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[54] **PIVOTALLY COLLAPSIBLE MOTORCAR**

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[52] **U.S. Cl.** ..... **296/27,** 180/1 A, 180/25 A, 280/36 R

[51] **Int. Cl.** **B62d 39/00**

[58] **Field of Search** ..... 180/1 A, 1 AS, 1 AW, 1 B, 180/25 A; 280/36 R, 41 R; 296/27

[56] **References Cited**

UNITED STATES PATENTS

2,488,123	11/1949	Hartry	280/34 R
3,003,571	10/1961	Ash et al.	280/36 R
3,004,619	10/1961	Straussler	280/36 R X
3,254,734	6/1966	Behrmann	280/36 R X

FOREIGN PATENTS OR APPLICATIONS

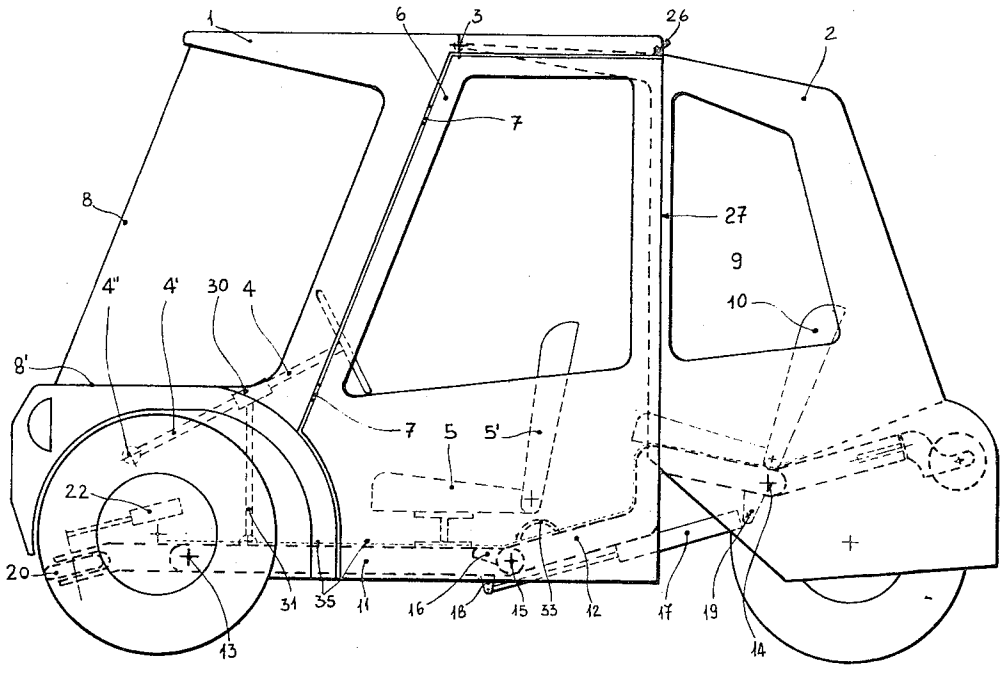
771,281	3/1957	Great Britain	180/1 A
1,513,216	1/1968	France	280/36 R

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Assistant Examiner—Leslie J. Paperner
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[57] **ABSTRACT**

Small car formed of two parts hinged at the top and adapted to partially fit one into the other, so as to reduce the bulk of the car when the latter is parked, sheltered or transported.

5 Claims, 3 Drawing Figures



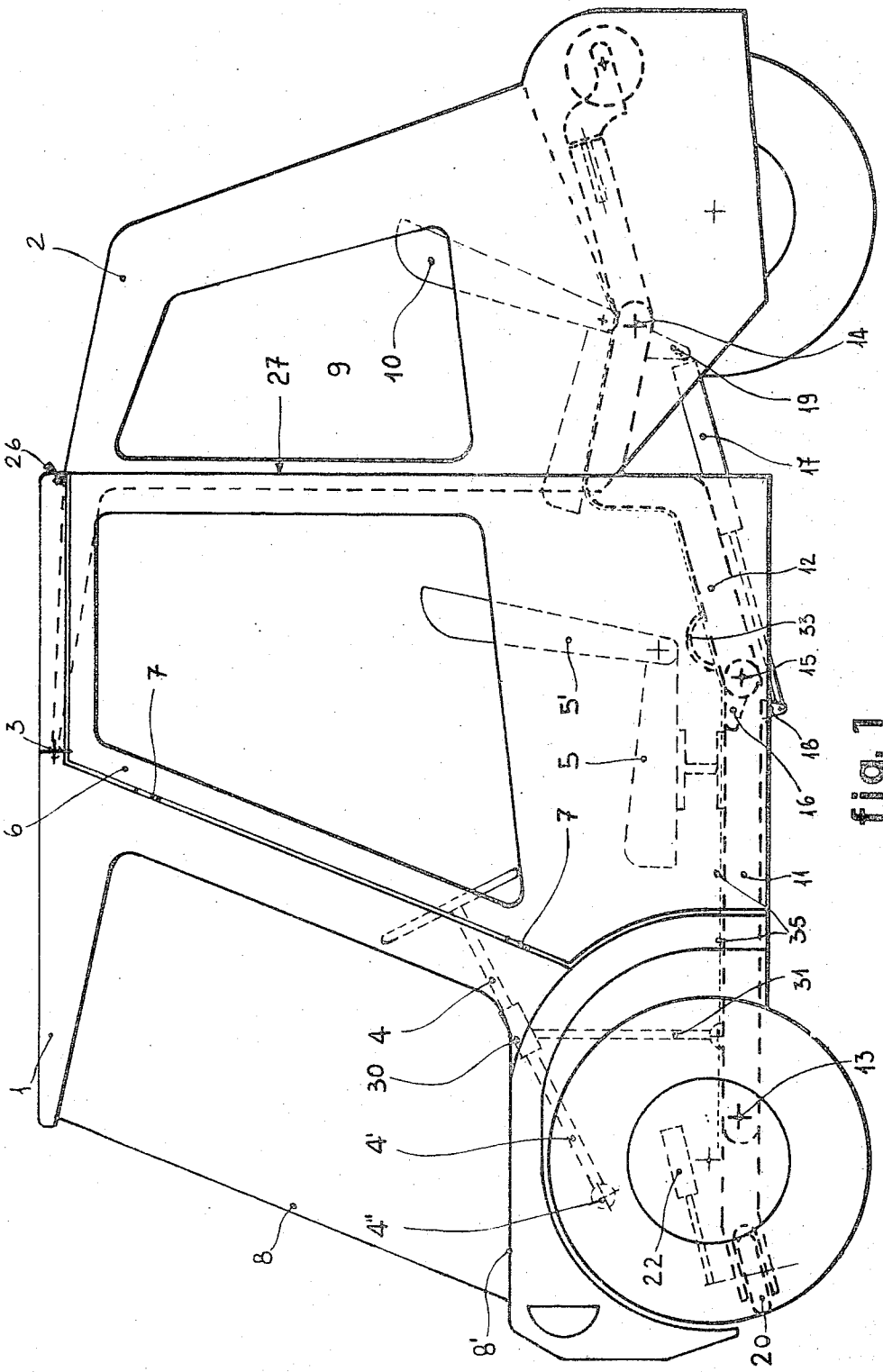

2
27
9
10
14
19
17
26
12
33
15
18
16
3
7
5'
5
6
7
11
35
31
4
30
13
4'
4"
22
8
8'
20
1

fig. 1

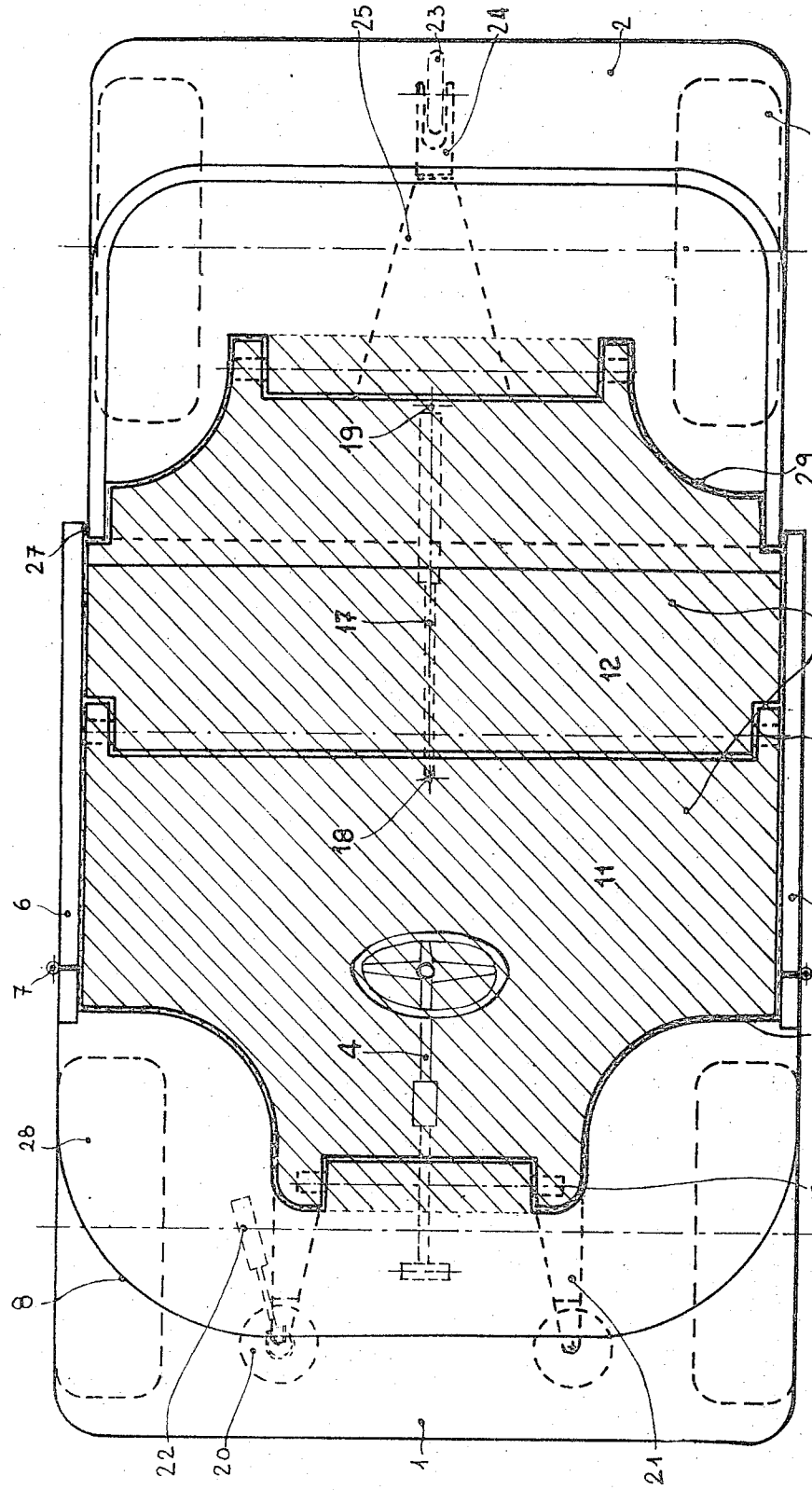


fig. 2

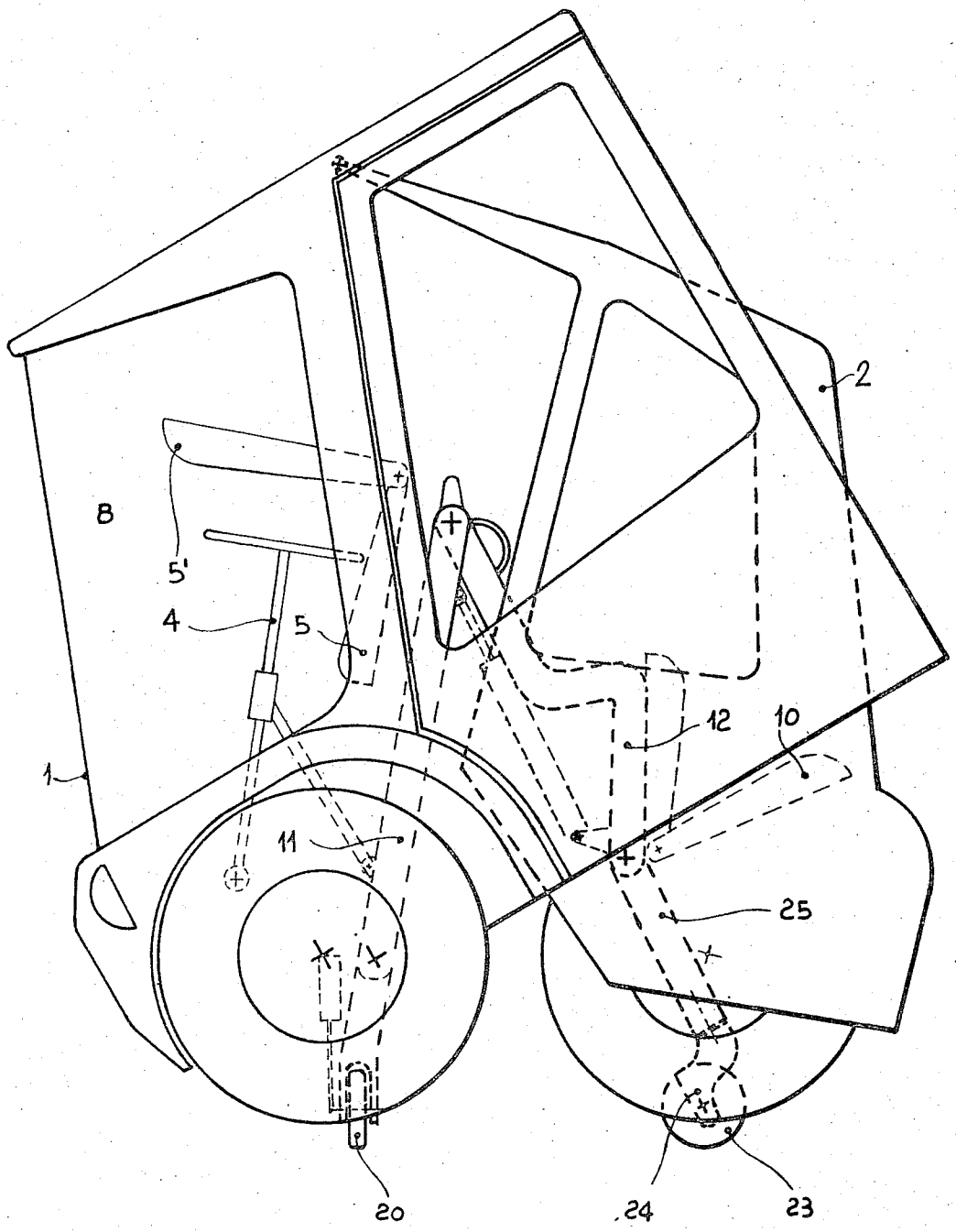


fig. 3

PIVOTALLY COLLAPSIBLE MOTORCAR

BACKGROUND OF THE INVENTION

It is known that the increasingly hard conditions of car traffic, particularly in urban centres, have caused various specialists to plan particular types of cars adapted to improve said conditions and being for said purpose of reduced proportions and very easy to control. However, for various reasons, the solutions proposed so far have been scarcely successful, and even in the most fortunate cases, have not gone beyond the production of prototypes. In general, the reason for this has been the difficulty to produce cars which were actually much smaller and easier to control than those existing on the market, and providing at the same time comfort and efficiency, while the most serious proposals, in spite of the efforts made, substantially consisted of small, uncomfortable, inefficient cars, often only slightly reduced in size and bulk compared with the smallest normal cars.

SUMMARY OF THE INVENTION

The present invention now proposes a type of small car which clearly differs from all those known so far, and which solves very well the up to now serious and hard problems of traffic, parking, sheltering and transport, through a variation of its size from a position of use to a position of parking, sheltering and transport, so as to provide comfort and safety in use and eliminate some of the greatest disadvantages when the car is at rest (with the advantages easy to imagine both for the drivers and for some of the traffic problems) and during transport thereof (with great improvement in the organization and economy of the manufacturing firms).

The small car according to the invention is substantially characterized by the fact that it is essentially formed of two parts, hinged together at the top, one of said parts being adapted to partially fit into the other, in the longitudinal direction of the car, through rotation about the common hinge, after unlocking from the position of use of means connecting the two parts, in order to reduce the size of the car for parking, sheltering or transport, by drawing the front wheels closer to the rear wheels.

The means connecting the two parts of the car preferably comprise, in addition to said common top hinge, two chassis elements, one for each part of the car, said elements being on one side hinged one to the other substantially at the centre of the car, and on the opposite side pivoted on said parts of the car, the hingeing and pivoting axes being parallel and substantially horizontal.

It is convenient for the chassis elements to have a metal box-like structure and to comprise, at the side hinged to the part of the car, one or more extensions for the support of supplementary wheels, at least some of which are transversally arranged.

Preferably, the car is provided with two seat elements, each connected to one of the parts of the car itself, and with means for causing the reciprocal rotation of the two parts, said means acting on the chassis elements, and is further provided with means for causing the rotation of the supplementary wheels.

BRIEF DESCRIPTION OF THE DRAWINGS

Other purposes, characteristics and advantages of the invention will become evident from the following detailed description of a preferred embodiment of the small car, given by merely by way of example. This embodiment is schematically illustrated by the accompanying drawings, in which:

FIG. **1** is a schematic side view of the small car in the position of use;

FIG. **2** is a plan view of the car, corresponding to the side view of FIG. **1**; and

FIG. **3** shows a side view of the small car according to the invention in the position of reduced size for parking, sheltering and/or transport.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, the small car according to the invention comprises two parts, of which the front part **1** carries the front wheels and the rear part **2** carries the rear wheels, said two parts being hinged one to the other at the top at **3.** The front part **1** is equipped with the steering members **4** and with the driving motor acting on the front wheels. Said front part **1** contains a transverse seat **5** and is closed on the sides by two doors **6,** hinged in front at **7,** and on its front by a wide and high windshield **8.** The rear part **2,** comprising windows **9,** contains a transverse seat **10,** which can be reached by pivoting the back **5'** of the front seat **5.**

According to the invention, the connection between the parts **1** and **2** of the car is provided at the top by means of the hinge **3** and at the bottom by means of two chassis elements **11** and **12.** These elements are formed with a stout box-like metal structure and may also be appropriately used as suitable tanks and/or containers for petrol and other liquids required for the running of the car, or for any goods and/or equipment. The first chassis element **11** is pivoted at its front tapered end (see FIG. **2**) to the part **1** of the car at **13.** Likewise, the chassis element **12** is pivoted at its rear tapered end to the rear part **2** at **14.** The two elements are then hinged one to the other at their inward ends, substantially at the centre of the car, along the axis **15.** The relative position of the parts, in the conditions of use of the car according to FIG. **1,** is ensured by pawl means **16,** illustrated in the same figure. Such means may easily be released for parking or transport, as shown in FIG. **3.** To obtain this transformation of the car, it is convenient to place between the chassis elements **11** and **12** a jack **17,** mounted under the chassis itself and connected at **18** to element **11** and at **19** to element **12.** The illustrated jack **17** is a hydraulic jack, the rod of its piston projecting entirely from the associated cylinder in the position of use of the car. Alternatively, an electrically actuated jack could be used.

In the condition suitable for parking the car (FIG. **3**) it is appropriate to provide means to cause the transverse displacement of the vehicle. For this purpose, a pair of supplementary front wheels **20** may be used, carried by supports **21** forming forward extensions of the platform element **11.** These wheels are arranged so as to take up a transverse vertical position when the car is in the parking condition of FIG. **3.** It is convenient for one or both of said wheels to be driving wheels and, for this purpose, a small self-locking electric motor **22** has

been provided, which is shown in the drawing as acting only on the right wheel, the left wheel being idle. A pivoting wheel **23** is mounted idle on a small suitable support **24** pivoted on the rear extension **25** of the chassis element **12.**

The problem of seals is very easily solved in the car described and illustrated. The seal between the two parts at the roof is of little importance, since the car parts involved do not slide reciprocally and are further placed, in the condition of FIG. **3,** in greatly inclined positions. For this area, therefore, as well as for the simple rear rabbets of the side doors, one may use ordinary door gaskets, with a structure against dripping. These gaskets are marked with reference numbers **26** and **27** in FIGS. **1** and **2.** It should be noted that the gasket **27** has a double function, in that it also helps to act as a rabbet directly between the front part **1** and the rear part **2** of the car.

The invention further provides for a carpet **35,** to cover the whole floor of the car and acting as a lower seal.

The carpet **35** is shown by a dashed line in FIG. **1** and is shaded in FIG. **2.** It has to be placed and fixed onto the chassis elements **11** and **12** and provides gaskets for all the seals at the periphery of the chassis elements themselves and their pivoting areas.

The carpet **35** may provide special sealing gaskets at its periphery, particularly in the area of the chassis elements close to the fenders **28** of the front part **1** and close to the fenders **29** of the rear part **2** of the car. Thus, with a single element, one obtains the sealing on the lower parts of the whole car compartment, as well as an efficient cover for its floor.

Other features of the small car according to the invention comprise: the assembly of the steering column **4'**, hinged at **4''** and guided by a sleeve **30** which is supported by a connecting rod **31** connected to the platform **11,** and the articulated connection of the rear seat **10** to the car platform **12,** which have to follow the movements resulting from the changing of the parts from the condition of use according to FIG. **1,** into the parking condition of FIG. **3**; the provision of a handle **33,** to facilitate or replace by hand the action of the jack **17**; the use of electric, hydraulic or combined control devices, placed outside the car so as to be easily reached by the user.

In use, the car will take up and be able to hold steadily the condition of FIG. **1,** once the locking pawl **16** will have been operated, which pawl may be any suitable known type of mechanism.

When the driver wishes to park or shelter the car, or when the car has to be transported, it is first of all necessary to provide for the locking of the front wheels with suitable brakes, and then for the unlocking of the pawl **16.** The jack **17** is then operated. The tractive effort transmitted by the latter elements **11** and **12,** leads such elements into rotation, so as to draw the rear wheels closer to the front wheels of the car, causes the elements themselves to take up a position forming a narrow angle and then place the parts **1** and **2** of the car in the condition according to FIG. **3.** During the last movements accompanying the changing of the car from the condition of use to that of rest, the supplementary wheels **20** and **23** come to bear on the ground, and on such wheels the whole vehicle gradually raises itself from the ground, the wheels **20** being locked and the wheel **23** favouring the last movements of part **2** of the car, thanks to the fact that it is mounted in a freely revolving position.

Once the car is in the condition of FIG. **3,** the transverse displacements are made possible by starting in one direction or the other the small motor **22,** without any risks of false moves since the motor is provided with a self-locking device.

Simple reversal controls allow the car to return from the parking and transport condition to the condition of use.

The advantage provided by the small car described is evident, both in the case of parking (where small spaces will easily and safely be used to place the car, and where the space of the single parking-places will be notably increased), and in the case of sheltering (both in public garages, where the cost of sheltering may be reduced owing to the increased space provided for sheltering cars, and in small private garages, where it will often be possible to shelter the small car described together with the normal larger car, without requiring a larger garage), and also in the case of transport (where the number of cars to be transported by a single carrier will provide remarkable advantages to the manufacturing firms and encourage or make possible in some cases export programmes otherwise prohibitive).

Although it is evident that the greatest advantage deriving from the characteristics of the small car according to the invention will be had in the urban use of the car itself, it is more than clear that the car described has no limitations of any kind which may discourage its use over long distances. Even for this use it will provide its characteristic advantages, with undoubted satisfaction for its user.

It is to be understood that the embodiment described and illustrated of the small improved car according to the present invention has been given hereabove merely by way of example. Many modifications to this embodiment may therefore be possible without thereby departing from the scope of the invention itself. It will thus be possible, for example, to produce the small car with a single seat placed in the rear part, thus limiting further the longitudinal dimensions of the vehicle, both in the condition of use and in the parking, sheltering and transport condition. Different from those described, or differently conceived, may further be the members connecting the two parts of the car and the means for operating the locking thereof, the means for controlling the relative movements of the two parts themselves and the means for moving the tranverse wheels, the way to operate said means and the automation degree of the controls.

I claim:

1. A small collapsible motorcar having a body enclosing a passenger space and a chassis, the body being in two parts, means pivotally interconnecting the two parts at the top of the two parts for relative vertical swinging movement about a horizontal axis between collapsed and extended positions, the chassis being in two parts, means pivotally interconnecting the two chassis parts for relative vertical swinging movement about a horizontal axis, and means pivotally interconnecting each chassis part with one of said body parts for relative vertical swinging movement about a horizontal axis, all said horizontal axes being parallel to each other, one of said body parts telescoping within the other said body part.

2. A small collapsible motorcar as claimed in claim 1, in which the rear body part telescopes within the forward body part.

3. A small collapsible motorcar as claimed in claim 1, and means interconnecting said two chassis parts at their ends for vertical swinging movement relative to each other about a single horizontal axis.

4. A small collapsible motorcar as claimed in claim 1, there being a passenger seat in each of said two parts.

5. A small collapsible motorcar as claimed in claim 1, and flexible carpet means on the floor of said body covering said chassis and flexing when said chassis parts pivot relative to each other.

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