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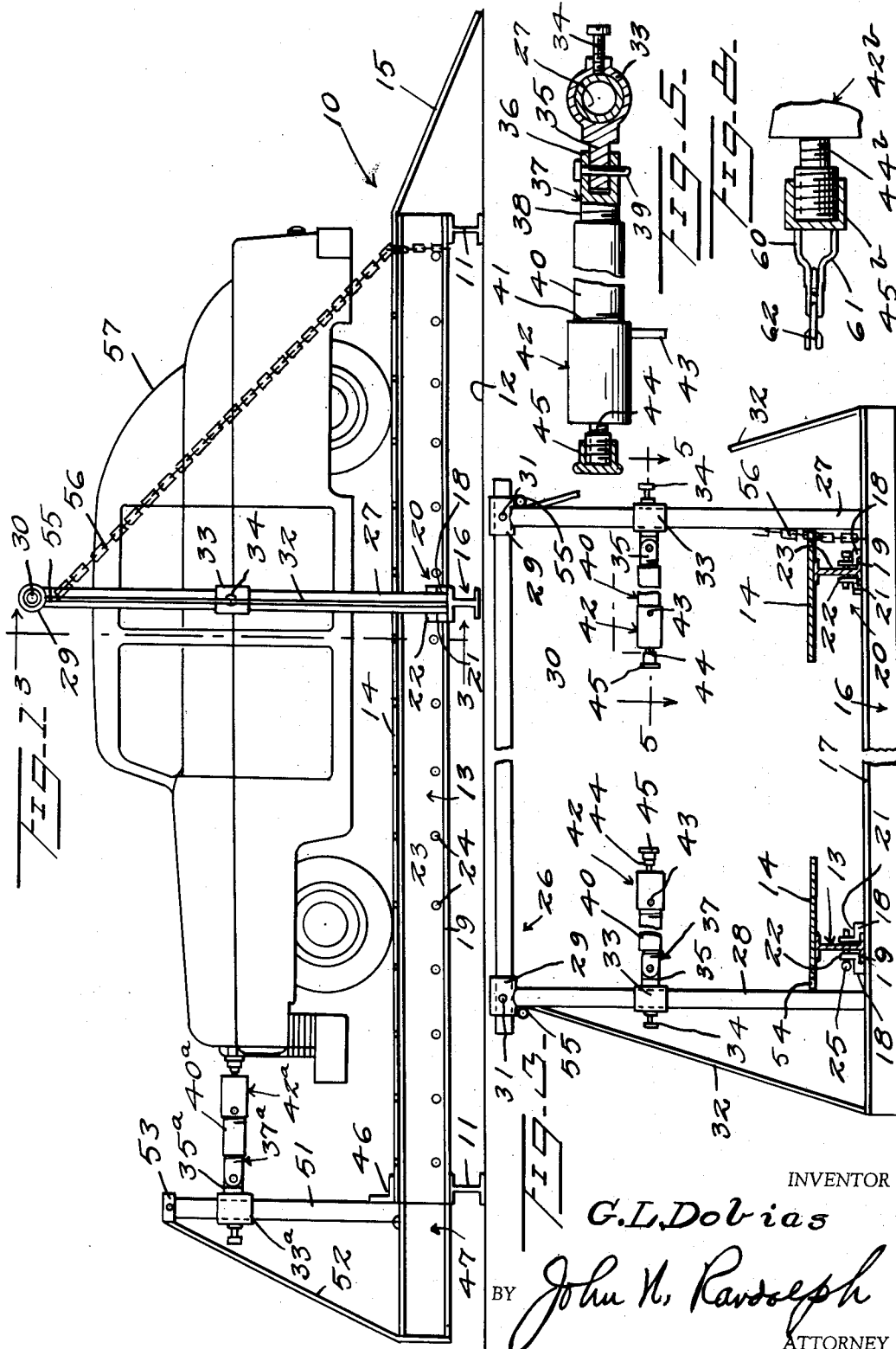
G. L. DOBIAS

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VEHICLE BODY AND FRAME STRAIGHTENING APPARATUS

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2 Sheets-Sheet 1



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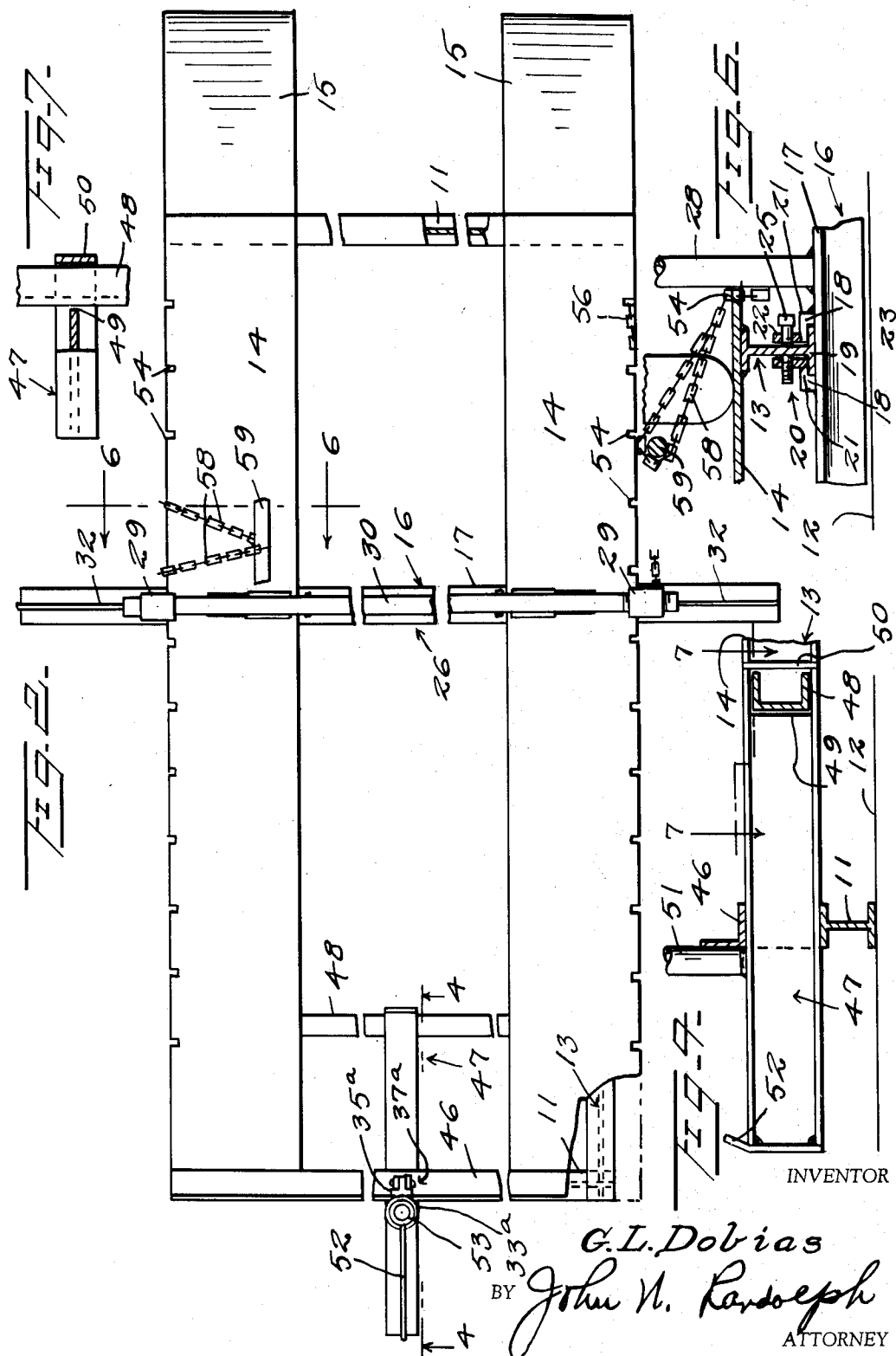
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## VEHICLE BODY AND FRAME STRAIGHTENING APPARATUS

George L. Dobias, Mount Pleasant, Mich.

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3 Claims. (Cl. 153—32)

This invention relates to a novel apparatus for straightening vehicle bodies and frames and has for its primary object to provide a device capable of straightening vehicle bodies by applying a pushing or pulling pressure on the outside of the vehicle body, rather than from the inside of the body, as is conventional, which latter operation results in damage to other parts of the vehicle body.

Another object of the invention is to provide an apparatus which may exert a push or pull on any part of the vehicle body to effect a straightening thereof and while at the same time a counterpush or pulling action of a different force or pressure may be exerted on another part of the body so as to prevent damage to the last mentioned part of the body, as the first mentioned part thereof is straightened.

A further object of the invention is to provide an apparatus which may be utilized for straightening any part of a vehicle and by means of which a pushing or pulling force may be exerted in any direction against a vehicle part to be straightened.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view of the apparatus;

Figure 2 is a fragmentary top plan view thereof;

Figure 3 is a cross sectional view of the straightening apparatus taken substantially along a plane as indicated by the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary longitudinal sectional view taken substantially along a plane as indicated by the line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary horizontal sectional view taken substantially along a plane as indicated by the line 5—5 of Figure 3;

Figure 6 is an enlarged fragmentary cross sectional view taken substantially along a plane as indicated by the line 6—6 of Figure 2;

Figure 7 is a fragmentary horizontal sectional view taken substantially along a plane as indicated by the line 7—7 of Figure 4, and

Figure 8 is a fragmentary sectional view, partly in elevation, similar to the left-hand end of Figure 5, showing the use of a pulling ram.

Referring more specifically to the drawings, the body and frame straightening apparatus in its entirety and comprising the invention is designated generally 10. The apparatus 10 includes a pair of crossbeams 11, each constituting an eyebeam and which are adapted to rest on a suitable supporting surface, such as a floor surface 12. The eyebeams 11 provide supports for a pair of substantially parallel longitudinally extending eyebeams 13, end portions of which rest on and are suitably secured to the ends of the crossbeams 11. A pair of relatively wide, rigid metal plates 14, rest on and are suitably secured to the upper flanges of the longitudinal eyebeams 13 and extend from end-to-end thereof. As seen

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in Figure 3, the plates 14 are substantially wider than the flanges of the eyebeams 13 and each extends inwardly a substantial distance therefrom and also outwardly thereof. The plates 14 are longer than the eyebeams 13 and have end portions 15 disposed beyond corresponding ends of the eyebeams 13 which are inclined downwardly and outwardly from the eyebeams and the outer distal ends of which are adapted to rest upon the supporting surface 12. Said end portions 15 provide ramps for the runways or tracks formed by the parts 13 and 14.

An eyebeam 16 is disposed transversely beneath the eyebeams 13 and between the crossbeams 11 and is of a sufficient length to extend outwardly from both of the runways 13 and 14, as best seen in Figures 2 and 3. As best seen in Figure 3, the upper flange 17 of the eyebeam 16 has pairs of spacing blocks 18 secured thereon, between which the bottom flanges 19 of the longitudinal eyebeams 13 are loosely disposed. The spacing blocks 18 form depending extensions of outer ends of base portions 21 of angle members 20. The base portions 21 loosely overlie the side portions of the flanges 19. The angle members 20 have upright flanges 22 which loosely straddle a web 23 of the eyebeams 13, for slidably supporting the eyebeam 16 beneath said eyebeams 13. The eyebeam 16 has a vertical thickness from top to bottom thereof slightly less than the thickness of the crossbeams 11, measured in the same manner, so that the bottom flange of the eyebeam 16 is supported by the eyebeams 13 slightly out of contact with the surface 12, to permit said eyebeam 16 to slide beneath the eyebeams 13 longitudinally of the runways, between the crossbeams 11. As seen in Figure 1, the webs 23 of the eyebeams 13 are provided with longitudinally spaced openings 24 disposed in equally spaced relationship to the bottom flange 19 for selectively receiving pins 25 which extend through the upright bracket portions 22 for connecting the eyebeam 16 to the eyebeams 13 to retain said eyebeam 16 against sliding movement relatively to the eyebeams 13 and in a desired adjusted position relatively to the runways 13, 14.

The eyebeam 16 constitutes a base of an arch, designated generally 26. The arch 26 includes a pair of uprights 27 and 28 preferably of circular cross section and which may be formed of rigid lengths of pipe. The lower ends of the uprights 27 and 28 are suitably secured to the top flange of the eyebeam 16 and extend upwardly therefrom in substantially parallel relationship and are disposed outwardly of the longitudinal beams 13 and plates 14. The uprights 27 and 28 are provided with sleeves 29 which are fixed to the upper ends thereof and disposed transversely of the uprights. A member 30 of circular cross section, preferably a length of pipe, constitutes the top portion of the arch 26 and has its ends extending through the sleeves 29 and secured thereto by suitable setscrews 31 which are threaded radially into the sleeves 29. The top member 30 braces the upper ends of the uprights 27 and 28 and prevents movement of the uprights relatively to one another. Each upright 27 and 28 is also provided with a diagonal brace 32 which is secured thereto adjacent the upper end of the upright. The braces 32 extend downwardly and outwardly from the uprights and are secured at their lower ends to the outer ends of the eyebeam 16, to afford additional brace means for said uprights.

A collar or sleeve 33 is slidably and turnably mounted on each upright 27 and 28. Each collar 33 has a setscrew 34 which is threaded radially into the bore thereof for engagement with the upright to clamp the sleeve 33 in any adjusted position on the upright both longitudinally and angularly thereof. Each collar 33, as best seen in Figure 5, has a laterally projecting arm 35 which is cir-

cumferentially spaced from the setscrew 34 and which fits loosely in a bifurcated end 36 of a connector 37 which has an opposite externally threaded end 38. A pin 39 extends loosely through registering openings of the furcations of the bifurcated end 36 and of the arm 35 for swingably and detachably mounting the connector 37 on said arm 35. A pipe 40, of any desired length, forms an extension of the connector 37 and has an internally threaded end which threadedly engages over the externally threaded end 38 of the connector and an opposite externally threaded outer end which is threadedly and detachably secured in an internally threaded socket 41, constituting the rear end of a fluid pressure jack 42 of conventional construction, such as a hydraulic or pneumatic jack or ram. A fluid medium under pressure is supplied to the cylinder of the ram 42 through a conduit 43 which leads from a suitable pump or pressure source. The conduit 43 is tapped into the cylinder of the ram. The fluid medium under pressure forces the ram plunger 44 to move from right to left, as seen in Figure 5, from a retracted to an extended position. A suitable head 45 is detachably connected to the outer end of the plunger 44 to engage and exert a force against a part to be straightened by operation of the ram 42.

A cross brace 46, preferably formed of angle iron, is disposed over the runway 13, 14, at the ends thereof located remote from the ramps 15, and is secured to the upper surfaces of the plates 14 in any suitable manner. As best seen in Figure 4, said cross brace 46 is disposed directly above one of the end cross braces 11 and is spaced therefrom. A supporting base 47, preferably comprising a short length of eyebeam, is disposed between the cross braces 11 and 46 and transversely thereof and is located between and substantially parallel to the ends of the runways 13, 14, which are located remote from the ramps 15. An intermediate portion of the base 47 is disposed between said cross braces 11 and 46 and is disposed for sliding movement transversely of the apparatus 10 toward and away from the runways 13, 14. A cross brace 48, preferably formed of channel iron, extends between the eyebeams 13 and is secured at its ends thereto. The cross brace 48 is located adjacent the cross brace 46. The eyebeam 47 at its inner end is provided with a notch 49 in the web portion thereof which slidably receives the cross brace 48 and a plate 50 is secured across the open end of the notch 49 at the inner end of said eyebeam 47. The cross brace 48 fits loosely in the opening thus formed by the notch 49 and plate 50 so as to permit the eyebeam 47 to slide relatively thereto and to prevent swinging movement of said eyebeam. An upright 51, preferably in the form of a rigid pipe is secured to and rises from the top flange of the base 47, outwardly with respect to the cross brace 46 and is preferably disposed in sliding engagement with said cross brace 46, to combine with the brace 48 to retain the base 47 parallel to the longitudinal axis of the apparatus 10. A diagonal brace 52 has a lower end secured to the outer end of the base 47 and extends upwardly and inwardly therefrom and is secured at its opposite end to a cap 53, which is mounted on and secured to the upper end of the upright 51.

The upright 51 carries a collar 33a, arm 35a, connector 37a, extension 40a, and a ram 42a, corresponding to the parts 33, 35, 37, 40 and 42, respectively, as previously described in detail.

The outer edges of the plates 14, which are spaced outwardly from the upper flanges of the eyebeams 13, are provided with longitudinally spaced outwardly opening notches 54. The uprights 27 and 28, adjacent their upper ends and on their outer sides, are provided with connecting eyes 55 to which complementary ends of chains 56 are secured. The chains 56 extend downwardly at an angle from the eyes 55 and in a direction longitudinally of the apparatus 10 and each has a link thereof, located near its opposite end, engaging in one of the notches 54

and so that a link immediately therebeneath and located at a right angle to the link engaged in the notch 54, will abut against the underside of the plates 14 to thus anchor the chain 56 to said plate. The chains 56 may extend longitudinally in either direction from the uprights 27 and 28. A chain 56 is utilized as illustrated in Figure 1 when the collar 33 of the upright 27 is to be turned so that the ram 42 will exert a thrust in a direction to the right or at an angle obliquely to the right of the upright 27 as seen in Figure 1, and so that the chain 56 will thus function as an additional brace to resist the longitudinal force thus exerted against the upright 27. The chain 56 will be similarly disposed if a pulling ram is substituted for the ram 42 and the collar 33 is turned so that the parts carried thereby extend to the left of the upright 27, as seen in Figure 1.

The top portion 30 of the arch 26 is located at a sufficient elevation so that an automobile can be driven onto the runways 13, 14 up the ramps 15 into a position as illustrated by the automobile 57 in Figure 1, with a part thereof disposed within the arch 26. The rams 42 can then be adjusted both vertically and angularly relatively to the uprights 27 and 28 to exert pushing forces against desired portions of the vehicle 57 to be straightened and which may comprise parts of either the frame or body. It will also be apparent that the parts 37, 40 and 42 may be swung relatively to the arms 35 to position said parts at different vertical angles as well as at different horizontal angles. Normally, the rams are carried by extensions 40 of sufficient length so that each ram head 45 will push outwardly on a side of the vehicle 57 located remote from the upright 27 or 28 by which said ram is supported. In this manner, straightening forces are exerted against the inner sides of the metal of the body to prevent marring thereof. Additionally, by simultaneously exerting forces outwardly against opposite portions of a vehicle and which forces may be of varying pressure, in the straightening of one bent vehicle part, the opposite vehicle part will not be twisted or bent by the straightening force. As previously described, it will also be apparent that forces exerted by the rams 42 may be in directions longitudinally as well as laterally of the apparatus 10 or at various angles relatively thereto.

It will also be apparent that the ram 42a may be utilized for straightening the front end of the vehicle 57 and by backing the vehicle onto the runways 13, 14, the ram 42a may be similarly employed for straightening the rear end of the vehicle.

Normally, the vehicle 57 is anchored down to the runways 13, 14 while the body or frame thereof is being straightened. This may be accomplished as illustrated in Figures 2 and 6 by engaging lengths of chain 58 around frame portions 59 of the vehicle 57 and anchoring end portions of the chain 58 in selected notches 54, in the same manner that the chains 56 are anchored in the notches 54, as previously described.

It will also be obvious that conventional pulling jacks 42b may be substituted for the pushing jacks or rams 42 and 42a. Such pulling rams 42b have heads 45b threadedly connected to the outer ends of the plungers 44b thereof. Each head 45b has an outwardly extending bail 60 the outer portion of which is restricted to define an inwardly opening notch 61, in which a link of a chain 62 can be detachably anchored, in the same manner that links of the chains 56 and 58 are anchored in the notches 54. The other end of each chain 62, not shown, may be equipped with a conventional body or frame engaging hook or clamp, not shown, which may be secured to a body or frame part to be straightened and so that a pulling force may be exerted on said part. As previously described, pulling forces exerted in opposite directions are normally applied simultaneously to opposite body or frame portions so that in straightening one part an opposite part will not be bent or twisted.

Various modifications and changes are contemplated

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and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A straightening apparatus of the character described comprising a pair of elongated runways, cross braces disposed beneath and secured to the ends of said runways and supporting the runways in elevated substantially parallel positions, a base member extending transversely beneath said runways, means slidably connecting said base member to bottom portions of the runways for supporting the base member beneath the runways for sliding movement longitudinally thereof, a pair of uprights fixed to and raising from said base member, said uprights being disposed on outer sides of the runways, a pair of fluid pressure actuated rams, means detachably connected to and rising from said base member, said uprights being for adjustably supporting said rams relatively to the uprights in desired positions to engage parts of a vehicle mounted on the runways between the uprights, a second base member disposed between corresponding ends of said runways and slidably supported on the cross brace supporting said runway ends for sliding movement of said second base member transversely of the runways, means retaining said second base member against swinging movement relatively to the runways, an upright fixed to and rising from said second base member and disposed beyond said runway ends, a third fluid pressure actuated ram, and means detachably and adjustably supporting said third ram on said last mentioned upright.

2. An apparatus as in claim 1, and ramps forming

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end portions of the runways located remote from said first mentioned runway ends.

3. A straightening apparatus of the character described comprising a pair of elongated runways, cross braces disposed beneath and secured to the ends of said runways and supporting the runways in elevated substantially parallel positions, a base member extending transversely beneath said runways, means slidably connecting said base member to bottom portions of the runways for supporting the base member beneath the runways for sliding movement longitudinally thereof, a pair of uprights fixed to and rising from said base member, said uprights being disposed on outer sides of the runways, a pair of fluid pressure actuated rams, means detachably connected to said rams and adjustably mounted on said uprights for adjustably supporting said rams relatively to the uprights in desired positions to engage parts of a vehicle mounted on the runways between the uprights, and anchoring chains adapted to engage around chassis portions of a vehicle disposed on said runway, said runways having notches formed in outer edges thereof for selectively receiving and anchoring end portions of said chains for anchoring the vehicle immovably on the runways.

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