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(54) **Vehicle support apparatus**

(57) The invention is concerned with a vehicle support apparatus which comprises at least four supporting means 1 the supporting means 1 being spaced apart so as to accommodate the wheelbase of a motor vehicle and having dimensions suitable to support the vehicle at a convenient working height. The support apparatus facilitates the convenient loading and unloading of a ve-

hicle thereon by means of a mobile lifting device. The support apparatus is particularly suitable for use in conjunction with lifting means in order to provide a vehicle lift which allows for ready access to all parts of the vehicle. Consequently, the vehicle support apparatus and vehicle lift are especially useful in facilitating the efficient depollution and/or dismantling of vehicles.

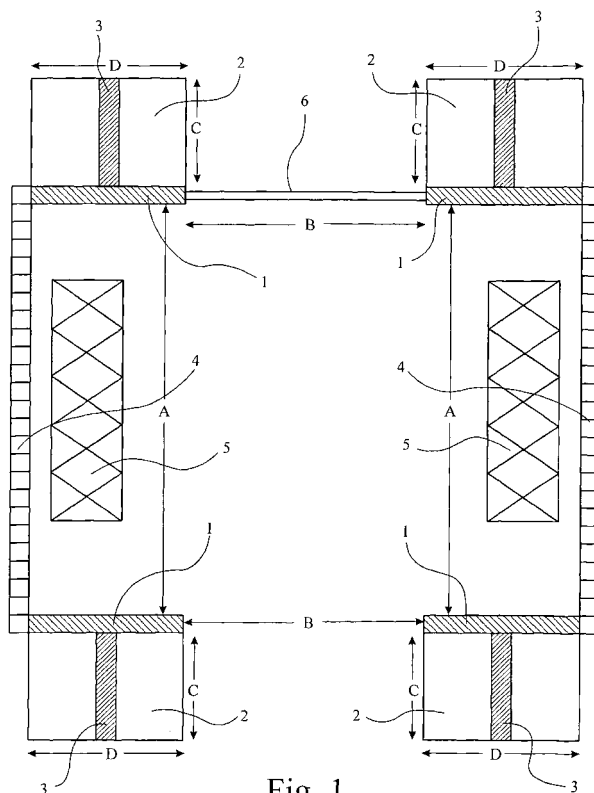


Fig. 1

Description

[0001] The present invention is concerned with an apparatus for supporting a vehicle. More specifically it relates to an apparatus which is useful for supporting and lifting a motor vehicle which has reached the end of its useful life and is to be subjected to a depollution and/or dismantling process.

[0002] Increasingly stringent environmental legislation has necessitated that rigorous procedures must now be observed during the disposal of motor vehicles which have become unroadworthy, or otherwise reached the end of their useful lives. Thus, it is, most particularly, required that all fluids, which may be a source of chemical pollution, should be removed from these vehicles, prior to final disposal. Therefore, fluids such as brake fluids, petrol or diesel, oil and antifreeze require to be drained from the vehicle. It is also necessary that the battery should be taken from the vehicle, due to the presence of battery acid.

[0003] In addition to these various fluids, it is also necessary, or desirable, that various other parts and accessories should be removed. A particularly obvious example is the tyres, since these cannot be sent with the car body for scrap. It is possible, of course, that the tyres may not have undergone extensive use, and may be suitable for reuse, and this is true of several other body parts, which may be relatively readily removed and could be in a sufficiently satisfactory state of repair to be suitable for use as spare parts following a suitable reconditioning treatment. It should also be mentioned that, for reasons of efficiency and convenience, it is much preferred that tyres should be removed whilst still attached to the wheels, rather than removing the tyres from the wheels, and leaving the wheels still attached to the vehicles.

[0004] Clearly, it is necessary that the motor vehicle should be manoeuvred into a suitable position to facilitate the work that requires to be performed. Thus, for example, in order that the wheels may be removed, it is necessary that the vehicle should be raised off the ground, by the use of jacking or other suitable means. The height to which the vehicle must be raised is not critical, provided that there is sufficient clearance between the tyres and the ground to facilitate easy removal of the complete wheel. For the purposes of removal of brake fluid, however, whilst it is possible for an operative to crawl on the floor in order to perform the task, it is much more desirable that the car should be raised off the floor to a sufficient height to allow for ready access for an operative in a standing position. This not only makes the task much simpler, but it also has significant advantages in terms of health and safety; furthermore, it also increases the speed and efficiency of the operation, with consequent economic benefits.

[0005] It will be apparent, therefore, that several aspects require consideration when designing a system for manoeuvring a vehicle so as to allow for efficient completion of all the tasks associated with the depollution and/or dismantling of a vehicle. Up to the present, the most common approach to this problem has been to lift the vehicle into a suitable workshop by means of a fork lift truck, or other suitable mobile lifting device, and then to raise the vehicle from the floor by means of a conventional lifting apparatus of the type that is commonly used by commercial tyre replacement outlets, whereby a lifting gear comprising four lifting arms, fixed at locations approximately adjacent the four corners of the vehicle, is operated by placing the lifting arms at various convenient points on the underside of the vehicle and using the power from a suitable motor to raise the arms, and thus the vehicle, to a selected height above the floor.

[0006] In general terms this procedure has proved to be satisfactory, despite being somewhat labour intensive when unloading the vehicle from the fork lift truck, or equivalent mobile lifting device, and reloading it on to the lifting apparatus. In addition, the procedure does suffer from a serious drawback following the completion of depollution and/or dismantling operations. In order to allow a device such as a fork lift truck to collect the vehicle, after depollution and/or dismantling for removal from the workshop, it is necessary for the vehicle to be lowered to the floor, since the lifting arms would otherwise be in the way of the prongs of the fork lift truck.

[0007] However, since the wheels will have been removed from the vehicle it will, of course, be necessary for the lifting arms to go all the way on to the floor, since there is no longer any means of supporting the vehicle. Consequently, it is not then possible for the prongs of a fork lift truck to collect the vehicle in this position. In general, therefore, it is then necessary for a towing truck, mobile crane, or other appropriate means to be employed in order to physically pull the vehicle from the lifting apparatus, along the floor and out of the workshop. Clearly, such a procedure is far from satisfactory and, whilst damage inflicted to the vehicle as a consequence of this procedure is generally of no consequence, since it is, in any event, destined to be scrapped, potential damage to the lifting device or flooring is a much more serious issue. In addition, of course, the procedure has obvious drawbacks in terms of efficiency, and also presents potential safety hazards.

[0008] Clearly, therefore, it would be significantly advantageous if means could be provided whereby this cumbersome, inconvenient and hazardous procedure could be avoided. Thus, the present invention seeks to provide a device and procedure for supporting and lifting vehicles, most particularly vehicles which are to be subjected to depollution and/or dismantling, which overcomes the problems associated with the devices and procedures of the prior art.

[0009] Most specifically, the invention seeks to provide an apparatus and procedure which offers marked advantages over the prior art in terms of ease of operation, speed and efficiency of operation, safety and convenience. The present invention is able to offer these advantages, since it provides a convenient means of supporting the vehicle, whilst also

allowing it to be easily raised and lowered and, unlike the devices of the prior art, it also facilitates ready access for a mobile lifting device such as a fork lift truck, both before and after the depollution and/or dismantling process has been completed.

[0010] Thus, according to a first aspect of the present invention, there is provided a vehicle support apparatus which comprises at least four supporting means, said supporting means being spaced apart so as to accommodate the wheelbase of a motor vehicle and having dimensions suitable to support said vehicle at a convenient working height, wherein said support apparatus facilitates the convenient loading and unloading of a vehicle thereon by means of a mobile lifting device.

[0011] The key features of the present invention are the ability to deal with a wide range of vehicles by virtue of the spacing of the supporting means, and the facility whereby a vehicle may readily be loaded on to the apparatus by means of a mobile lifting device, such as a fork lift truck. The latter feature is of particular value in respect of vehicles which undergo depollution and/or dismantling procedures, including the removal of wheels, whilst stationed on the support apparatus. The apparatus and procedures previously known in this field have never before allowed for the convenient removal of the vehicle after removal of the wheels. Naturally, however, the apparatus of the present invention is equally useful for the depollution and dismantling of vehicles wherein the wheels are not removed, and it can also find application in the context of supporting vehicles which are not to be depolluted or dismantled. The apparatus of the present invention is distinguished from many of the similar devices of the prior art in that it allows for the loading and unloading of a vehicle by means of a mobile lifting device whilst at the same time facilitating the removal of the wheels of the vehicle.

[0012] Preferably, the vehicle support apparatus comprises four supporting means which are spaced apart such that two supporting means are positioned to support one side of a vehicle and two further supporting means are positioned to support the other side of the vehicle. The supporting means are further arranged so as to accommodate the wheelbase of a vehicle.

[0013] Since vehicles are of many shapes and sizes, the present invention envisages a vehicle support apparatus wherein said supporting means are movable so as to be able to accommodate a wide variety of vehicles. Thus, the supporting means may, for example, be located on a pair of floor mounted parallel guide rails, thus allowing for adjustments such that vehicles with different wheelbases may readily be accommodated. Similarly, it is possible that provision may also be made for a degree of lateral movement, such that wider vehicles may be handled.

[0014] The major requirement for the apparatus of the first aspect of the present invention, however, is in the depollution and/or dismantling of motor cars, the dimensions of which all fall within a limited range. Consequently, a preferred embodiment of this aspect of the invention provides an apparatus which comprises supporting means which are fixedly located such that wheelbases of substantially all motor cars may be accommodated. Said preferred embodiment preferably comprises at least one base member to which said supporting means are fixedly attached. Preferably, said apparatus comprises two base members, arranged such that supporting means at one side of the vehicle are fixedly attached to one base member, whilst supporting means at the other side of the vehicle are fixedly attached to the other base member. Most preferably, said apparatus comprises four supporting means, two supporting means being attached to one base member whilst the remaining two supporting means are attached to the other base member.

[0015] Said supporting means typically comprise a rigid upright structure capable of supporting a region on the underside of a vehicle. The supporting means may comprise a solid metal structure, but a preferred design comprises a rectangular metal frame of suitable dimensions so as to fulfil the objectives of the invention in terms of locating the vehicle at a convenient height from the floor so as to allow various operations to be performed whilst the vehicle is *in situ*, and to facilitate loading and unloading by means of a mobile lifting device, whilst also enabling vehicles of various wheelbases to be accommodated.

[0016] It has been found that rectangular metal frames having dimensions within the following limits are preferred for this purpose:

Height = 400-600 mm; Width = 400-600 mm; Depth = 40-80 mm

[0017] More preferably, the following dimensions apply:

Height = 450-550 mm; Width = 450-550 mm; Depth = 50-70 mm

[0018] In the most preferred embodiment, the supporting means comprises a substantially square frame having the dimensions:

Height = 480-520 mm; Width = 480-520 mm; Depth = 55-65 mm

[0019] Typically, the frame comprises a metallic frame of rectangular, preferably square, cross-section, which preferably also comprises at least one diagonal cross-member of substantially the same cross-section, designed to add strength to the frame. In addition, further strengthening is preferably also provided by means of at least one angled member, fixedly attached at one end to the top of the frame and at the other end to the base member, at a point spaced apart from the frame.

[0020] Optionally, each of said supporting means also includes retaining means, comprising a small metallic member projecting from the outer top corner of the supporting means which is preferably integral with the frame. Said retaining means serves to prevent the vehicle from excessive slippage on the support device which could result in it moving outside the perimeter of the support apparatus, which would clearly be undesirable.

[0021] Preferably, the vehicle support apparatus also includes at least one side member attached to the supporting means. Said side member is included primarily in view of safety considerations and may comprise a metallic bar attached to each supporting means at the side of the vehicle. Thus, in the case where the vehicle support apparatus comprises two supporting means located at each side of the vehicle, two side members could be employed, each conveniently being removably attached at its ends to a supporting means. Alternatively, at least one side member may comprise a more substantial member, such as a metallic plate, which may again be attached to the supporting means in a similar fashion, but may be of sufficient dimensions so as to completely prevent access beyond the perimeter of the support apparatus. Typically, a side member of this type would be utilised to prevent damage to apparatus from occurring during loading or unloading of vehicles. Said side members may be attached to said supporting means in any convenient manner, for examples by means of hooks, bolts, screws and the like.

[0022] In the preferred case wherein the vehicle support apparatus comprises four supporting means, and the apparatus is intended for use in conjunction with motor cars, it is found that essentially all vehicles in this class can be accommodated by an apparatus wherein two supporting means are located at one side of the vehicle, and spaced apart by a distance of 1200-1800 mm, preferably 1400-1600 mm, most preferably 1450-1550 mm, and the remaining supporting means are located in corresponding positions at the other side of the vehicle. The optimum distance between the two sets of supporting members is in the region from 500-1200 mm, preferably from 700-900 mm, most preferably from 750-850 mm. The spacing between the two sets of supporting members in this arrangement is important not just in terms of the ability of the apparatus to accommodate vehicles of various dimensions, but also in terms of allowing access between the supporting means to the underside of the vehicle. This is particularly important when it is intended that the support apparatus should be used in conjunction with lifting means, and this aspect of the invention will now be considered.

[0023] The support apparatus of the first aspect of the present invention is most usefully employed in conjunction with lifting means, which facilitates the raising and lowering of the vehicle to the most convenient heights for performing specific tasks. This is especially true in respect of vehicle depollution and/or dismantling operations, wherein diverse tasks such as wheel removal, battery removal and brake fluid removal and removal of spare parts are all most easily performed with the vehicle in different relative positions. Thus, it is especially advantageous that at least one lifting device should be located adjacent the vehicle support apparatus.

[0024] Accordingly, a second aspect of the present invention provides a vehicle lift which comprises a vehicle support apparatus according to the first aspect of the invention and lifting means.

[0025] Said lifting means typically comprises at least one lifting device, capable of lifting the vehicle to any desired height. In a preferred embodiment, said lifting means comprises two lifting devices, most conveniently located within the perimeter of the vehicle support apparatus, which are able to co-operate with the underside of the vehicle and facilitate lifting of the vehicle. Generally, any suitable commercially available vehicle lifting device or jacking means of sufficient strength and sturdiness will suffice for the purpose. Preferably, said lifting means comprises powered lifting means.

[0026] The use of apparatus according to the second aspect of the invention introduces a further consideration when the apparatus is being loaded with a vehicle by means of a mobile lifting device such as a fork lift truck. Thus, since the apparatus comprises lifting means, generally located within the perimeter of the vehicle support apparatus, there exists the possibility that the prongs of a device such as a fork lift truck may inadvertently enter the apparatus at such a height as to cause damage.

[0027] In its lowest position the lifting means will be at a position below the height of the supporting means but, particularly when unloading the vehicle from the support apparatus, the lifting members, or prongs, of a fork lift truck may enter the apparatus at too low a height, thereby inadvertently inflicting damage on the lifting means. In such cases, therefore, it is advantageous to employ side members which are more substantial than a metallic bar, and which comprise a metallic plate, affixed to the supporting means at a point below the top of the supporting means, located so as to allow access of the lifting members, or prongs, of the fork lift truck, said side member extending substantially to

ground level, so as to prevent access within the perimeter of the vehicle support apparatus; in this way, inadvertent damage to the lifting means may be prevented.

[0028] As will have become apparent from the foregoing discussion, the vehicle support apparatus of the present invention is constructed from metals. Preferably, all members of the vehicle support apparatus are constructed of the same metal which typically comprises steel having sufficient strength to fulfil the purposes described.

[0029] As previously discussed, the apparatus according to the present invention is most advantageously utilised in the depollution and/or dismantling of vehicles which are intended to be sent for scrap. Thus a third aspect of the present invention envisages a process for the preparation of a vehicle for scrap, the process comprising:

- (a) loading said vehicle on to a vehicle lift according to the second aspect of the invention;
- (b) performing at least one of depollution and dismantling operations on the vehicle; and
- (c) unloading said vehicle from said vehicle lift.

[0030] Typically, said procedure for depolluting the vehicle comprises removal of potentially toxic and environmentally harmful fluids from the vehicle; such fluids include diesel or petrol fuel, oil, antifreeze, brake fluid, windscreen wash, and the like. Additionally, batteries, which contain harmful battery acid, together with wheels and tyres, are also usually removed. The techniques for the removal of said fluids and parts are those which are well known to those skilled in the art.

[0031] In addition to the depollution process, the procedure for the preparation of a vehicle for scrap will also generally involve dismantling operations, which generally comprise the removal of potentially useful spare parts.

[0032] The present invention will now be illustrated, though without limitation, by reference to the accompanying drawings, wherein:

Figure 1 is a plan view of the vehicle lift according to the second aspect of the invention, and incorporates a vehicle support apparatus according to the first aspect of the invention;

Figures 2(a) and (b) are side elevations of the apparatus as shown in Figure 1; and

Figures 3(a), (b) and (c) are end elevations of the supporting means shown in Figures 1 and 2 which also illustrate the different side members which may be incorporated in the apparatus of the invention.

[0033] Referring firstly to Figure 1, there is seen a vehicle lift which comprises supporting means 1 situated on base members 2 and comprising angled members 3 and side members 4. In addition, the lift comprises lifting means 5, and there can also be seen a section of ducting 6, which serves to protect electrical cables located on the floor. The vehicle support device according to the first aspect of the invention comprises the apparatus as seen in Figure 1 in the absence of the lifting means 5 and ducting 6.

[0034] The dimensions as shown in Figure 1 are as follows:

$$A = 1500 \text{ mm}; B = 800 \text{ mm}; C = 350 \text{ mm}; D = 500 \text{ mm}$$

[0035] Turning now to Figures 2(a) and 2(b), there are seen a side elevations of the above apparatus which comprise supporting means 1, incorporating retaining means 7, situated on base members 2 and comprising angled members 3 and side members 4a and 4b. In addition, the lift comprises lifting means 5. Side member 4a comprises a metal bar and acts as a safety barrier, whereas side member 4b comprises a metal plate which extends substantially to the floor and prevents inadvertent damage being caused to lifting means 5 by the action of, for example, the prongs of a fork lift truck.

[0036] The dimensions as shown in Figures 2(a) and (b) are as follows:

$$A = 1500 \text{ mm}; C = 350 \text{ mm}; E = 500 \text{ mm}; F = 6 \text{ mm}; G = 330 \text{ mm}$$

[0037] Referring finally to Figures 3(a), 3(b) and 3(c) there are seen end elevations of the above apparatus which show supporting means 1, incorporating angled members 3, diagonal cross-members 8 and retaining means 7, situated on base members 2. In Figure 3(a) there is shown a side member 4b comprising a metal plate, and in Figure 3(c) there is shown a side member 4a comprising a metal bar. Figure 3(b) shows the apparatus in the absence of a side member, though with a hooked member 9 by means of which a side member may be attached.

[0038] The dimensions as shown in Figures 3(a), (b) and (c) are as follows:

D = 500 mm; E = 500 mm; F = 6 mm; G = 330 mm.

Claims

1. A vehicle support apparatus which comprises at least four supporting means 1, said supporting means 1 being spaced apart so as to accommodate the wheelbase of a motor vehicle and having dimensions suitable to support said vehicle at a convenient working height, wherein said support apparatus facilitates the convenient loading and unloading of a vehicle thereon by means of a mobile lifting device.
2. A vehicle support apparatus as claimed in claim 1 which facilitates the unloading of the vehicle following removal of its wheels.
3. A vehicle support apparatus as claimed in claim 1 or 2 which comprises four supporting means, and wherein said four supporting means 1 are spaced apart such that two supporting means 1 are positioned to support one side of a vehicle and two further supporting means 1 are positioned to support the other side of the vehicle, and said supporting means 1 are further arranged so as to accommodate the wheelbase of a vehicle.
4. A vehicle support apparatus as claimed in claim 1, 2 or 3 wherein said supporting means 1 are moveably located on a pair of floor mounted parallel guide rails.
5. A vehicle support apparatus as claimed in claim 1, 2 or 3 wherein said supporting means 1 are fixedly located.
6. A vehicle support apparatus as claimed in claim 5 which additionally comprises at least one base member 2 to which said supporting means 1 are fixedly attached.
7. A vehicle support apparatus as claimed in any preceding claim wherein said supporting means 1 comprises a rigid, upright rectangular metal frame of such dimensions as to facilitate loading and unloading by means of a mobile lifting device whilst also enabling vehicles of various wheelbases to be accommodated.
8. A vehicle lift which comprises a vehicle support apparatus as claimed in any preceding claim and lifting means 5.
9. A process for the preparation of a vehicle for scrap, the process comprising:
 - (a) loading said vehicle on to a vehicle lift as claimed in claim 8;
 - (b) performing at least one of depollution and dismantling operations on the vehicle; and
 - (c) unloading said vehicle from said vehicle lift.
10. A process as claimed in claim 9 which comprises the removal of wheels and tyres from the vehicle.

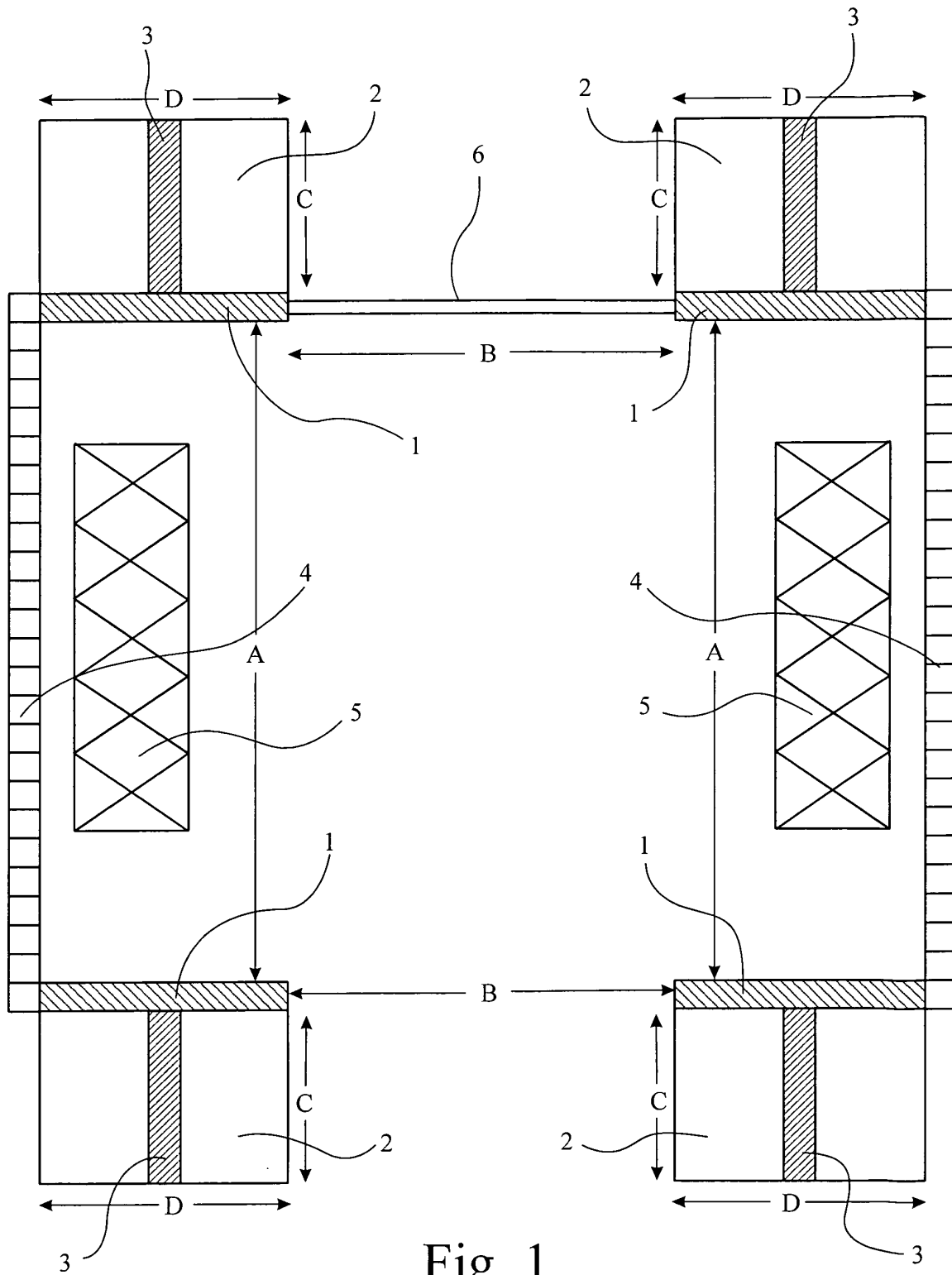


Fig. 1

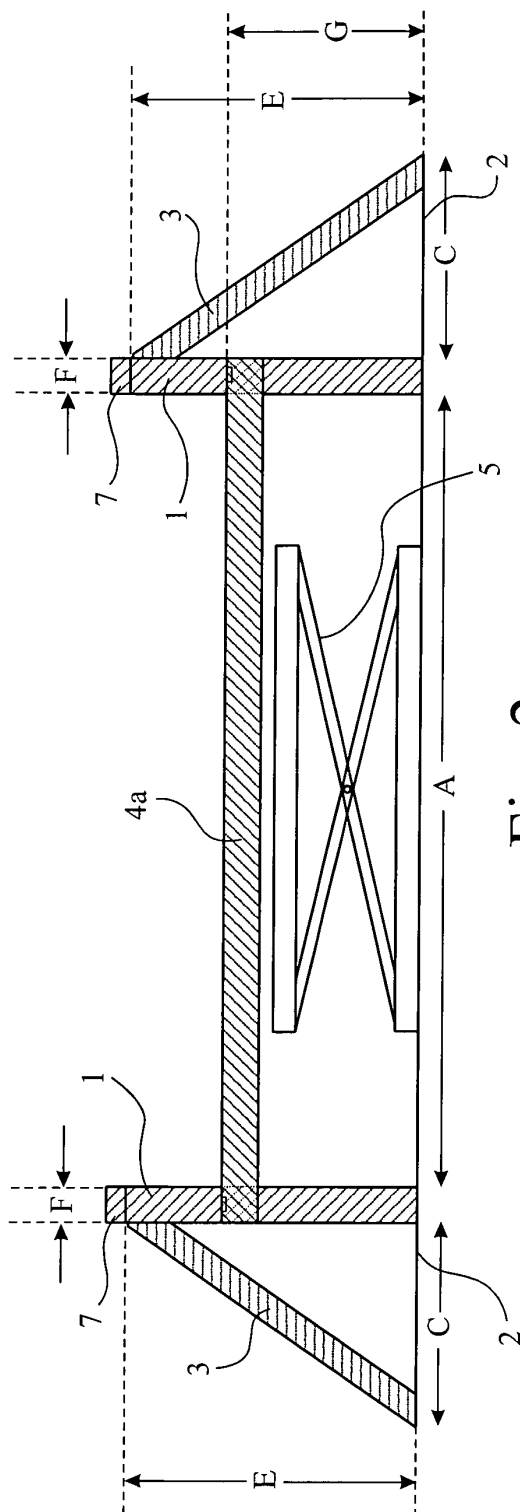


Fig. 2a

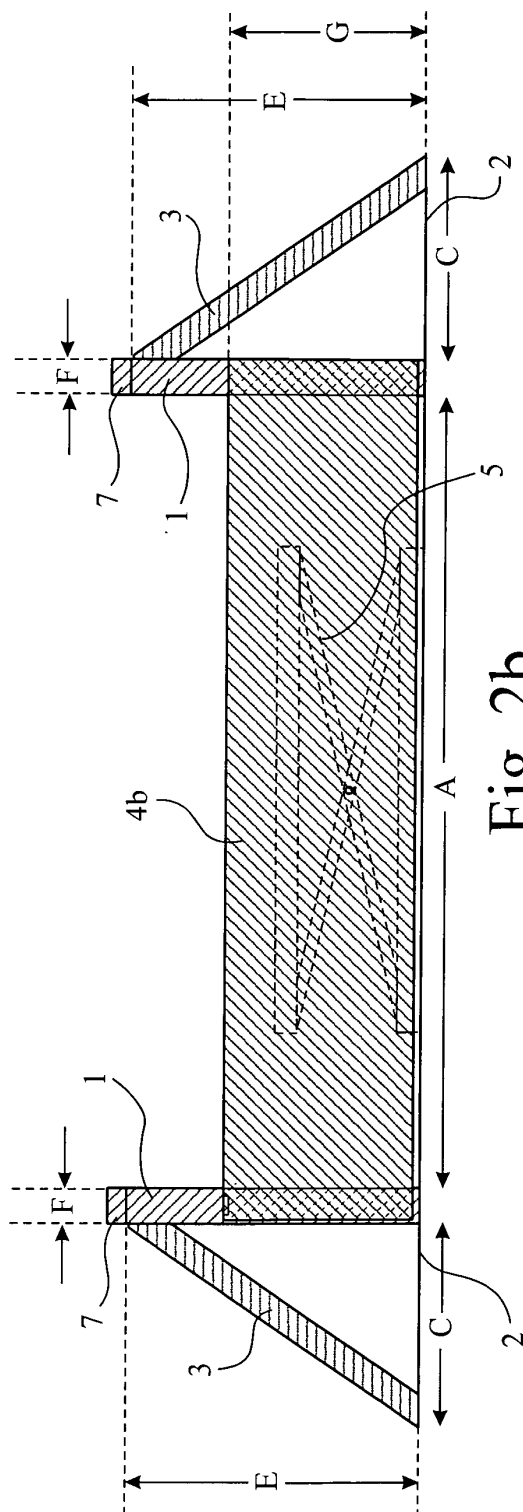


Fig. 2b

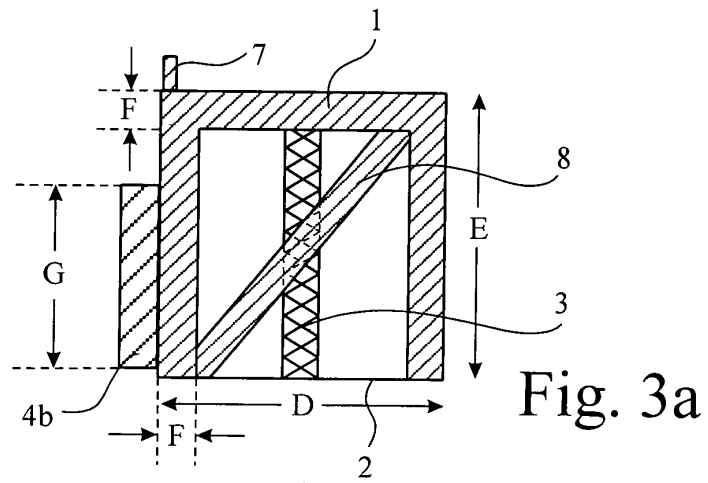


Fig. 3a

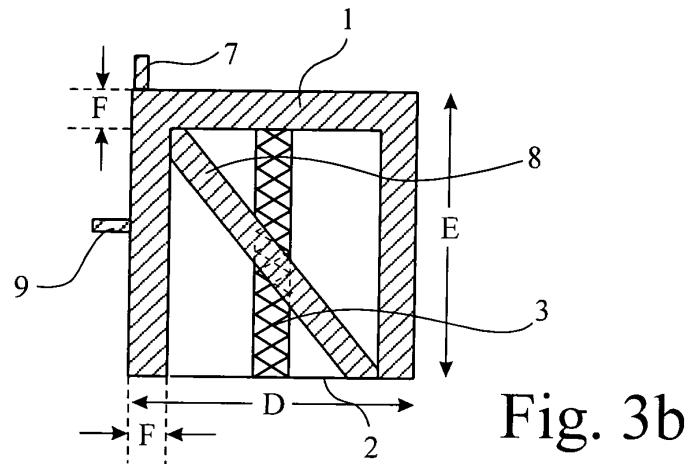


Fig. 3b

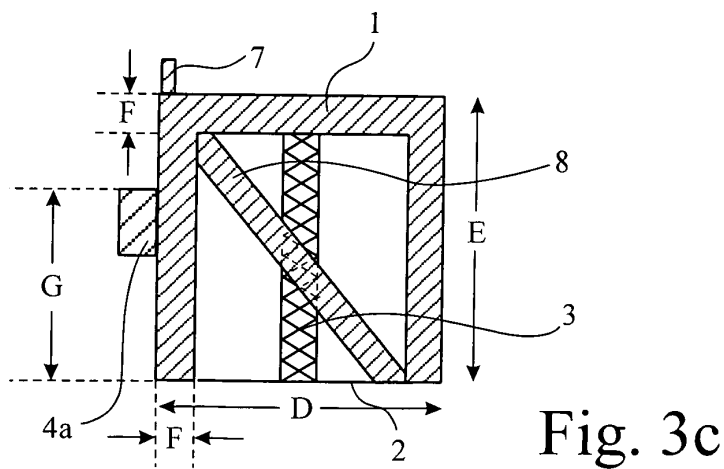


Fig. 3c



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Application Number
EP 03 02 7206

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 March 2004	Examiner Sheppard, B
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Place of search THE HAGUE		Date of completion of the search 22 March 2004	Examiner Sheppard, B
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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