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M. S. MERRILL

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APPARATUS FOR STRAIGHTENING FRAMES AND THE LIKE

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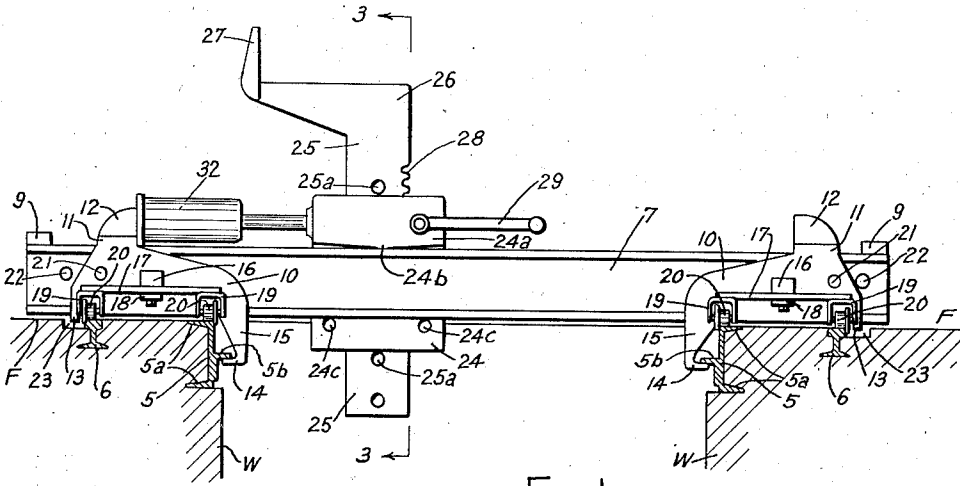


FIG. 1

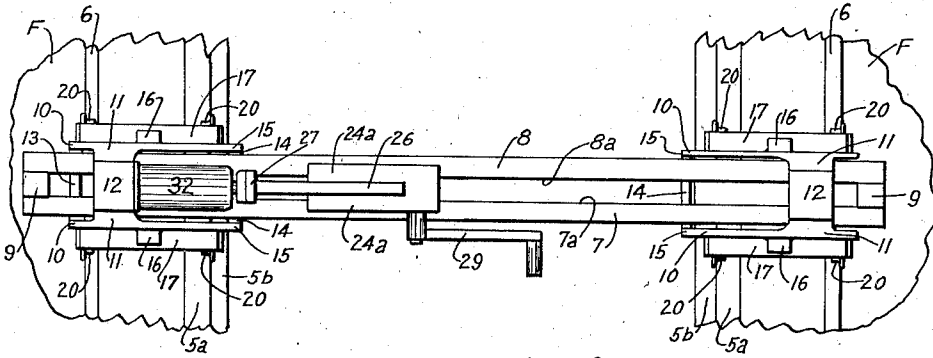


FIG. 2

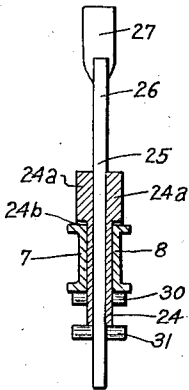


FIG. 3

INVENTOR.
MARCELLUS S. MERRILL
BY WHITEHEAD & VOGL
Attorneys
Per: *Earle Whitehead*

UNITED STATES PATENT OFFICE

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APPARATUS FOR STRAIGHTENING FRAMES AND THE LIKE

Marcellus S. Merrill, Denver, Colo.

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11 Claims. (Cl. 153—32)

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This invention relates to apparatus for straightening frames of automotive vehicles and the like and particularly for the straightening of such frames while in position in such vehicle.

The invention includes improvement upon and modification and adaptation of frame straightening apparatus of the type described in applicant's U. S. Patent No. 2,013,785.

Apparatus of this class is generally used on the concrete floors of garages and repair shops and is commonly positioned over a pit which provides space for both workers and depending portions of the apparatus as indicated at Figure 2 of the drawings of said former patent.

It will be understood that such apparatus requires a strong base, frame and anchorage to provide for the heavy pressures and stresses, exerted in operation, running as high as 30-40 tons, in straightening heavy frame parts, as in large trucks, etc.; accordingly, a heavy and expensive metal framework, set upon the floor, has commonly been used as a base for devices of this class. When thus positioned on the floor, in order to position the vehicle above the apparatus for operative purposes, it has been common to provide a runway, including a ramp, up which ramp and onto which runway over the apparatus the vehicle is propelled.

Such apparatus, by reason of its size and weight, is, and for practical purposes must be, left permanently positioned on the floor and over the pit, thus eliminating from use for other purposes, the floor space and pit covered by the apparatus.

One of the principal objects of the present invention is to mount such an apparatus in the pit wall and in the floor immediately adjoining the pit walls and in such a manner that suitably reinforced concrete in such walls and floor may be used in place of the present commonly used metal framework positioned on top of the floor thus eliminating the cost of such framework and making available, for use for other purposes, that portion of the floor space ordinarily occupied by such framework.

A further object is to provide, in the pit mounting described in the last above paragraph, means whereby the various elements of the straightening apparatus may be rolled along such mounting to the very end of the pit leaving the main portion of the pit free for other uses or to be covered by floor plates and made available as floor space when the straightening apparatus is not in use.

These objects and purposes will more fully ap-

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pear and further objects and purposes will appear in the following specification, including the definition thereof in the appended claims, and to these ends the invention comprises certain novel constructions, combinations and arrangements of parts as will now be described. The preferred embodiment thereof will be illustrated in the accompanying drawing in which:

Figure 1 is an elevation one of the frame straightening elements showing the mounting of the same in the walls of the pit and adjacent floor, the walls, floor and track elements mounted therein being shown in cross section;

Figure 2 is a plan of the structures illustrated in Figure 1;

Figure 3 is a detailed fragmentary sectional view of line 3—3 of Figure 1.

In my said prior patent I illustrated a plurality of members adapted to selectively hold and/or exert pressure upon any desired points in the frame of an automobile, such members being positioned at right angles to the side rails of the framework and movable along said rails and preferably rollingly supported thereon. These members were, in said patent, referred to as "holding-pressure units" and are, in said patent, illustrated and described, both as to structure and function, in detail.

The present invention likewise includes a plurality of "holding-pressure units" all of like structure and all of structure and function similar to that of the "holding-pressure units" in said patent, but with some modifications in structure, as herein illustrated and described. They will be hereinafter referred to simply as "units" and, as they are all alike and are all mounted in the pit walls and adjacent floor in the same manner and in and upon the same structure, only one of said units and one section of the mounting structure is illustrated.

The reinforced concrete floor is indicated at F and the reinforced concrete side walls of the pit are indicated at W.

In the top portion, and longitudinally, of the walls W, I embed flanges 5a of channel rails 5, the inner faces of the webs being seated solidly against the reinforced concrete, and being provided, on their outer faces, with longitudinal ribs 5b projecting from the rails into or toward the pit. In the floor F, suitably spaced from and parallel with rails 5, I embed rails 6, preferably of railroad rail type, with their tops preferably flush with the floor and co-planar with the tops of rails 5. These rails 5 and 6 extend longitudinally along that portion of the pit which is to be used

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for operation of the units and, combined with the reinforced concrete walls and floor, comprise the framework in and upon which said units operate as, and hereinafter referred to as, a base.

A unit includes beams 7 and 8, preferably of channel type, having interrelatively opposed parallel faces 7a and 8a and being affixed in such interrelative position by suitable means as by spacing blocks 9 between their end portions, the blocks being secured to the beams in suitable manner as by welding. The beams 7 and 8 thus form a track in which the frame engaging element, shown, centrally, of Figs. 1 and 2 and in detail at Fig. 3, is mounted and longitudinally along which said element may be moved to any desired point for operation. This element will be later described.

The unit is rollingly supported upon and engaged to the base by means of abutment brackets, illustrated at right and left ends of Figs. 1 and 2. Each bracket comprises sides 10 connected at their tops by bridge 11 carrying abutment 12 and connected at their bottoms by bridge 13 and hooked flange 14 which is formed integral with pendants 15 of sides 10, and which flange 14 is adapted to engage the underside and edge of rib 5b.

Each side 10 is provided with means, as lug 16, for attachment to the central portion of a spring 17, in any suitable manner, as by bolt 18, the ends of spring 17 being supported on yokes 19 supported by flanged rollers 20, said yokes being appropriately spaced apart so that one roller 20 of each pair of rollers will engage and roll along the outer edge of rails 6 and the other roller of each pair will engage and roll along the inner edge of rail 5, as clearly shown at Fig. 1.

The track composed of beams 7 and 8 normally rests on bridges 13 and the bottoms of sides 10 are normally spaced above and away from the tops of rails 5 and 6 and the floor therebetween, the support of the brackets in such normal position being accomplished by the strength of the springs 17 which are sufficiently strong to bear the weight of the unit without appreciable distortion of the springs so that, in normal position, the sides 10 and the beams 7 and 8 are all raised above the level of the floor and the tops of the rails 5 and 6 so that the unit may be freely rolled upon and along the rails 5 and 6.

A hole 21 is provided in each of the sides 10, said holes, in each pair of sides, being interrelatively aligned. As many as desired of holes 22 are provided through the webs of beams 7 and 8 and adapted to selectively align with the holes 21 whereby a pin may be inserted through the holes 21, and the hole 22 aligned therewith, to prevent interrelative longitudinal or vertical displacement of the track and the bracket.

The floor F is cut away along the rear edges of rail 6 as at 23 to provide for the flanges of rollers 20 and also for the bridges 13 when the same are depressed as hereinafter described.

It will be understood that various devices for establishing engagement between the unit track and the frame of an automobile may be mounted in or upon or otherwise engaged with the track. For example, a jack may be seated upon the unit track and its plunger engaged with the desired point in the frame of the automobile according to common practice and in the manner illustrated at Fig. 4 of my said prior patent. In such case, and in any case where substantial downward pressure is exerted upon the unit track, the springs 17 will be depressed and the bottom edges

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of sides 10 and/or the bottom faces of beams 7 and 8, constituting the unit track, will be brought to rest on the tops of rails 5 and 6 and upon the floor therebetween, whereby the rollers 20 and the yokes 19 will be relieved of the excessive pressure which, in such case, will be borne by the tops of the rails 5 and 6 and the intervening floor surface. In such case the bridges 13 will be received by the cutaways 23 in the floor. In such case, also, the hooked flanges 14 will be slightly lowered below and out of engagement with the bottoms of ribs 5b, it being understood that when the unit is supported in normal position, as illustrated at Fig. 1, the hooked flanges 14 have a sliding engagement with the underfaces of ribs 5b.

It will also be understood that devices may be anchored to the unit track and engaged with a portion of the frame of an automobile for exerting a downward pull on such portion of such frame. Such devices are in common use and their structures and uses are well understood, one form being illustrated at Figs. 6 and 7 of my prior Patent No. 2,042,856. In case of the use of any structure or device anchored to the unit track for exerting a downward pull on a portion of the automobile frame, the hooked flanges 14 engage the underfaces of the ribs 5b and, through sides 10 and bridges 11, anchor the track against upward movement.

In the drawing there is illustrated a frame engaging element of preferred embodiment for engaging selected portions of the automobile frame and this element comprises a sheath 24 adapted to slidably seat in the unit track and to slidably receive the stem 25 of a frame engaging member 26, the upper portion of which may be of any structure desired for conveniently and efficiently engaging any particular portion of the frame of an automobile, here conventionally shown as an upstanding lug 27. Any one of a variety of types of member 26, all having a stem 25, may be used to engage the frame in manner required by any job to be done.

The upper portion of the sheath 24 is thickened so as to project over and rest upon the tops of the beams 7 and 8, as at 24a, the bottom faces of the projecting portions being inclined upwardly from the central point 24b whereby the element as a whole may slightly rock longitudinally of the track and upon the points 24b.

The element is provided with suitable means for raising and lowering the member 26, convenient means being the provision of a rack 28 on one edge of the stem 25 and a pinion (not shown) mounted within the upper part of sheath 24 operated by a crank 29.

The sheath 24 is provided with seats 24c for the reception of pins 30 to engage the lower faces of the unit track and lock the element against movement longitudinally of the track when the element is tipped or rocked about the point 24b. The stem 25 is provided with holes 25a for the reception of pins 31 to limit the up or down movement of stem 25 relative to the sheath 24.

It will be understood that the frame engaging elements may be positioned in the unit track, as illustrated in the drawing, or in reverse position, bringing the lug 27 to the right of the element instead of to the left as illustrated. It will also be understood that a plurality of these elements may be positioned in the same track and/or in the tracks of other units so that, by adjusting the various units longitudinally of the base and positioning and adjusting the frame engaging

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elements longitudinally of their respective unit tracks, these elements may be so arranged as to engage the frame of the automobile at any desired points in order to exert pressure upon a selected point or selected points and/or to hold other selected points in the frame against such pressure. Pressure is exerted on a frame engaging element by the insertion of a jack, indicated at 32, between an abutment 12 and the thickened upper portion of the sheath 24 as clearly illustrated at the left at Figs. 1 and 2.

It will be understood that normally the unit track is longitudinally slidable in the brackets so that when the pressure of jack 32 is applied the frame engaging element will tip until it locks onto the track, as above described, whereafter the continued pressure of the jack, based against abutment 15, will cause the element to move forward, sliding the track in the brackets and pressing lug 27 against the portion of the frame with which it is engaged. In the units employed as holding units, the track will be locked in the brackets by means of pins inserted through holes 21 and 22 as above described.

It will be noted that a small amount of movement of the brackets transversely of the base, is allowed. This is provided for by making the distance between the lower extremities of the inner faces of right and left pendants 15 somewhat less than the distance between the edges of right and left ribs 5b so that there will be some space between one or the other (or both) of the inner faces of pendants 15 and the edge of rib 5b. This is illustrated at the right at Fig. 1 where the inner face of pendant 15 is illustrated as spaced somewhat from the edge of rib 5b. To the same end it will be noted that yokes 19 are wider than rollers 20, allowing some movement of the yokes laterally of the base.

I have not further described the use of the holding-pressure units and the frame engaging elements in actual application to and operation upon the frame of an automobile because, given a base and a plurality of units movable longitudinally of such base, the application of such units to and their operation upon the frame of an automobile is well understood by those skilled in the art and because, given such base and units, such application and operations are quite fully set forth in my said prior patents.

It will be found that two or three holding-pressure units will answer practically all operative requirements. Three are ordinarily provided. With these units mounted in and upon the base hereinabove described, all three units can be rolled along the base to the end of the pit and there packed together in a small space, leaving the major portion of the pit free for other uses, or it may be covered, and made available as floor space.

When it is desired to use the units for operation upon an automobile frame, the automobile is rolled along the floor, straddling the open pit, to the position desired for the operation. The end of the automobile nearest the units is then raised by a crane or any other suitable means and the units are rolled along the base to their desired respective positions beneath the automobile. The frame engaging elements may be then positioned as desired and the automobile lowered into the desired engagement.

When the operation is completed the automobile is again raised out of engagement with the units which may again be rolled back to non-use, assembled position at the end of the pit.

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It will be understood that many changes in detail of construction may be made without departing from the spirit and scope of the invention as described and illustrated or as defined in the appended claims.

I claim:

1. In apparatus for straightening frames of automobiles and the like, a base comprising a floor and a parallel-walled pit in the floor, having rails embedded in and along the top portions of said walls and in said floor, rollers, pairs of brackets adapted, by said rollers, to rest upon and roll along said base, one of each pair on each side of the pit, slidably interengaging means carried by the base and the brackets, and a holding-pressure unit carried in each pair of brackets and normally slidable therein transversely of said base and means for locking the unit to the bracket for limiting such sliding, the unit carrying an element adapted to engage selected portions of a frame positioned over the apparatus.

2. Apparatus as defined in claim 1, wherein the rails comprise primary rails embedded in the tops of said walls and secondary rails embedded in the floor parallel with but spaced from said primary rails, the top surfaces of said rails being co-planar with the surface of the floor.

3. In apparatus as defined in claim 1, said slidably interengaging means comprising ribs on the pit walls below the tops thereof and hooked members depending from the brackets within the pit and adapted to slidably engage the under faces of the ribs.

4. In apparatus as defined in claim 1, rollers adapted to roll along both of said rails, yielding means carried by said rollers and supporting said brackets, said yielding means being adapted to normally support said brackets and said units out of engagement with said base but, under added pressure, to yield and permit said unit to rest directly on said rails.

5. In apparatus as defined in claim 1, said base including primary rails embedded in the tops of said walls and secondary rails embedded in the floor parallel with but spaced from said primary rails, said primary rails carrying longitudinal ribs and said brackets having hooklike pendants adapted to slidably engage said ribs.

6. In apparatus as defined in claim 1, said base including primary rails embedded in the tops of said walls and secondary rails embedded in the floor parallel with but spaced from said primary rails, said primary rails being channelled in cross section and having their flanges embedded in the pit walls and their tops substantially flush with the floor.

7. In apparatus as defined in claim 1, said base including primary rails embedded in the tops of said walls and secondary rails embedded in the floor parallel with but spaced from said primary rails, said primary rails being channelled in cross section and having their flanges embedded in the pit walls and their tops substantially flush with the floor, and said secondary rails being substantially I shaped in cross section and having their tops substantially co-planar with the tops of the primary rails.

8. In apparatus as defined in claim 1, said brackets each comprising two side members bridged together at their tops and bottoms and said units each including an elongated beam-like member slidably resting within, and extending beyond said brackets.

9. In apparatus as defined in claim 1, said interengaging means being adapted to limit move-

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ment of the brackets upwardly from and transversely of the base, an abutment carried by each bracket, a frame engaging element carried by each unit and aligned with said abutment whereby a power exerting device based against said abutment may exert pressure against such element, and, through such element, upon the engaged portion of the frame.

10. In apparatus as defined in claim 1, said interengaging means being adapted to limit movement of the brackets upwardly from and transversely of the base, an abutment carried by each bracket, a frame engaging element carried by each unit and aligned with said abutment whereby a power exerting device based against said abutment may exert pressure against such element, said element being tipable relative to the unit and being adapted to tip and interlock with the unit responsive to such exertion of pressure thereagainst.

11. In apparatus of the character described, having a base and abutment-carrying brackets movable along said base, a holding-pressure unit

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including parallel spaced beams longitudinally slidable in said brackets transversely of the base, a sheath carried between and supported by, and adjustable longitudinally of, said beams and a frame-engaging member having a stem adapted to slidably fit within said sheath, said sheath being adapted to tip longitudinally of said beams and means for locking the sheath to the beams responsive to the tipping of the sheath.

MARCELLUS S. MERRILL.

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