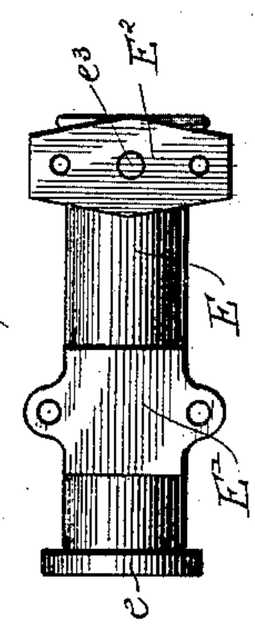


Fig. 6.

Fig. 9.



Witnesses.

Wm. R. Rheem.

Louis W. Hollinshead.

Inventors

Martin Conrad —

Christoph Hotz. —

By Dayton, Poole & Brown

Attys

(No Model.) 4 Sheets—Sheet 3.

M. CONRAD & C. HOTZ.

WAGON GEAR.

No. 409,829. Patented Aug. 27, 1889.

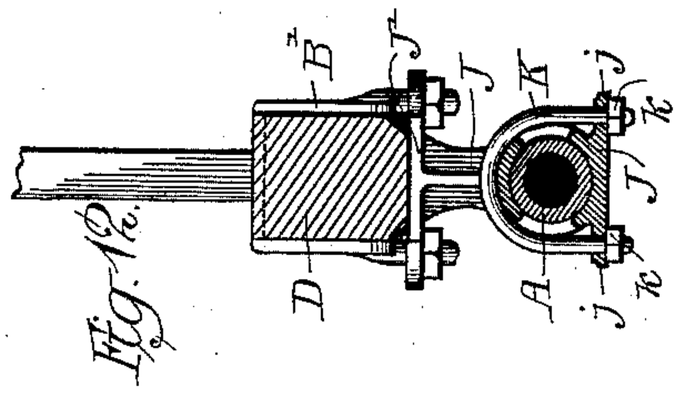


Fig. 12.

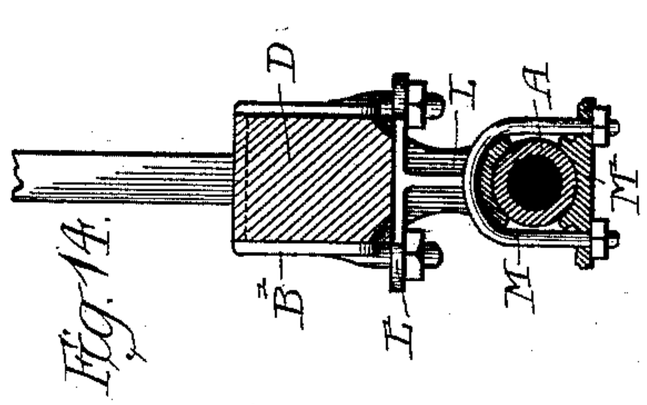


Fig. 14.

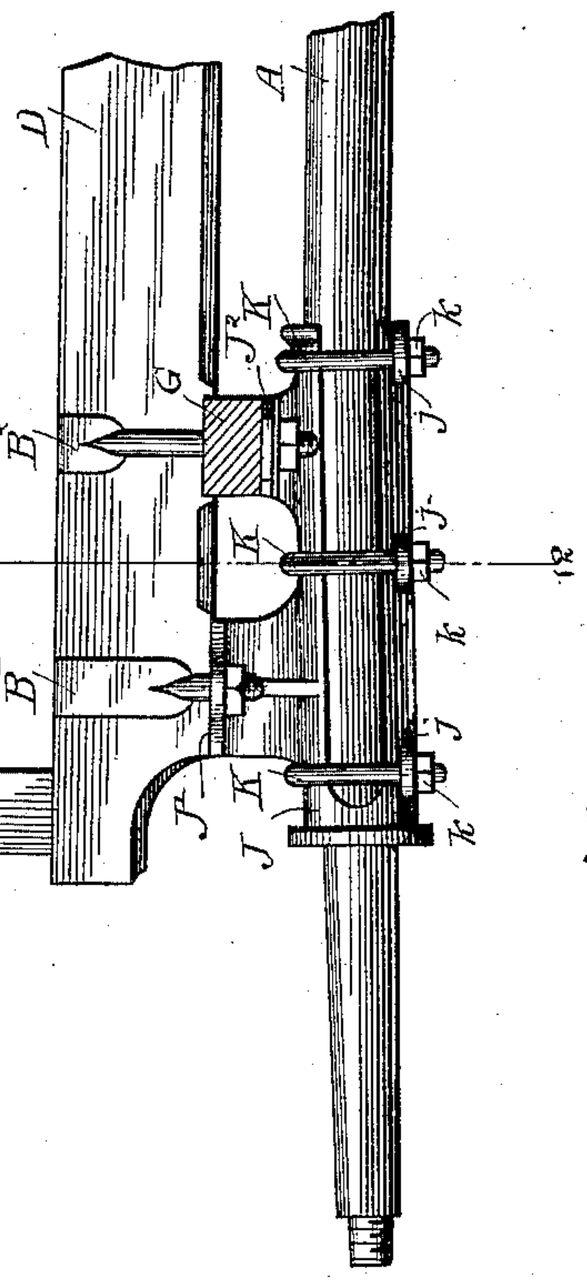


Fig. 11.

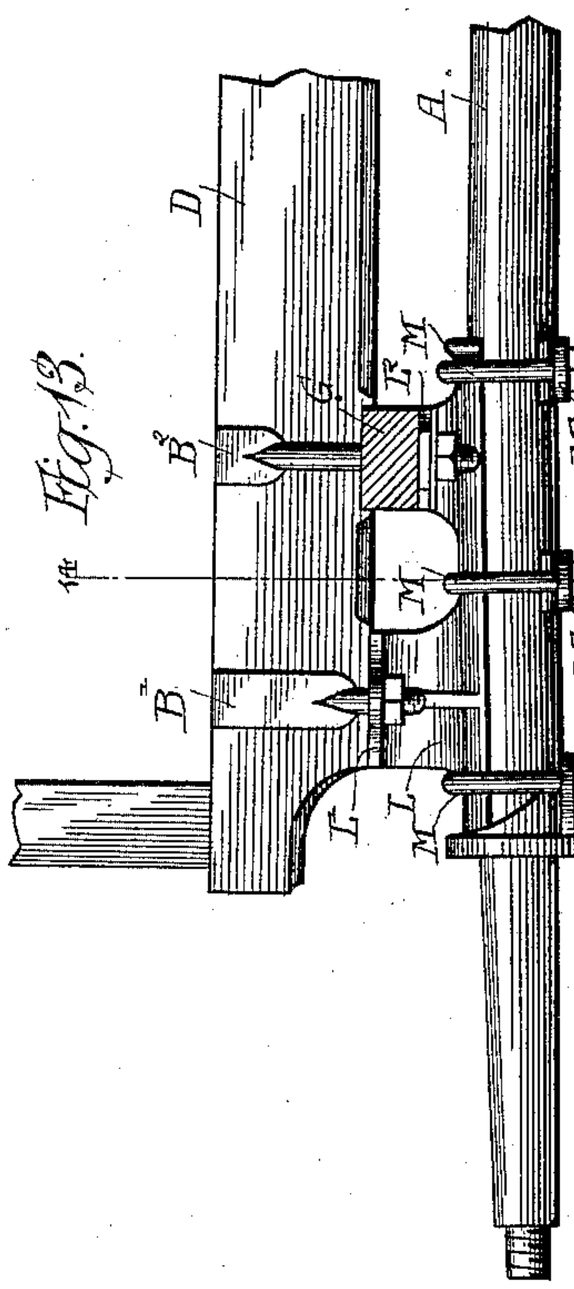


Fig. 13.

Witnesses.—
Wm. Rheem
Louis M. T. Whitehead.

Inventors.—
Martin Conrad.—
Christoph Hotz.—
By Dayton, Poole & Brown
Attys

(No Model.)

M. CONRAD & C. HOTZ.

4 Sheets—Sheet 4.

WAGON GEAR.

No. 409,829. Patented Aug. 27, 1889.

Fig. 16.

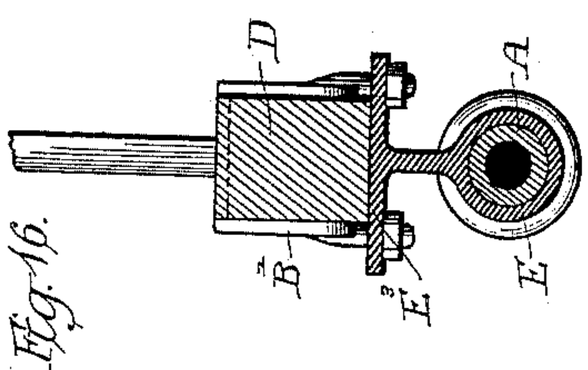


Fig. 18.

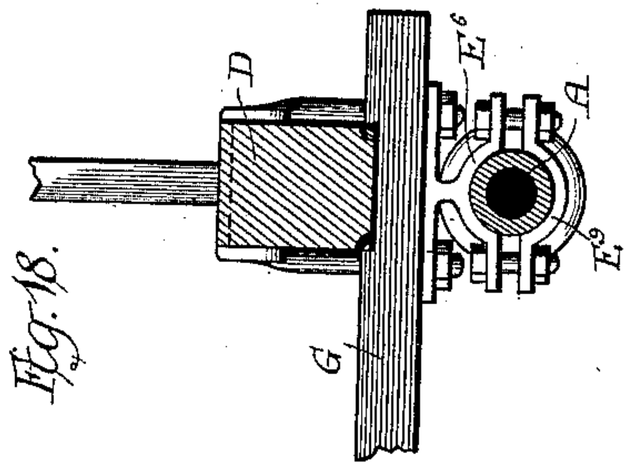


Fig. 15.

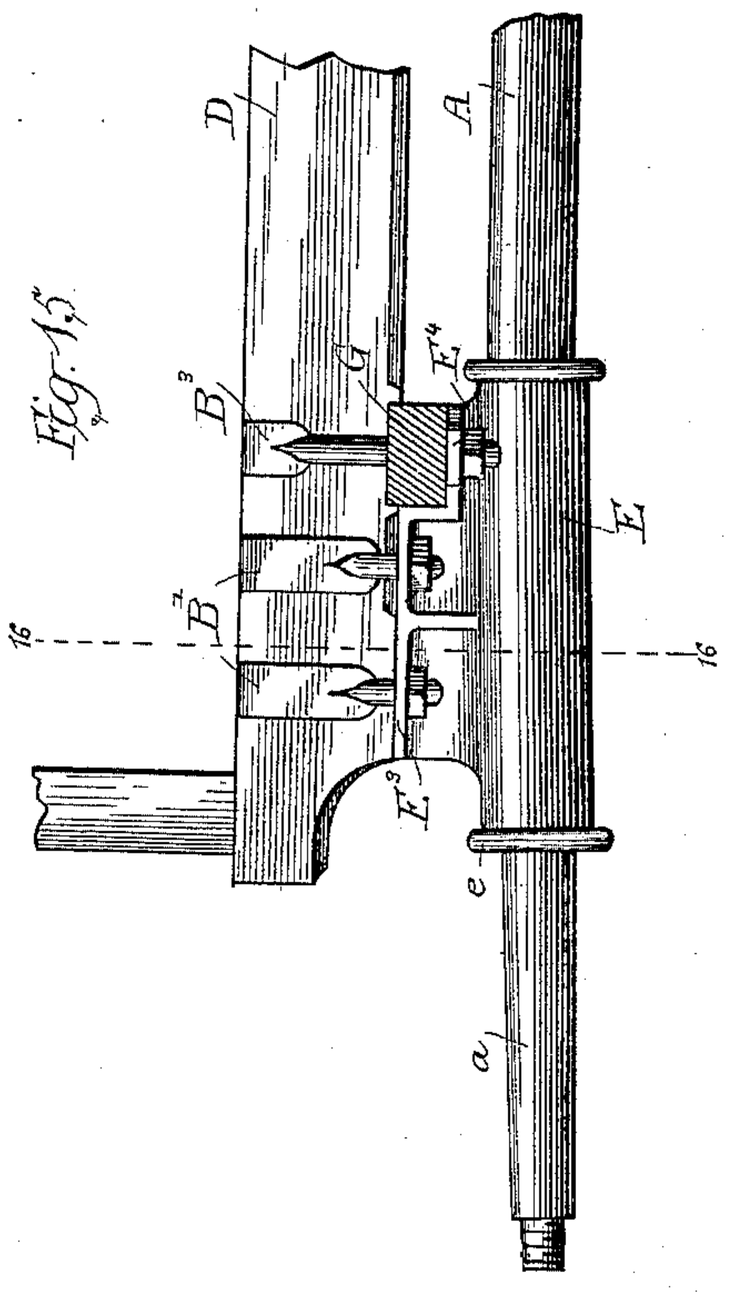
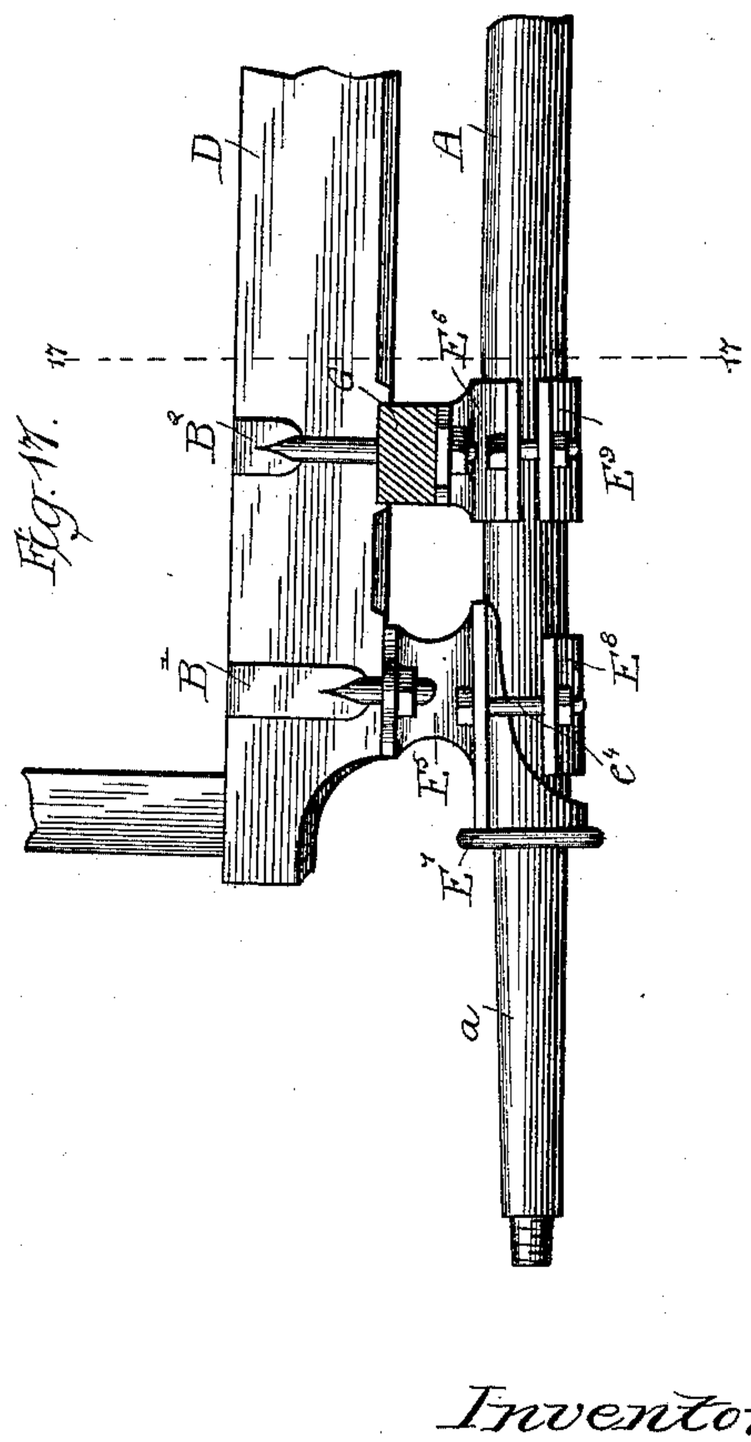


Fig. 17.



Witnesses.

Wm. Rheem.

Louis M. V. Hollinshead.

Inventor.

Martin Conrad.

Christoph Hotz.

By Dayton, Poole & Brown

Att'y's.

UNITED STATES PATENT OFFICE.

MARTIN CONRAD AND CHRISTOPH HOTZ, OF CHICAGO, ILLINOIS.

WAGON-GEAR.

SPECIFICATION forming part of Letters Patent No. 409,829, dated August 27, 1889.

Application filed April 23, 1889. Serial No. 308,298. (No model.)

To all whom it may concern:

Be it known that we, MARTIN CONRAD and CHRISTOPH HOTZ, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wagon-Gear; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in wagon-gears, having reference more especially to the construction of the axles, to means for holding the wheels upon the axle-arms, and to means for connecting forward end of the reach with the front axle.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating our invention, Figure 1 is a plan view of the front axle and connected parts. Fig. 2 is a front elevation of the same. Fig. 3 is a sectional plan view of the same, taken upon line 3 3 of Fig. 2. Fig. 4 is a central vertical section taken upon line 4 4 of Fig. 2. Fig. 5 is a plan view of the rear axle. Fig. 6 is a side elevation of the same. Fig. 7 is a cross-section of the same, taken upon line 7 7 of Fig. 6. Fig. 8 is a cross-section of the same, taken upon line 8 8 of Fig. 6. Fig. 9 is a plan view of one of the axle-sleeves shown in Fig. 6 removed from the axle. Fig. 10 is a sectional view taken upon line 10 10 of Fig. 6. Fig. 11 is a fragmentary side elevation of the rear axle, showing a modified construction in the devices for rigidly connecting the axle with the rear bolster. Fig. 12 is a sectional view taken upon line 12 12 of Fig. 11. Fig. 13 is a detail side view of part of the rear axle, showing still another construction in devices for rigidly connecting the axle with the rear bolster. Fig. 14 is a sectional view taken upon line 14 14 of Fig. 13. Fig. 15 is a detail side view of a part of a rear axle, showing a single wide table on the axle. Fig. 16 is a sectional view taken on line 16 16 of Fig. 15. Fig. 17 is a similar side view showing separate tables or castings connecting the bolster and axle. Fig. 18 is a sectional view taken upon line 18 18 of Fig. 17.

As illustrated in the said drawings, Figs. 1 to 9, A A indicate the front and rear axles; B, the sand-board; C, the front bolster, and D the rear bolster. The front and rear axles are substantially alike, and are constructed as follows: The main part of the axle consists of a metal bar of cylindric or tubular form, which is slightly bent or curved at its middle in the usual manner to give the proper inclination or "gather" to the axle-arms *a a*.

Upon the axle, at each end thereof, inside of and adjacent to the axle-arm *a*, is placed a cast-metal sleeve E, which is fitted closely to the axle, and which will commonly be forced into place upon the axle by a hydraulic press or other powerful means. At its outer end the sleeve E is provided with a flange *e*, forming the axle-collar, against which the inner end of the wheel-hub bears.

Cast upon the sleeve E near its outer end is a flat horizontal supporting plate or table E′, which is supported somewhat above the top of the sleeve by a suitable connecting flange or standard, and near the inner end of the said sleeve is cast a similar horizontal table E^2. The outer table E′ in the case of the rear axle is for the attachment of the end of the rear bolster, and on the front axle for the attachment of the sand-board. The inner tables E^2 are to afford bearings for the front and rear hounds F and G, which are inserted between the sand-board or bolster and the said tables E^2. Said tables E^2 are arranged at such distance below the level of the tables E′ as to allow the hounds to be inserted between the said inner tables and the sand-board or rear bolster. At each end of the front axle the said sand-board is rigidly secured to the table E′ by means of a clip B′, passing around the said sand-board and passing through the table E′, which latter is provided with lateral extensions or lugs projecting beyond the side faces of the sand-board for the passage of the said clip, the latter being desirably extended to the bottom of the sleeve and engaging lugs *e′ e′* cast thereon. A second clip B^2 passes around the sand-board and extends through the front hounds F and the ends of the table E^2, and is engaged at its lower ends with laterally-projecting lugs *e′ e′*, cast upon the sides of the said sleeve E at the lower part of the latter. Said clip B^2 obviously serves to se-

curely clamp the sand-board and hounds to the axle, while at the same time positively holding the hounds from shifting or changing their position.

As a separate and further improvement the table E^2, which supports the hound, is provided with a centrally-arranged dowel-pin e^3, which is adapted to enter a hole bored in the under surface of the hound, so as to hold the same in position in assembling the parts and to afford stronger connection after the parts are put together. Said table E^2, as clearly shown in the plan view, Fig. 9, is oppositely tapered or inclined at its side edges, so as to correspond with the inclination of the hounds, and both ends of the table are made alike, so that the same casting may be employed at both ends of the axle, and the necessity is avoided of making the said castings in pairs or right and left handed.

The rear bolster D is secured to the outer plate or table E′ by means of a clip D′ passing over the bolster and engaged at its ends with the laterally-projecting parts or lugs of the said table, and by a clip D^2, placed over the said bolster and passing through the rear hounds G, table E^2, and lugs e' e' at the lower part of the said sleeve E, in the same manner as hereinbefore described. At the center of the rear bolster the latter is provided with a U-shaped iron strap B^3, bolted to the lower surface of the bolster, to form a guide for the rear end of the reach.

A main advantage gained by the construction above described is that, the axles being rigidly secured to the sand-board and rear bolster at two separate points at each end, a truss construction is afforded, giving much greater strength to the axle; in other words, by the rigid connection of the sand-board and rear bolster with the axles, the entire strength of the wooden sand-board and rear bolster is utilized to give additional strength and stiffness to the axle. In prior constructions in which a wooden axle-stock is used the stock is commonly tapered at its ends, so as to give little additional strength or rigidity to the outer ends of the axle, while the stock can seldom be fitted to the cylindric and bent axle with such accuracy that the parts will be in bearing throughout their entire lengths. In our improved construction the axle-stock is done away with, while at the same time a stronger axle is secured. When a tubular sleeve or longitudinal casting is employed as a means of connecting the tables with the axle, furthermore, the additional advantage is obtained of re-enforcing the axle a considerable distance back of the axle-arms, thereby greatly adding to the strength and rigidity of the same.

Instead of securing in place the sleeve, made as above described, by forcing it upon the tubular axle, it may be shrunk upon the axle by heating the sleeve and placing it thereon while hot.

The same general results as above set forth may be obtained by a construction in which the rear bolster or sand-board is attached to the front or rear axle otherwise than by the use of a tubular sleeve secured upon the axle in the manner above described—as, for instance, a split sleeve may be used, which is clamped upon the axle by suitable bolts, or the supports or tables for sustaining the sand-board or bolster may form part of a longitudinal casting, and which is fitted to the top surface of the axle and secured thereto by bolts or clips; or, instead of separate tables, single wide or long tables may be used at each end of the axle, or more than two narrow or separate tables may be used, or such narrow tables may be separate from each other and independently secured to the axle. In either case the desired result is obtained of providing a rigid attachment between the axle and sand-board or bolster at both ends of the axle.

As shown in said Figs. 11 and 12, A is the axle, and D the rear bolster.

J is a metal casting having the general form of a tubular sleeve, but provided with longitudinal side openings or slots extending from the inner end of the sleeve to a point near the axle-collar, so as to give a U-shaped form of the casting. In other words, the sleeve is split to allow the opposite sides thereof to be clamped against the axle. Upon said casting J, at its outer end, is a horizontal supporting plate or table J′, to which the rear bolster is secured, and at the opposite or inner end of the casting is located a similar horizontal table J^2, which supports the hound. These tables are made in the same manner as the tables E′ E^2, hereinbefore described, and in the case of the front axle will serve for the connection of the sand-board and front hound in the same manner as hereinbefore stated.

K K K are U-shaped metal bars or clips passing around the casting J and acting to clamp the parts of the same against the axle. In the particular construction shown said casting is provided at its lower part with horizontal outwardly-extending lugs j, through which pass the lower ends of the clips K, the latter being provided with nuts k on their threaded ends below the lugs, in the usual manner. In this instance the clips B′ B^2, for securing the rear bolster and hound to the casting J, are inserted at their ends through the tables J′ J^2, and are provided with nuts located below and in contact with said tables instead of reaching to the bottom of the axle, as in the other forms of the device hereinbefore described.

In Fig. 13, L is the longitudinally-arranged casting fitted to the top surface of the axle adjacent to the axle-collar and provided with horizontal elevated tables L′ L^2 for engagement with the rear bolster or sand-board and rear or front hound in the same manner as hereinbefore described. The rear bolster is shown in said Fig. 13 as being secured to the casting L by clips B′ B^2, passing through the

said tables L′ L², and having nuts resting against the under surfaces of the tables in the same manner as shown in Fig. 11. The axle shown in Fig. 13 is shown as provided with a collar A′, made separate from the casting L, and shrunk or forced upon the axle. Said casting L is secured to the axle by means of clips M M M, which embrace the casting at either side of and between the tables L′ L². Two of said clips are arranged to pass at their lower ends through cross-bars M′ M′, which are fitted to the lower surface of the axle in the manner clearly shown in Fig. 14, and a third clip nearest the axle-collar A′ is desirably inserted through laterally-projecting lugs *a′ a′*, cast upon said collar A′, in the manner clearly shown in the drawings.

In Figs. 15 and 16 the axle is shown as connected with the bolster by means of a sleeve E, having cast upon its upper part a single longitudinally-arranged elevated table E³, extending from the hound outwardly to a point near the end of the bolster, and connected with a lower table E⁴, supporting the hound. In this instance a clip B³ passes through the hounds and engages the table E⁴, and two clips B′ B′ engage the table E³.

In Figs. 17 and 18 the connection between the axle and bolster is formed by two separate tables or interposed castings E⁵ E⁶, which are clamped to the axle and secured to the bolster by clips B′ B². In this instance the outer table or casting E⁵ is cast integral with an axle-collar E⁷, which is shrunk or forced upon the axle, and is additionally held by means of bolts *e*⁴, which pass through lugs or ears at the sides of the casting E⁵, and through a plate E⁸, which is fitted to the bottom of the axle. The table or casting E⁶ is shown as fitted to the upper part of the axle and held thereon by means of bolts passing through lugs on the casting and through a plate E⁹, which fits and bears against the lower surface of the axle.

The construction shown in Figs. 17 and 18, while of great advantage as affording a rigid connection between the ends of the bolster and axle, we do not consider as desirable as the other forms illustrated, in which the elevated tables or castings interposed between the axle and bolster or sand-board are formed upon a longitudinal sleeve or casting, which serves to re-enforce the end portions of the axle.

We have herein shown the axles A as made cylindric and tubular; but it is entirely obvious that the features of construction herein described and claimed may be employed as well in connection with axles of other shape.

As an improved means of connecting the forward end of the reach with the front axle we employ the following construction:

N is the reach, which is provided at its forward end with a vertical cylindric hole and herein shown as formed in a metal casting N′, which is secured to the reach by bolts *n′ n²*.

O is a metal casting, which is located over and secured to the metal axle A. Said casting O is provided with a horizontal top surface, upon which the forward end of the reach rests, and with a cylindric vertically-arranged bearing stud or pivot *o′*, which is adapted to fit within the opening *n* of the reach. At its lower part the casting O is recessed to fit against the cylindric surface of the axle, and said casting is held upon the axle by means of the casting and through the ends of a plate O², which is fitted to and bears against the lower surface of the axle. The front bolster is pivotally connected with the sand-board by means of a king-bolt P, which reaches to and enters a central aperture *e′*, formed in the casting O to receive the same.

The top of the bearing stud or pivot O′ is located at such distance below the lower surface of the sand-board that in connecting the reach with the front axle the front end of the reach may be inserted between the top of said pivot and the under surface of the sand-board and then dropped over the pivot. After the front end of the reach has been engaged with the pivot O′ in the manner described, however, it is desirable that the reach should be held from being lifted and disengaged from said pivot, and for this purpose we have placed upon the reach a pivoted dog or detent Q, which is adapted to be swung beneath the sand-board after the reach has been engaged with the pivot, so as to engage the under surface of the sand-bar and prevent the reach being lifted sufficiently far to free it from the pivot. Said dog or detent Q, as herein shown, consists of a horizontal plate pivoted at one end to the reach by means of a pivot-bolt *q*, and provided at its opposite end with a depending lug *q′*, adapted to rest upon the top surface of the casting N′ when the dog is swung around over the pivot O′, and to thereby maintain the dog in its horizontal position.

In order to hold the dog from shifting after it is placed in its forward or locked position, it is provided with an aperture *q*² of proper size to receive the king-bolt P, and in inserting the reach the king-bolt is inserted through said aperture after the reach has been placed upon the pivot and the dog swung around into place with its aperture in line with the king-bolt. The dog is thus locked positively from movement, and possibility is avoided of the disengagement of the reach from the pivot without first removing the king-bolt and then swinging the dog laterally from beneath the sand-bar.

A principal advantage gained by the use of the connecting device described is, that it takes the strain from the king-bolt and brings it directly upon the front axle.

The several metal parts herein shown and described may obviously be made of either cast or wrought metal, as found convenient or desirable in practice.

We claim as our invention—

1. The combination, with a metal axle, of a

sand-board or bolster located over and extending the full length of the axle and rigidly clamped to the said axle at two or more separate points near each end of the same, substantially as described.

2. The combination, with a metal axle, of a sand-board or bolster and metal parts or castings secured to each end of the axle adjacent to the axle-arm, each of said metal parts or castings being provided with two or more elevated tables or plates, by which the sand-board or bolster may be rigidly secured to the axle at two or more separate points near each end of the same, substantially as described.

3. The combination, with a metal axle, a sand-board or bolster, and front or rear hounds, of metal parts or castings secured to the axle near the axle-arms, said castings being each provided with table or plate near its outer end to engage the sand-board or bolster, and with a second table near its inner end to engage the hounds, and bolts or clips securing the sand-board or bolster and hounds to the said casting, substantially as described.

4. The combination, with a sand-board or bolster and a metal axle, of metal sleeves placed around the axle near the ends of the same, said sleeves being each provided with two tables or plates, by which the sand-board or bolster may be rigidly secured thereto at two separate points, substantially as described.

5. The combination, with a metal axle and sand-board, of castings secured upon the axles adjacent to the axle-arms and provided with upwardly-extending horizontal plates or tables supporting the sand-board free from the axle, a reach passing beneath the sand-board, and a metal casting for supporting the reach secured to the upper surface of the axle, substantially as described.

6. The combination, with a metal axle and sand-board which are connected with each other with a space between them, of a reach having an aperture in its front end, and a metal casting for supporting the reach, secured to the upper surface of the axle and provided with an upwardly-projecting cylindric part forming a pivot for the reach, the top of said cylindric part being located below the adjacent surface of the bolster a distance not less than the thickness of that part of the reach which engages the said cylindric part, substantially as described.

7. The combination, with a metal axle and sand-board which are connected with each other with a space between them, of a reach having an aperture in its front end, and a metal casting for supporting the reach, secured to the upper surface of the axle and provided with an upwardly-projecting cylindric part forming a pivot for the reach, and a horizontally-swinging detent or dog pivoted to the reach and adapted to enter between the top of the same and the lower surface of the sand-board, substantially as described.

8. The combination, with a metal axle and sand-board which are connected with each other with a space between them, and a king-bolt, of a reach having an aperture in its front end, and a metal casting for supporting the reach, secured to the upper surface of the axle and provided with an upwardly-projecting cylindric part forming a pivot for the reach, and a horizontally-swinging detent or dog pivoted to the reach and adapted to enter between the top of the same and the lower surface of the sand-board, the said dog or detent being provided with a hole or aperture to receive the king-bolt, substantially as described.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

MARTIN CONRAD.
CHRISTOPH HOTZ.

Witnesses:
C. CLARENCE POOLE,
GEO. W. HIGGINS, Jr.