Oct. 9, 1934. W. F. ERRIG ET AL 1,975,930

TIRE GROOVER

Filed July 17, 1933 3 Sheets-Sheet 1

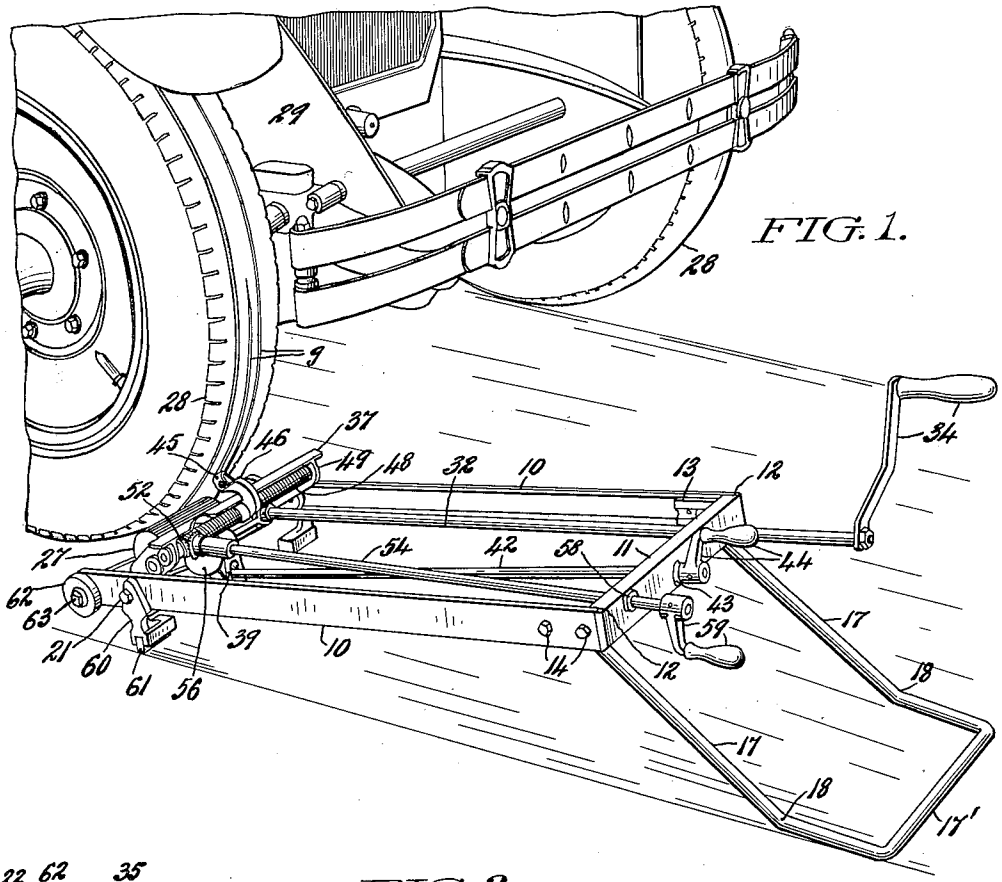


FIG. 1.

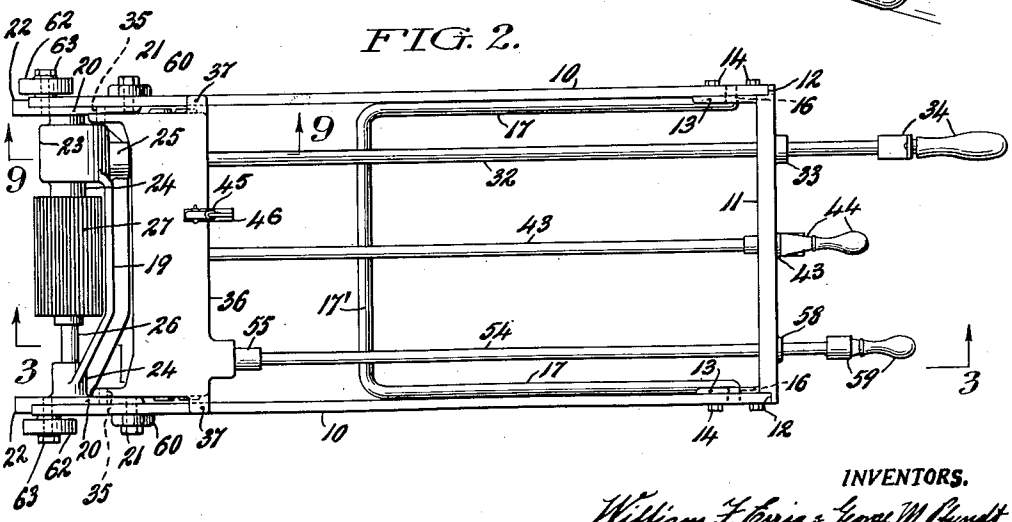


FIG. 2.

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Filed July 17, 1933 3 Sheets-Sheet 2

FIG. 3.

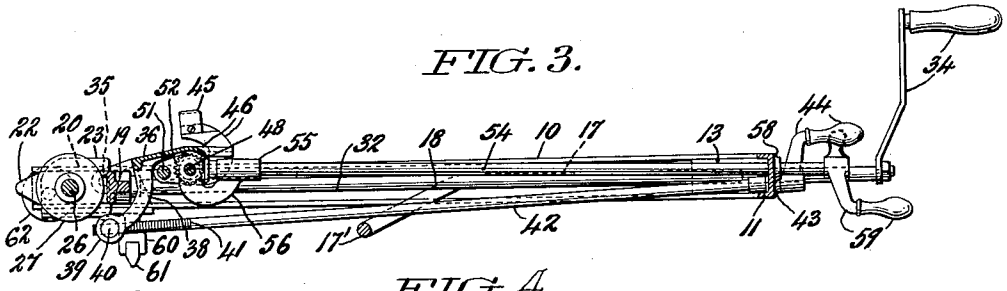


FIG. 4.

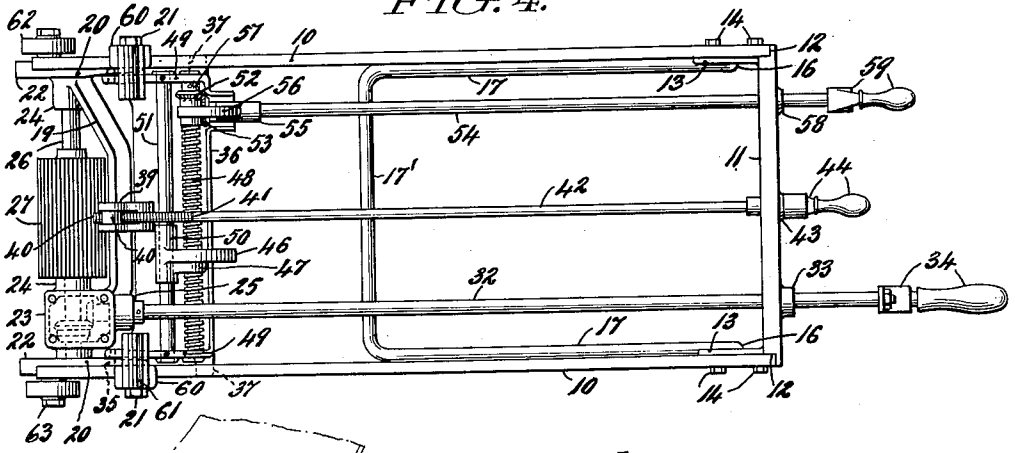


FIG. 5.

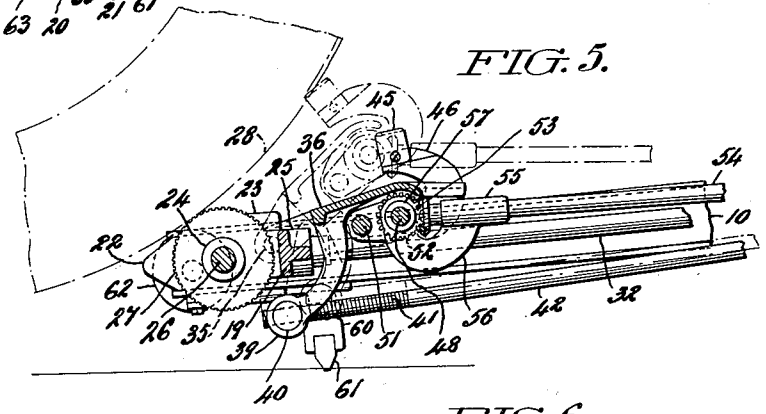
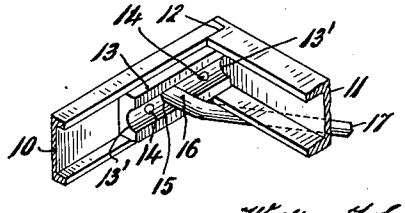


FIG. 6.



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TIRE GROOVER

Filed July 17, 1933 3 Sheets-Sheet 3

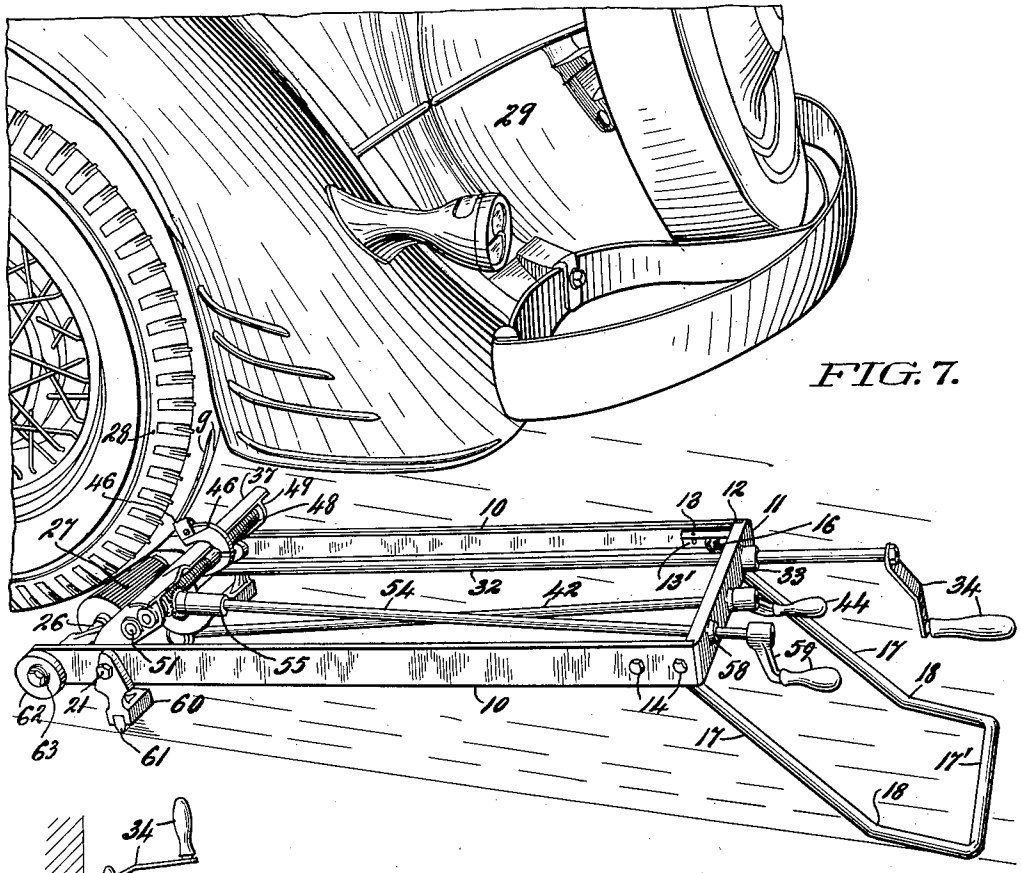


FIG. 7.

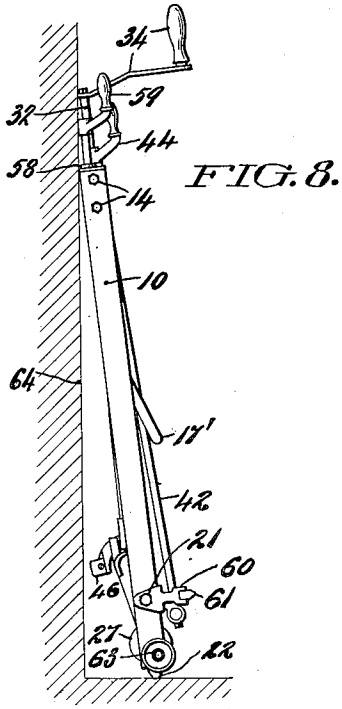
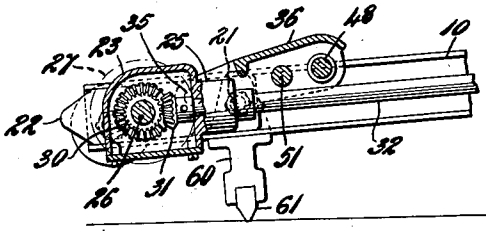


FIG. 8.

FIG. 9.



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Patented Oct. 9, 1934 1,975,930

UNITED STATES PATENT OFFICE

1,975,930

TIRE GROOVER

William F. Errig, Philadelphia, and George M. Pfundt, Churchville, Pa.

Application July 17, 1933, Serial No. 680,708

5 Claims. (Cl. 82—4)

This invention relates in its broader aspect to devices, tools or machines in general for grooving, re-grooving, or trimming various articles; the grooves or wearing faces of which have become more or less useless for the initially designed purposes.

More particularly our present improvements have reference to tools or devices for re-grooving the worn and damaged running surfaces of all types of rubber-tires, whether they be solid or inflated.

The primary object of our instant invention is to provide a grooving device which is particularly, although not essentially, well adapted to the re-grooving of vehicle tire treads, without removal from the vehicle, the wheel guards, chassis and bumpers of which often project more or less considerably beyond the peripheral running zone of said wheel. In other words, we fundamentally aim to provide a grooving device which, when the car is jacked-up, can be easily positioned thereunder, and manipulated without removing the wheels or tires, or involving any operating inconvenience upon the user.

Another object of the invention is to furnish a grooving device which when moved into proximity with the surface to be grooved, re-grooved or trimmed, under fulcrum or what we prefer to term "lever" action assumes operative relation with respect thereto; or, in other words, our improved device when wheeled into grooving or trimming position and released automatically places a rotative element into driving engagement with said surface.

A further objection is the provision of a device of the stated type in which all the operating media are proximately arranged in a position where they are actuable with ease, and without entailing any operating strain upon the user in making adjustments incident to the diversified grooving or trimming operations of which our invention is capable.

A still further aim of our invention is to provide a grooving or trimming device which is quick, accurate, portable, easily operated, comprises but few easily constructed parts, and which is capable of facile adjustment as well as being positive in action.

With the foregoing and ancillary objects in view, our invention consists essentially in the novel subject-matter hereinafter set forth and claimed, the description being supplemented by the accompanying drawings illustrative of one practical embodiment of said invention.

In the drawings.

Fig. 1 is a perspective illustrating our invention in operative relation at the front of an automobile having short mud guards and a comparatively close in bumper.

Fig. 2 is a top plan view of our novel groover or trimmer.

Fig. 3 is a longitudinal section taken as indicated by the arrows 3—3 on Fig. 2.

Fig. 4 is an underside plan view of the groover or trimmer.

Fig. 5 is a somewhat larger fragmentary view of the left-hand end portion of Fig. 3, and also indicating by a dot-and-dash showing the cutter mechanism moved into grooving position.

Fig. 6 is a perspective view of a detail, later on fully explained.

Fig. 7 is a perspective view, along the lines of Fig. 1, but showing our grooving or trimming device in operative position at the rear of a car having low mud-guards and a bumper that projects rearwardly somewhat considerably relative to the running base of said car.

Fig. 8 is a side view illustrative of the compactness of our improved groover or trimmer when in folded-up storage position; said view also serving to show how the device may be neatly leaned against a wall without fear of slippage downwardly to the floor; and,

Fig. 9 is a sectional detail, later on fully explained.

In all the view corresponding parts are designated by similar reference characters.

Referring more in detail to the drawings, our novel groover or trimmer comprises a main frame including spaced side members 10, of opposed channel-sections, with a connecting cross-member 11, of like character; the engaging ends whereof are preferably permanently connected at 12, with inter-position of grooved corner-sections or reinforcements 13, conveniently, although not essentially, rigidly retained in place by screw-bolts 14. These corner sections 13 are provided with lateral borings 15, Fig. 6, that serve as pivot bearings for the opposingly-angled termini 16, of a stirrup-support or arrestor-bail 17, upon the cross portion 17' whereof one or both feet of the operator may be placed to prevent longitudinal or lateral slippage of the device when in use. Incidentally, it is to be noted that the corner sections 13, while affording pivotal bearing for the arrestor-bail 17 also serve by coaction with grooves 13' in said sections to securely retain the bail 17 in closed position, as clearly understandable by those acquainted with the art. It is likewise to be observed that the side por-

tions of the arrestor-bail 17 are also angled at 18 proximate the cross portion 17' to ensure firm frictional grippage upon a hard floor or other surface.

Fitted between channel side members 10, at their ends remote from the cross-member 11, is a bridging piece 19, having end flanges 20 adapted to snugly fit in the channels of said side members, and to be secured thereto in any suitable manner as by screw bolts 21 for example. The end flanges 20 are fashioned at their forward ends to provide acute-angled toes 22, for a purpose hereafter explained.

The bridging-piece 19 is mainly of T-section and embodies a housing 23, aligned bearing bosses 24, and a journal boss 25 at right angles thereto. Freely rotatable as by antifriction means, not shown, in the bearing bosses 24 is a transverse shaft 26 on which is secured a suitably-grooved drive-roller 27 adapted to coast with a vehicle wheel tire 28, for example, for revolving the latter when the car 29 is jacked up, as will be best appreciated from an inspection of Figs. 1, 5 and 7. Splined or otherwise fixed on the transverse shaft 26, within the housing 23, is a bevel gear 30, with which meshes a smaller similar gear 31, at the rear end of a shaft 32, afforded rotary bearing in the journal boss 25 and a bearing 33 on the cross-member 11, said shaft 32 being extended somewhat beyond the cross-member 11 and provided at its terminal portion with a crank-handle 34, whereby it is rotatable. The housing 23, conveniently, is fitted with a removable cover 23' so that it may be fitted with suitable lubricant to render the device silent in operation and to minimize operating wear and so forth.

Fulcrumed by pivot pins 35 between the end flanges 20, of the bridging piece 19, is a somewhat plate-like carriage structure 36, having lateral ears 37 adapted to engage the top flanges of the frame, side members 11, to limit its downward swingable movement, and a depending arm 38, having its lower end forked at 39 to afford pivotal support for a universal trunnion 40. This trunnion 40 is suitably bored for reception of the screw-threaded end 41 of a manipulation-shaft 42 afforded vertical angular-movement in a bearing 43 on the cross-member 11, hereinbefore referred to; and it is fitted with a crank handle 44, whereby said shaft is rotatable to angularly swing the carriage structure 36 arcuately up-and-down, as later on explained.

The cutter 45 is conveniently, although not essentially of the type set forth and claimed in our prior application for patent on "Tire groovers", filed September 26, 1932, under Serial Number 634,818, and which later matured into U. S. Patent No. 1,916,258, dated July 4, 1933. This cutter 45, is mounted at the free end of an arcuate arm 46 embodying a threaded follower-boss 47 traversable along a screw-shaft 48, rotatively-journaled at its ends in the depending side flanges 49 of the carriage structure 36; and said arcuate arm is also provided with a sleeve portion 50 freely slidable along a guide rod 51 fixedly secured, in parallelism with the screw-shaft 48, to the carriage structure depending side flanges aforesaid. In order to rotate the screw-shaft 48 it is fitted at one end with a miter-gear 52, meshed by a similar gear 53 at the rear end of a manipulator shaft 54. This manipulator shaft 54 is rotatively supported in the sleeve portion 55 of a curved bearing 56 having a second sleeve portion 57 pivotally mounted on a non-threaded section of the screw-shaft 48 adjoining the miter-gear 52, and by means of which it is restrained against axial shifting, in a manner obvious to those conversant with the mechanic arts. It is also particularly noteworthy that by mounting the curved bearing 56 by the sleeve portion 57 for free pivotal action on a non-threaded portion of the screw shaft 48, that no matter what position the carrier structure 36 occupies the gears 52, 53 are always positively retained in proper operative mesh. The shaft 54 is also journaled remote from the mechanism just described, in a suitable bearing 58 of the cross-member 11, and it is provided with a counter-balanced crank-handle 59 whereby it is turned as hereafter set forth, and automatically ensures non-rotation of the shaft 54 when said handle is released, in the known manner. Clamped to side members 10, as by aid of the screw bolts 21, hereinbefore referred to are wedge-like chocks or skid shoes 60 preferably having insets 61 of aluminum, or other suitable gripping material, which serve as frontal fulcrum-support for the groover or trimmer when moved into operative position, as best understood from Figs. 1 and 7. These chocks or skid shoes 60, it will be readily understood, engage the lower flanges of the side members 10, as that when the groover or trimmer is in use they not only rigidly support it but also serve to prevent lateral movement of said groover or trimmer; while wheels or rollers 62, freely rotative on the shanks of screw studs 63, that serve as auxiliary securing means between the side members 10 and carriage-structure flanges 20, afford easy means whereby the device may be rolled about or moved into operative relation with the vehicle tires 28. It is also noteworthy from Fig. 8, that when the device is out of use or leaned against a wall 64, for example, that the rollers 62 are elevated from the ground or floor level, so that the device rests steady upon the acute-angled toes 22.

In operation, and assuming the arrestor bail 17 is folded up as shown in Figs. 2, 3 and 4, the device is rolled on the rollers 62 into proximate relation to the tire, or other article, to be grooved, regrooved or trimmed; whereupon said bail is released from engagement in the corner-section grooves 13, and swung into the position shown by Figs. 1 and 7. Incident to the movements just explained the device moves or swings upwardly, at its front end, upon the wedge-like chocks or skid shoes 60, which swings, the drive roller 27 into contact or frictional grippage with the tire tread, or other surface to be operated on. The user thereupon rests one or both feet upon the bail portion 17' and by manipulation of the crank handles 59 and 44 concurrently or independently adjusts the cutter 45 positionally lateral to the tire tread 28 and swings it angularly upward into operative position. When the adjustments just stated are accomplished, the crank handle 34 is revolved, in turn through the shaft 32 and gears 30, 31 affects rotation of the grooved roller 27, whereby the tire 28 is revolved and desired groove *"g"*—Figs. 1 and 7—recut to predetermined depth in the tire 28.

Obviously, the number of grooves *"g"* cut or recut, or trimmed, will depend on service conditions and the structural capacity of the article treated, while it will be self-evident that the finest adjustments can be effected with a minimum of effort upon the part of the operator and a corresponding saving in time; still further it is obvious that incident to the ease with which definite adjustments can be made without the user getting under the car or doubling up on the floor,

that smooth clean grooves of predetermined depth are quickly cut with accuracy and ease.

Finally, while we have particularly described the illustrated embodiment of our invention, it is to be distinctly understood that we reserve the right to all such other forms and usages of our said invention as are comprehended within the scope of the following claims.

Having thus described our invention, we claim:—

1. In a tire groover, the combination of a portable frame including parallel side components of channel-section connected at one end by a corresponding section and reinforced at the angles by corner sections; a bridge-piece securely bracing to free ends of the side components and embodying spaced bearings and a gear housing; a shaft with a grooved drive roller freely rotative in said bearings; aligned wedge-like skids below the frame in proximity to the drive roller shaft and upon which the frame fulcrums into operative position; a carrier pivoted between the frame side components affording bearing for a screw shaft and paralleling guide rod; a follower on the screw shaft coacting with the guide rod and having an overshot arm adapted for supporting a cutting tool; means with an actuator instrumentality beyond the frame end member aforesaid whereby the roller shaft may be rotated to effect the grooving operation; similar means and correspondingly-located instrumentalities for operating the screw-shaft and pivoted carrier individually to effect positional adjustments of the cutting tool; and means pivotally supported by the frame corner sections adapted to arrest the groover against lateral or longitudinal shifting when in use.

2. The combination of claim 1 wherein the operative connection between the screw shaft and the associated actuator instrumentality comprises a curved bearing having a sleeve portion pivotally engaging said screw shaft and a journal bearing at right angles thereto for a rotary shaft, and coordinating meter gears.

3. The combination of claim 1 wherein the bridge-piece is provided with end flanges engageable between the channel-section frame side components and have forwardly-directed acute-angled ends for the purpose specified.

4. The combination of claim 1 wherein the frame portable means comprises freely rotative rollers at the free ends of said frame.

5. The combination of claim 1 wherein the frame corner sections are longitudinally grooved and laterally apertured to afford pivotal arresting support for the angled ends of a stirrup-shaped arrestor-member for the purpose specified.

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