

May 15, 1962

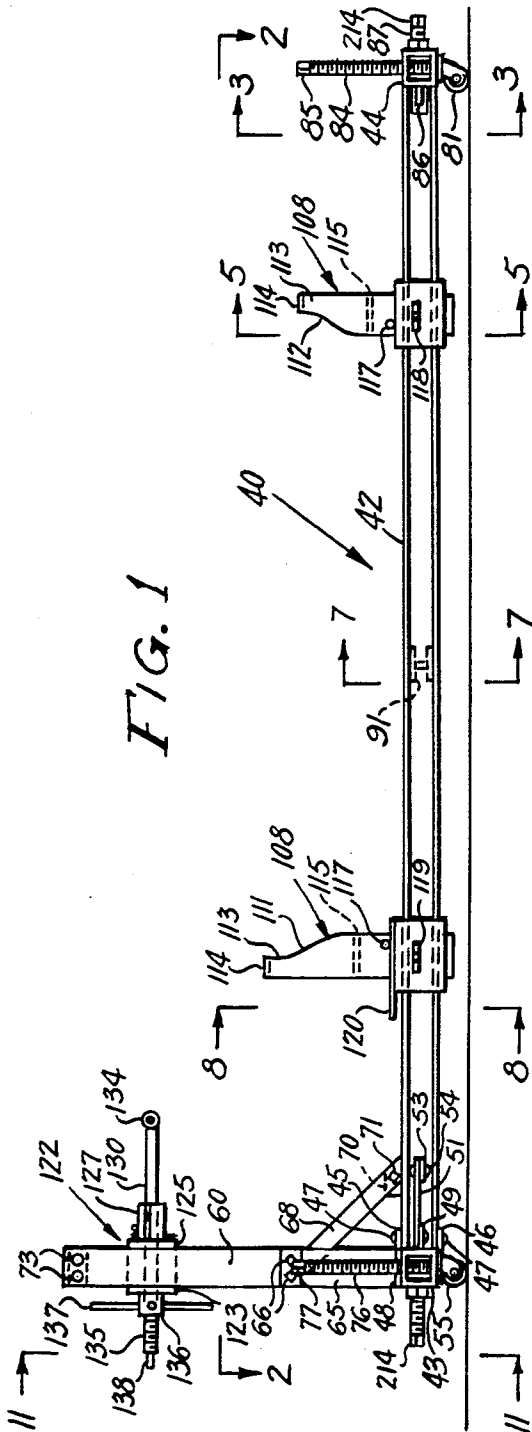
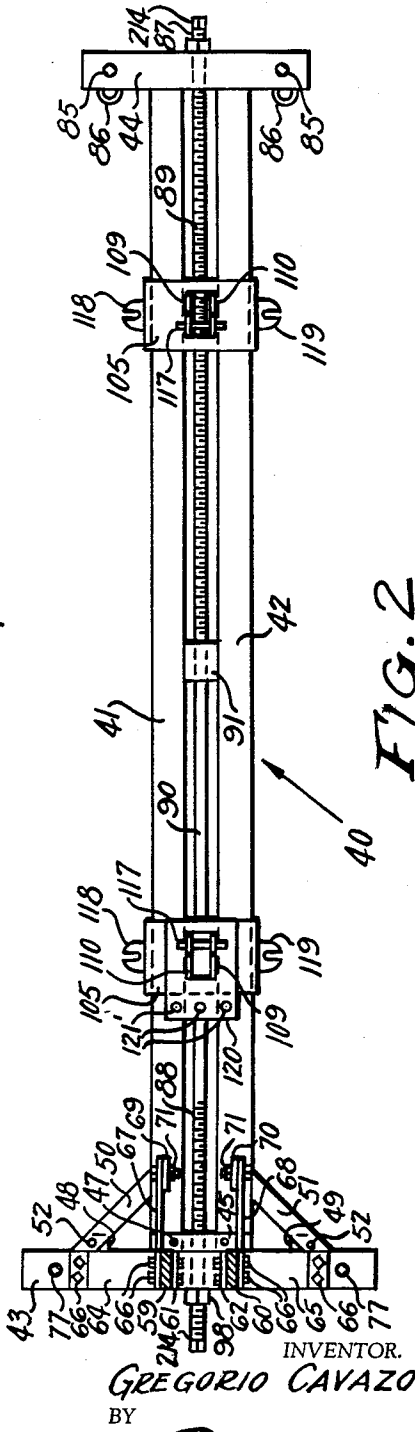
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3,034,564

AUTO BODY AND FRAME STRAIGHTENING MACHINE

Filed Sept. 21, 1959

5 Sheets-Sheet 1



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AUTO BODY AND FRAME STRAIGHTENING MACHINE

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5 Sheets-Sheet 2

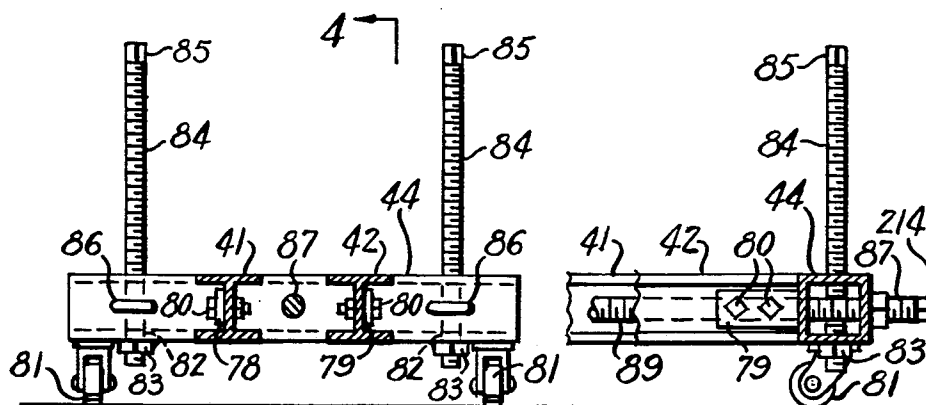


FIG. 3

FIG. 4

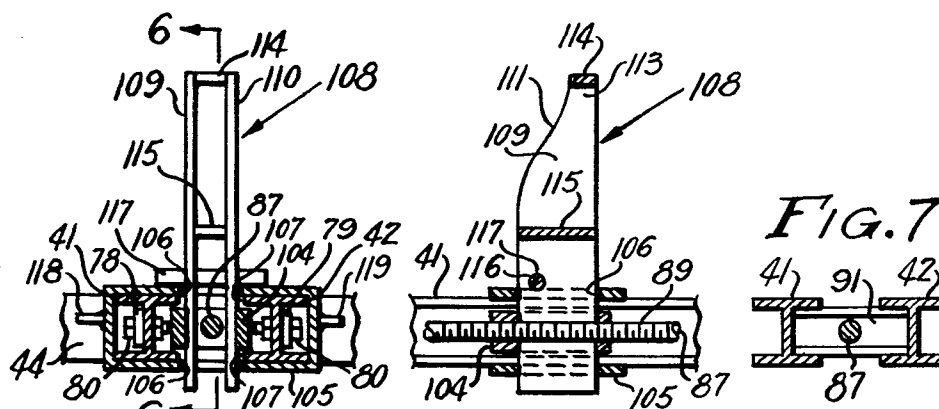


FIG. 5

FIG. 6

FIG. 7

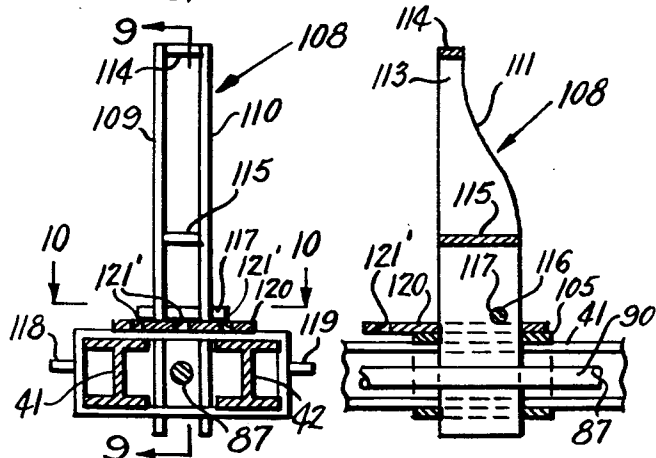


FIG. 8

FIG. 9

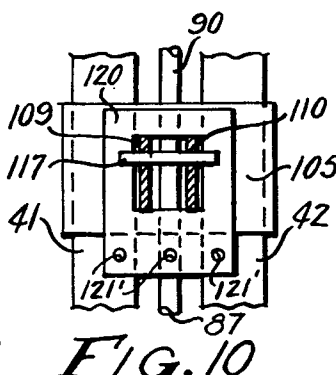


FIG. 10

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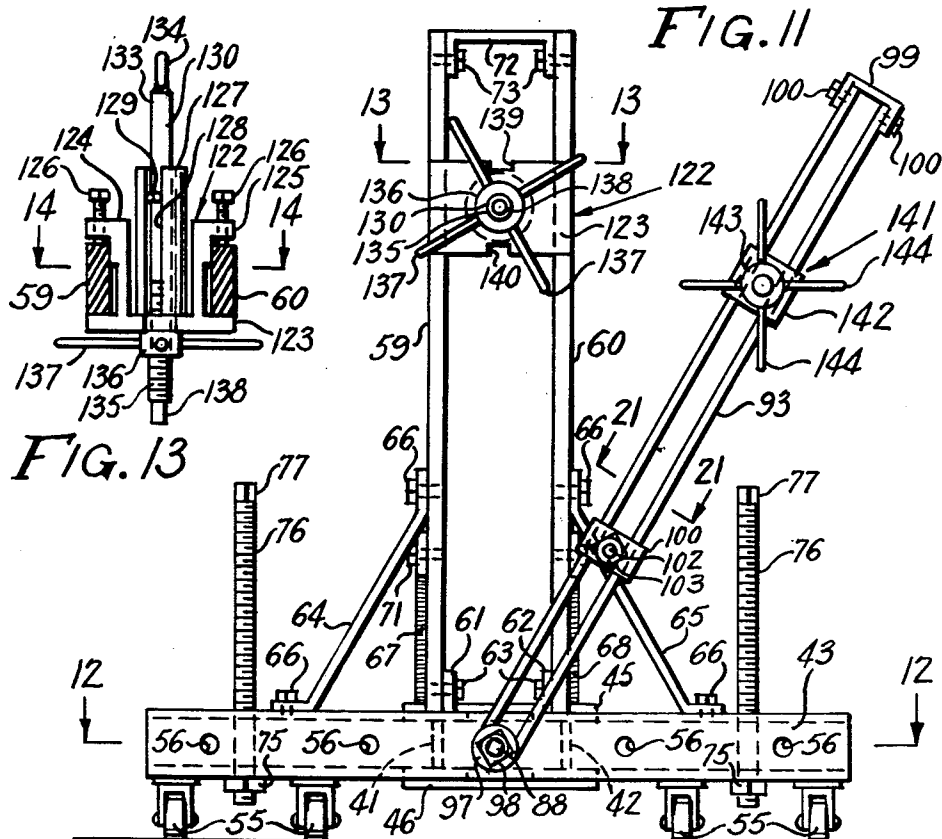
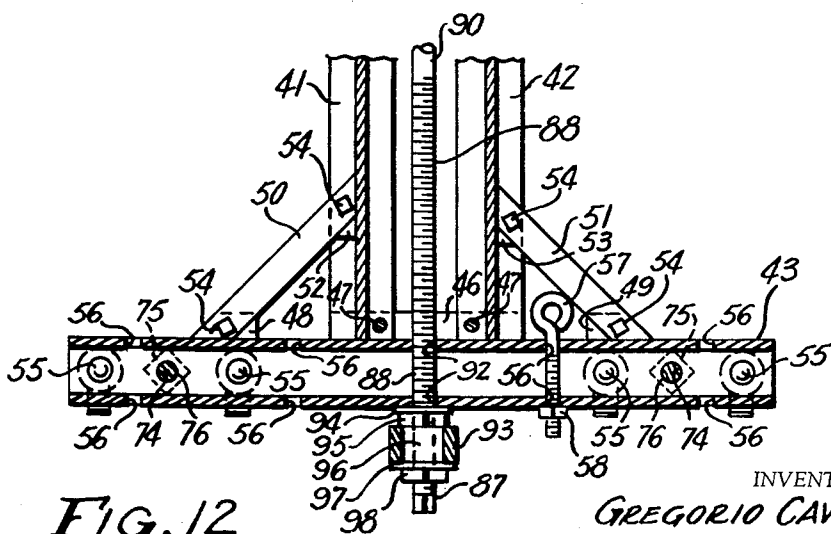


FIG. 12

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AUTO BODY AND FRAME STRAIGHTENING MACHINE

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5 Sheets-Sheet 4

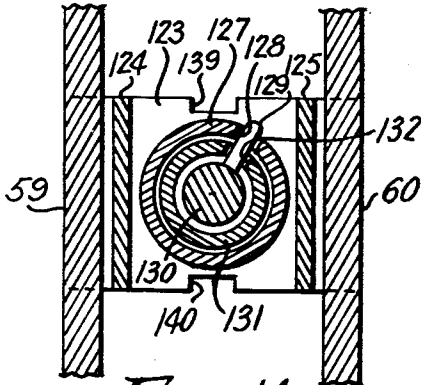


FIG. 14

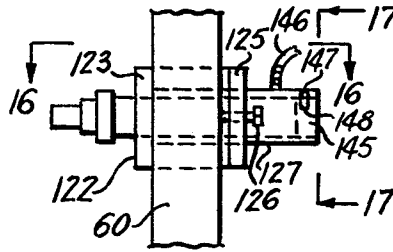


FIG. 15

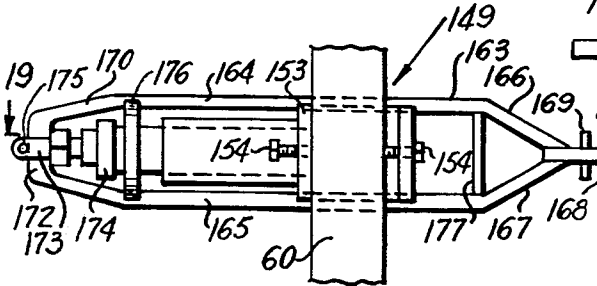


FIG. 18

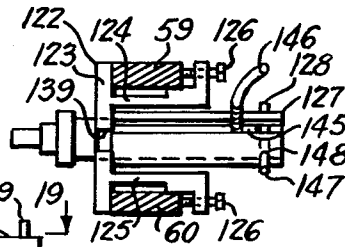


FIG. 16

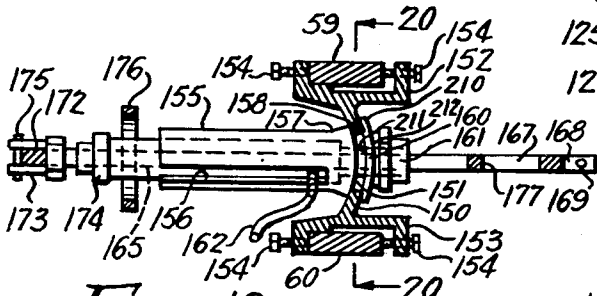


FIG. 19

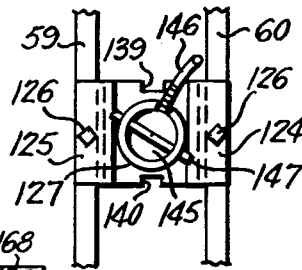


FIG. 17

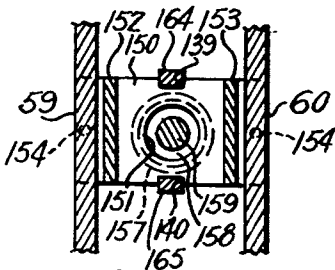


FIG. 20

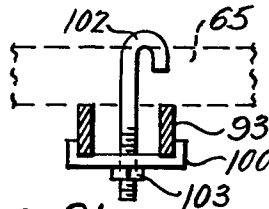


FIG. 21

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5 Sheets-Sheet 5

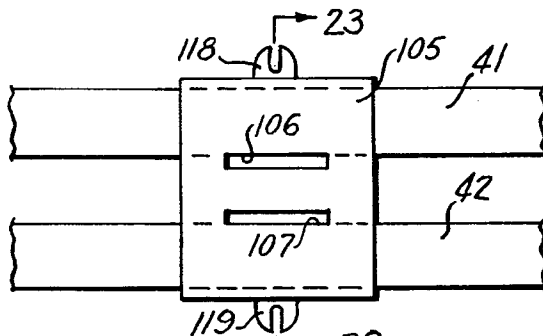


FIG. 22

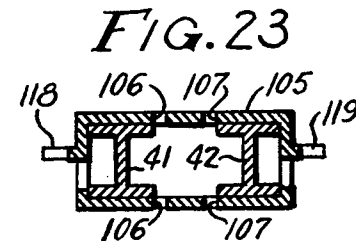


FIG. 23

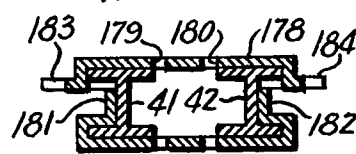


FIG. 24

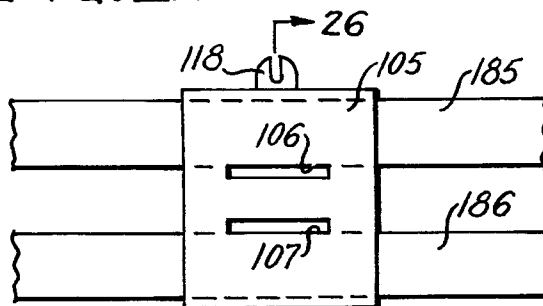


FIG. 25

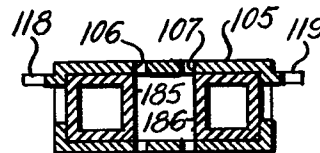


FIG. 26

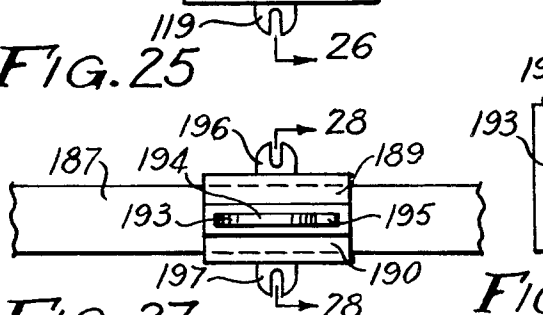


FIG. 27

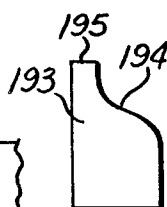


FIG. 29

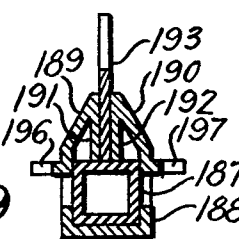


FIG. 28

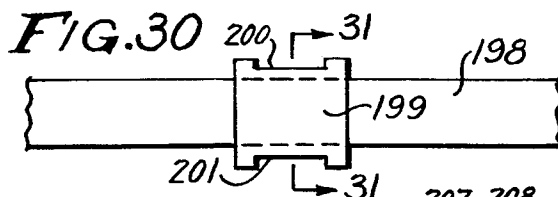


FIG. 30

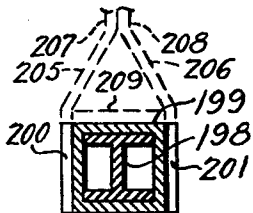


FIG. 31

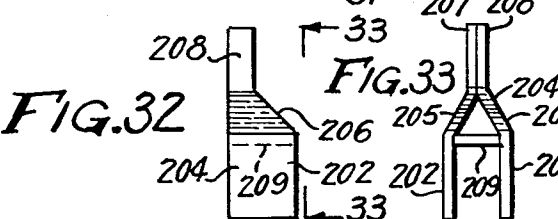


FIG. 32

FIG. 33

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3,034,564 AUTO BODY AND FRAME STRAIGHTENING MACHINE

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2 Claims. (Cl. 153—32)

This invention relates to improvement in auto body and frame straightening machines that are used to straighten auto frames and the body and parts of an automobile, such as doors, floors, turret tops, quarter panels, body posts, windshield frame and rear glass openings, bumpers, fenders, cowlings, seats and any other parts that may be damaged.

An object of this invention is to provide a portable auto body and frame straightening machine that is simple in construction and may therefore be operated by unskilled personnel.

Another object of the invention is to provide a machine of this type that can be used with automobiles of various sizes and makes and enable the operator thereof to save many man hours in performing a straightening operation.

With the above and other objects and advantages in view, the invention consists of the novel details and construction, arrangement and combination of parts more fully hereinafter described, claimed and illustrated in the accompanying drawings, in which:

FIG. 1 is a side elevational view of an auto body and frame straightening machine embodying the invention;

FIG. 2 is a longitudinal sectional view on the line 2—2 of FIG. 1;

FIG. 3 is an enlarged vertical sectional view on the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary vertical sectional view on the line 4—4 of FIG. 3;

FIG. 5 is an enlarged vertical sectional view on the line 5—5 of FIG. 1;

FIG. 6 is a vertical sectional view on the line 6—6 of FIG. 5;

FIG. 7 is an enlarged vertical sectional view on the line 7—7 of FIG. 1;

FIG. 8 is an enlarged vertical sectional view on the line 8—8 of FIG. 1;

FIG. 9 is a vertical sectional view on the line 9—9 of FIG. 8;

FIG. 10 is a transverse sectional view on the line 10—10 of FIG. 8;

FIG. 11 is an enlarged end view on the line 11—11 of FIG. 1;

FIG. 12 is a longitudinal sectional view on the line 12—12 of FIG. 11;

FIG. 13 is a transverse sectional view on the line 13—13 of FIG. 11;

FIG. 14 is a transverse sectional view on the line 14—14 of FIG. 13;

FIG. 15 is a fragmentary view showing a jack attachment for use with the machine;

FIG. 16 is a transverse sectional view on the line 16—16 of FIG. 15;

FIG. 17 is a vertical sectional view on the line 17—17 of FIG. 15;

FIG. 18 is a fragmentary view of another form of jack that is to be used with the machine;

FIG. 19 is a longitudinal sectional view on the line 19—19 of FIG. 18;

FIG. 20 is a vertical sectional view on the line 20—20 of FIG. 19;

FIG. 21 is a transverse sectional view on the line 21—21 of FIG. 11;

FIG. 22 is a fragmentary view showing the box support and frame for the machine;

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FIG. 23 is a vertical sectional view on the line 23—23 of FIG. 22;

FIG. 24 is a view similar to FIG. 23 showing a modified form of box support and the frame;

FIG. 25 is a fragmentary view showing another modified form of box support and frame;

FIG. 26 is a vertical sectional view on the line 26—26 of FIG. 25;

FIG. 27 is a fragmentary view showing still another modified form of box support and frame;

FIG. 28 is a vertical sectional view on the line 28—28 of FIG. 27;

FIG. 29 is a side elevational view of a foot grip bracket that is used with the modified form of FIG. 27;

FIG. 30 is a fragmentary view showing a still further modified form of box support and frame;

FIG. 31 is a vertical view on the line 31—31 of FIG. 30;

FIG. 32 is a side elevational view of a foot grip bracket that is used with the modified form of FIG. 30; and

FIG. 33 is a vertical edge view on the line 33—33 of FIG. 32.

Referring more in detail to the drawings, wherein like parts are designated by like reference numerals, the reference numeral 40 is used to generally designate an auto body and frame straightening machine embodying the invention.

In FIGS. 1 to 22 the machine 40 is shown to comprise a pair of parallel longitudinally arranged laterally spaced body, I or H-beams 41 and 42 having forward ends and rearward ends, which may be of any desired length and thickness. Positioned at opposite ends of the I or H-beams 41 and 42 are box-shaped end beams 43 and 44 and the end beam 43 is of greater length than the end beam 44. The forward end beam 43 and the rearward end beam 44 each have portions adjacent each end extending beyond the adjacent part of the adjacent body beam 41 or 42.

The end beam 43 has a pair of horizontally disposed longitudinally spaced securing plates 45 and 46 secured thereto as by welding at the central portion thereof. Fastening means 47 extend through the plates 45 and 46 and the upper and lower flanges of the I or H-beams 41 and 42 to secure these beams in rigid relation to the end beam 43. A pair of horizontally disposed inwardly extending cleats 48 and 49 are secured to the inner surface of the end beam 43 as by welding and horizontal diagonally disposed brace bars 50 and 51 are secured to the cleats 48 and 49 and to outwardly extending cleats 52 and 53, secured to the I or H-beams 41 and 42 as by welding, by fastening means 54.

The machine 40 is to be portable so a pair of caster wheels 55 are secured to the undersurface of the end beam 43 adjacent each end thereof.

Alined openings 56 are positioned in the sides of the end beam 43 intermediate of each pair of caster wheels 55 and inwardly of each of the inner caster wheels 55. Eye bolts 57 are adapted to be selectively received in the openings 56 and be retained therein by nuts 58. The outer openings 56 are spaced inwardly from the ends of the end beam 43 as the inner openings 56 are spaced inwardly from the cleats 48 and 49.

A pair of parallel vertically disposed horizontally spaced solid steel bars 59 and 60 are positioned on the end beam 43 centrally thereof, and vertically disposed cleats 61 and 62 are secured, as by welding, to the upper surface of the end beam 43 for engagement with the bars 59 and 60. Fastening means 63 extend through the bars 59 and 60 and cleats 61 and 62 to rigidly secure the bars 59 and 60 to the end beam 43.

Diagonally disposed side braces 64 and 65 are secured

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to the outer surfaces of the bars 59 and 60 and the upper surface of the end beam 43 by fastening means 66 and forwardly extending diagonally disposed braces 67 and 68 are secured to the outer surfaces of the bars 59 and 60 and to vertically disposed cleats 69 and 70, secured as by welding, to the upper surface of the beams 41 and 42 by fasteners 71.

A channel plate 72 is secured to the upper ends of the bars 59 and 60 by fasteners 73 and the plate 72 retains the bars 59 and 60 in rigid spaced relation to each other.

Alined openings 74 are provided in the top and bottom surfaces of the end beam 43 and nuts 75 are secured by welding to the bottom surface of the end beam 43 in circumjacent relation to the openings 74. A screw 76, having a wrench engaging head 77 is threadably mounted in each set of openings 74 in engagement with the nuts 75. Rotation of the screws 76 will raise the machine 40 so that the caster wheels are released from engagement with the ground or floor surface. Thus, the machine can be raised to facilitate working on the underneath of the auto body during the operation of the machine.

The inner surface of the end beam 44 has a pair of spaced vertically disposed cleats 78 and 79 secured thereto, as by welding, and the cleats 78 and 79 engage I or H-beams 41 and 42 are secured thereto by fastening means 80. Since the machine 40 is portable, caster wheels 81 are secured to the bottom of the end beam 44 adjacent the outer ends thereof, and alined openings 82, similar to the openings 74 in the end beam 43, are provided in the top and bottom surfaces of the end beam 44. Nuts 83 are secured by welding to the bottom surface of the end beam 44 in circumjacent relation to the openings 82 and a screw 84 having a wrench engaging head 85 is threadably mounted in each set of openings 82 in engagement with the nuts 83. Like the screws 76, rotation of the screws 84 will raise the machine 40 so that the caster wheels 81 are released from engagement with the ground or floor surface for the purpose previously stated.

Eye belts 86 are secured to the inner side surface of the end beam 44 in alinement with the screws 84 and chains are secured to eye bolts 57 and 86 and to the body of the auto being straightened to retain the body in position on the machine 40.

A drive screw 87 extends longitudinally of the machine 40 and has a threaded portion 88 adjacent the end beam 43 and a threaded portion 89 adjacent the end beam 44 and each threaded portion has a wrench engaging end 214 for a purpose which will be later described. The smooth portion 90 of the screw 87 extends between upper and lower flanges of an I or H-beam support member 91 that is secured to the inner surfaces of the I or H-beams 41 and 42 centrally thereof between the flanges of the I or H-beams 41 and 42.

The threaded portion 88 of the screw 87 extends outwardly of the end beam 43 through alined openings 92 and an auxiliary U-shaped jack support 93 is mounted on the threaded portion 88 outwardly of the outer side surface of the end beam 43. A washer 94 mounted on the threaded portion 88 engages the outer side surface of the end beam 43, a nut 95 on the threaded portion 88 engages the washer 94, a pipe collar 96 on the threaded portion 88 engages the nut 95, a second washer 97 on the threaded portion 88 engages the pipe collar 96, a second nut 98 on the threaded portion 88 engages the washer 97 and the support 93 is mounted on the pipe collar 96. A channel plate 99 is secured to the upper ends of the support 93 by fasteners 100 and a channel plate 101 carrying the screw hook 102 is mounted on the support 93 so that the screw hook 102 engages the diagonal side brace 65, FIG. 21. A nut 103, when tightened, will retain the support 93 in any desired

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angular position and the nut 98 will be tightened for the same purpose.

A box-shaped carrier nut 104 is mounted on the threaded portion 89 of the screw 87 and a sliding box-shaped member 105 is slidably positioned on the I or H-beams 41 and 42 for coaction with the carrier nut 104. The top and bottom of the member 105 has parallel longitudinally spaced slots 106 and 107 and these slots are alined with the open center of the nut 104.

A foot grip bracket 108 having parallel side plates 109 and 110 which are inserted into and extend through slots 106 and 107 of the member 105 and the open center of the nut 104. The plates 109 and 110 have curved upper ends 111 and 112 that converge into the upper reduced ends 113 which are connected by an upper connecting plate 114 and a centrally disposed connecting plate 115 parallel with the plate 114 is connected to the inner surfaces of the plates 109 and 110 below the curved upper ends 111 and 112. The plates 109 and 110 are provided with alined openings 116 to receive a pin 117 which rests on the upper surface of the member 105 to retain the bracket 108 in elevated relation to the upper surface of the member 105. Horizontally disposed outwardly extending slotted cleats 118 and 119 are secured to the outer surfaces of the sides of the member 105 centrally thereof.

A member 105 is also mounted on the smooth portion 90 of the screw 87, but a plate 120, having a central opening 121 therein, is positioned on and secured to the upper surface of the member 105 with the opening 121 in alinement with the slots 106 and 107, as in FIG. 10. The plate 120 is provided with three equally spaced openings 121' which receive chains to retain the member 105 in fixed relation to the end beam 43 or permit pulling of the member 105 as desired. The member 105 may also be provided with a central opening instead of the slots 106 and 107 if desired.

Slidably mounted on the bars 59 and 60 is a jack screw carrying carriage 122 which comprises a front plate 123 that has spaced L-shaped bar engaging members 124 and 125 that extend rearwardly of the plate 123 and encompasses the bars 59 and 60. Screw bolts 126 are mounted in the plates 124 and 125 to engage the bars 59 and 60 to retain the carriage 122 in fixed relation to the bars 59 and 60.

The plate 123 is provided with a centrally located opening and a sleeve 127 extends rearwardly of the plate 123 in circumjacent relation to the opening therein. The sleeve 127 has a longitudinally extending slot 128 therein which receives a pin 129 that extends outwardly of a jack screw 130 that is positioned in the sleeve 127 and a second filler sleeve 131 is positioned in the sleeve 127 between the sleeve 127 and the jack screw 130. The sleeve 131 also has a longitudinally extending slot 132 that is alined with the slot 128 of the sleeve 127 so that the pin 129 also extends through the slot 132. The jack screw 130 has a smooth portion 133 provided with a reduced end 134 that extends outwardly of the sleeve 127 and is formed so that a shackle bolt can be used to connect a chain or cable to the jack screw 130. The opposite end of the jack screw 130 has a reduced portion 138 to fit jack pipes and a threaded portion 135, inwardly of the portion 138, on which is threadably mounted a jack screw nut 136 that is provided with outwardly extending radially disposed handles 137, and the upper and lower edges of the plate 123 is provided with centrally located cutouts 139 and 140.

There is mounted on the support 93 a jack screw assembly 141 that is similar in structure to the jack screw assembly previously described, but of smaller size and, as shown in FIG. 11, includes a carriage 142, nut 143, and radially disposed handles 144 that are secured to the nut 143 in the same manner as previously described for the jack screw assembly mounted on the bars 59 and 60.

In FIGS. 15, 16 and 17 the carriage 122 is shown mounted as previously described, but in these views a hy-

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draulic jack 145 is mounted in the sleeves 127 and 131. A hose 146 for the jack 145 extends through the slots 128 and 132 in the sleeves 127 and 131. A pin 147 extends through openings 148 in the sleeve 127 to prevent the jack 145 from turning and slipping when in operation.

In FIGS. 18, 19 and 20 another form of jack assembly 149 is shown. In the jack assembly 149 a concavo-convex jack carrying plate 150, having a centrally located opening 151 is mounted for sliding movement on the bars 59 and 60 by U-shaped end plates 152 and 153.

Oppositely disposed screw bolts 154 are mounted in the end plates 152 and 153 to engage the bars 59 and 60 to retain the jack assembly 149 in adjusted fixed relation to the bars 59 and 60.

A sleeve 155, having a longitudinal slot 156, is provided with an enlarged tapered portion 157 having a convex end surface 158 that has sliding engagement with the concave face of the plate 150. A hydraulic jack 174 is mounted in the sleeve 155, and the sleeve 155 has a reduced threaded portion 159 outwardly of the tapered portion 157 that extends through the opening 151. A concave-convex washer plate 160 is placed on the portion 159 in engagement with the convex face of the plate 150. A washer 210, having an elongated slot therein, is then positioned on the portion 159. The washer 210 has a concave face 211 that engages the convex face of the washer plate 160 and a flat face 212 that engages a cap nut 161 that is threadably mounted on the portion 159 and when loose, will permit the jack 158 to swing in a circle in relation to the bars 59 and 60. Thus, the jack 158 may have vertical, horizontal and angular movement when in operation. A hose 162 extends through the slot 156 and a jack sling 163, having side bars 164 and 165, is mounted on the plate 150 by engagement of the side bars 164 and 165 in the cutouts 139 and 140 in the upper and lower edges of the plate 150.

The ends 166 and 167 of the side bars 164 and 165 converge inwardly to be connected to handle plate 168 through which extends a handle 169. The ends 170 and 171 of the side bars 164 and 165 converge inwardly to be connected to crossbar 172 which fits inside a fork 173 of the jack 174 and a pin 175 extends through the fork 173.

A ring 176 is positioned intermediate of the side bars 164 and 165 to prevent the side bars 164 and 165 from moving together and a bar 177 extends between the side bars 164 and 165 for the same reason.

In FIG. 24 a box member 178 is shown to be slidably mounted on the I or H-beams 41 and 42. The member 178 has aligned slots 179 and 180 therein to receive the brackets 108, but in this instance, the sides 181 and 182 are shaped to conform to the shape of the I or H-beams 41 and 42. Outwardly extending horizontally slotted cleats 183 and 184 are provided on the sides 181 and 182, as on the member 105.

In the form of the invention previously described the I or H-beams are interchangeable since the only difference between the two types of beams is the positioning of the web that extends between the flanges of each beam.

In FIG. 25 the I or H-beams are replaced by box-shaped beams 185 and 186, but the member 105 remains unchanged in construction.

In FIGS. 27, 28 and 29, a single box-shaped beam 187 is used and the box member 188 has converging top plates 189 and 190 that are formed integral with the upper ends of spaced supporting plates 191 and 192. The plates 191 and 192 are spaced to receive a single plate foot grip bracket 193 that has an inwardly curved edge 194 that merges into a reduced upper end 195. Outwardly directed horizontally disposed slotted cleats 196 and 197 are provided on the sides of the member 188.

In FIGS. 30, 31, 32 and 33, a single I or H-beam 198 is used and a box member 199 is slidably mounted on the I or H-beam 198. Cutouts 200 and 201 are provided in

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the sides of the member 199 to receive the lower ends of the plates 202 and 203 of the foot grip bracket 204. The plates 202, have intermediate converging portions 205 and 206 that merge into reduced parallel end portions 207 and 208 that are welded together, as shown in FIG. 33. A short plate 209 extends between the plates 202 and 203 at the lower edges of the portions 205 and 206 to prevent collapse of the side plates 202 and 203 where they extend into the cutouts 200 and 201 in the member 199.

The forms of the invention shown in FIGS. 27 to 33 are adapted to be used with small foreign cars, but the remainder of the machine is as previously described.

The operation of the machine 40 cannot be adequately described for the straightening of a damaged car body is intricate and usually each straightening job is different from those previously employed. However, in use the auto body is positioned on the I or H-beams 41 and 42, box beams 185, 186 and 187 or I or H-beams 198. If it is desired the foot grip brackets are connected to the auto body and by rotating the screw 87, the foot grip brackets may be moved toward or away from each other. The jack assemblies are engaged with certain parts of the auto body for straightening the same and if desired the jack assembly on the support 93 may be used to engage parts of the auto body that cannot be engaged by the jack assembly mounted on the bars 59 and 60. The operation of the jack assemblies and foot grip brackets depending on the straightening job to be accomplished.

It is believed, however, that one skilled in the art will understand the construction of the invention from the previous description and that the use of the machine will also be obvious.

It is also to be understood that changes in the minor details of construction, arrangement and combination of parts may be resorted to provide they fall within the spirit of the invention and the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. An automobile frame straightening machine comprising a pair of horizontally disposed longitudinally extending body means having forward and rearward ends arranged in lateral spaced relation to form an elongated slot therebetween, a first end beam extending transversely of said body beam adjacent the forward end of the latter and having a portion adjacent each end extending beyond the adjacent body beam, a second end beam extending transversely of said body beam adjacent the rearward end of said body beam and having a portion adjacent each end extending beyond the adjacent body beam, ground engaging caster wheels dependently supported from said rearward end beam adjacent each end of the latter, a vertically disposed ground engaging screw jack journaled in each of said end portions of said forward end beam and operable to lift said forward end beam above the ground surface, and a pair of spaced upstanding brackets mounted on said body beams for sliding movement toward and away from each other, each of said brackets being adapted to engage an automobile frame element when the automobile straddles said body beams with the wheels thereof between the projecting end portions of said forward and rearward end beams, a first pair of bars being vertically disposed and rigidly attached to said body beams adjacent the said rearward end thereof, a horizontally disposed jack screw mounted on said first pair of bars for engagement with an automobile body, a second pair of bars being laterally disposed and pivotally attached to said body means adjacent the said rearward end thereof and to said first pair of bars, a horizontally disposed jack screw mounted on said second pair of bars above said body means for engagement with an automobile body, and means releasably engaging said second pair of bars to retain the same in a selected angular position with respect to said first pair of bars.

2. An automobile frame straightening machine com-

prising a pair of horizontally disposed longitudinally extending body means having forward and rearward ends arranged in lateral spaced relation to form an elongated slot therebetween, a first end beam extending transversely of said body beam adjacent the forward end of the latter and having a portion adjacent each end extending beyond the adjacent body beam, a second end beam extending transversely of said body beam adjacent the rearward end of said body beam and having a portion adjacent each end extending beyond the adjacent body beam, ground engaging caster wheels dependently supported from said rearward end beam adjacent each end of the latter, a vertically disposed ground engaging screw jack journaled in each of said end portions of said forward end beam and operable to lift said forward end beam above the ground surface, a pair of spaced upstanding brackets mounted on said body beams for sliding movement toward and away from each other, each of said brackets being adapted to engage an automobile frame element when the automobile straddles said body beams with the wheels thereof between the projecting end portions of said forward and rearward end beams, and manually operable means supported in said slot operatively connected to each

of said brackets for shifting the same along said body beams from points exterior of the adjacent forward or rearward end beam, a first pair of bars being vertically disposed and rigidly attached to said body beams adjacent the said rearward end thereof, a horizontally disposed jack screw mounted on said first pair of bars for engagement with an automobile body, a second pair of bars being laterally disposed and pivotally attached to said body means adjacent the said rearward end thereof and to said first pair of bars, a horizontally disposed jack screw mounted on said second pair of bars above said body means for engagement with an automobile body, and means releasably engaging said second pair of bars to retain the same in a selected angular position with respect to said first pair of bars.

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