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(71) Applicant(s)
Sarah Anne Miles
Orchard House, Garden Close Lane, NEWBURY, Berkshire, RG14 6PP, United Kingdom

Alice Selina Caldecott
Ladle Hill House, Old Burghclere, NEWBURY, Berkshire, RG15 9NR, United Kingdom

(72) Inventor(s)
Sarah Anne Miles
Alice Selina Caldecott

(74) Agent and/or Address for Service
Rowland Allsop
10 London End, BEACONSFIELD, Bucks, HP9 2JH, United Kingdom

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(56) Documents Cited
GB 2233616 A GB 2049794 A NL 008403751 A
US 5133201 A US 4622833 A US 4034824 A

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(54) A wheel clamping device

(57) A wheel clamping device, particularly to prevent the theft of a trailer, includes an electrically operable means in the form of an electromagnet 3 mounted on the axle of a vehicle adjacent a wheel to be clamped. The electromagnet carries a locking pin 7 which is held in a withdrawn position when the electromagnet is energised and constrained to move away from the electromagnet when the same is de-energised to enter an aperture 2 provided in a locking plate 1 attached to the wheel to be immobilised.

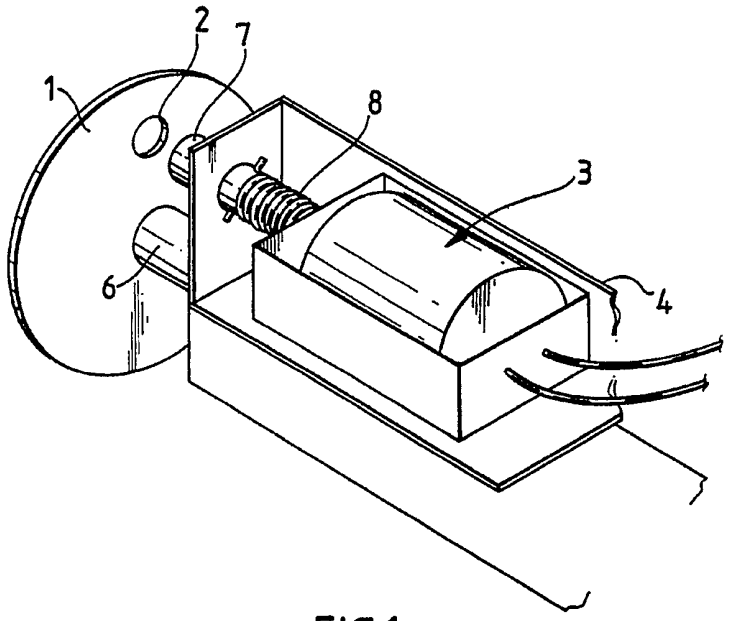

FIG.1.

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

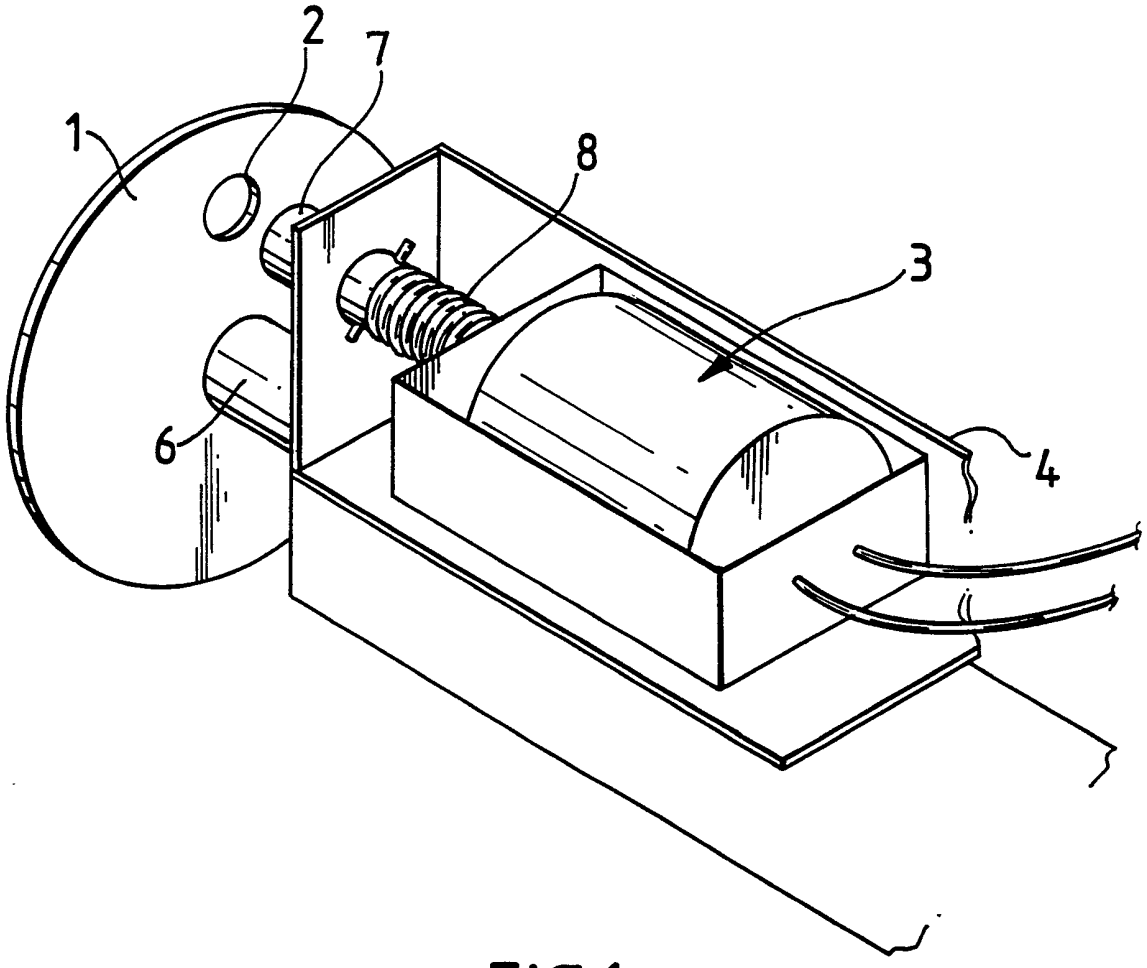

FIG.1.

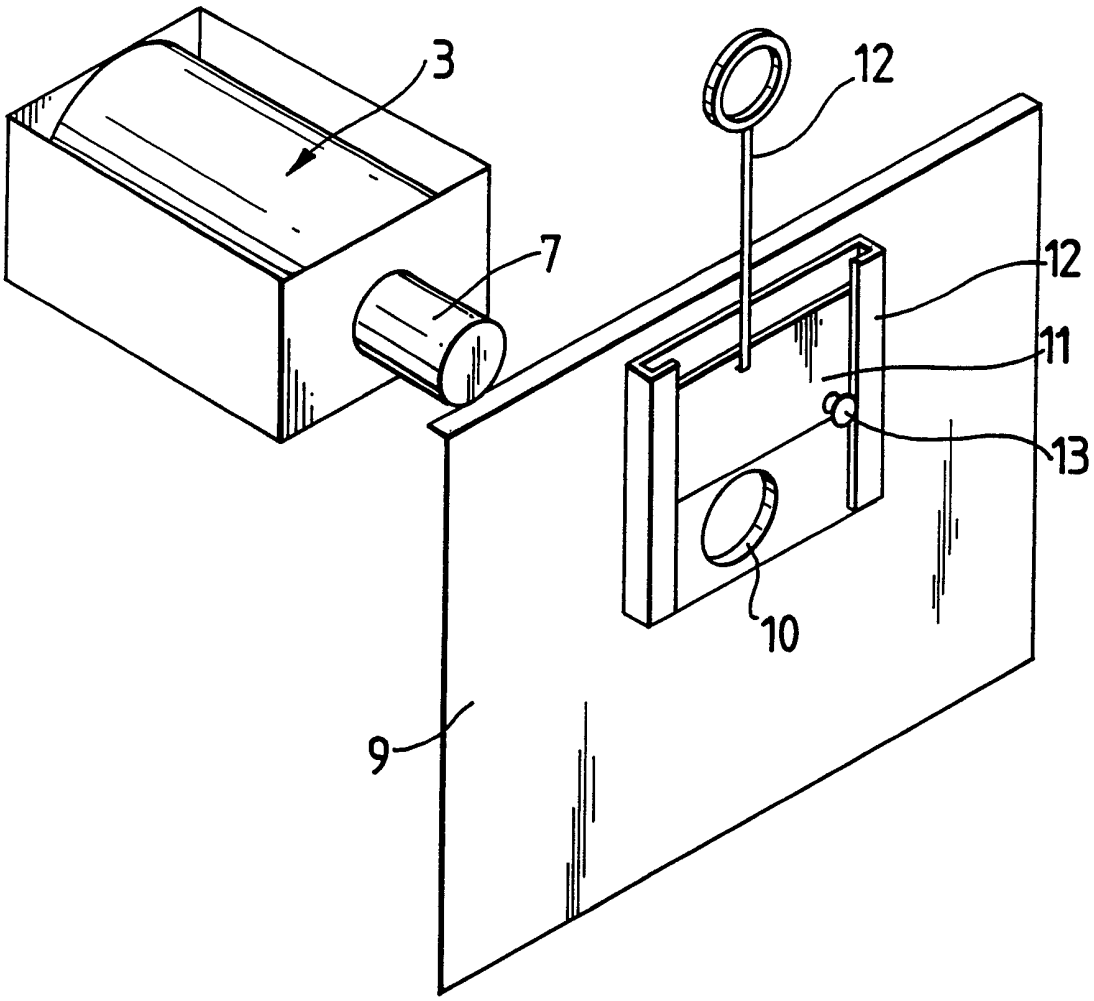

FIG.2.

A WHEEL CLAMPING DEVICE

FIELD OF THE INVENTION

The present invention relates to a wheel clamping system and particularly to such a system for immobilising a caravan or similar trailer.

BACKGROUND OF THE INVENTION

Wheel clamping devices in present day use to the applicants knowledge, are strictly mechanically operated to the extent that they have to be installed and removed by hand.

It is an object of the present invention to improve upon the prior art and to provide an automatically operable wheel clamping system and preferably to incorporate within the clamping system an alarm device which actuates upon the occurrence of unauthorised tampering with the clamping system.

SUMMARY OF THE INVENTION

According to the invention, there is provided a wheel clamping device comprising a first locking part provided on a vehicle wheel, a second locking part positioned adjacent said wheel for movement between a first position set apart from the first locking part and a second position in engagement therewith to prevent rotation of the wheel, and electrically operable means mounted on the vehicle for moving the second locking part between said first and second positions.

The electrically operable means may be an electromagnet which upon energisation acts to hold a locking pin forming the second locking part in the first position.

Advantageously, the locking pin is spring loaded to the second position such that the locking pin moves to the second position when the electromagnet is de-energised.

Preferably the first locking part is a locking plate mounted on the inside of the wheel and having at least one hole for receiving the electromagnetically operated locking pin which is mounted with the electromagnet on the axle of the wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become apparent from the following description of a preferred embodiment thereof taken with reference to the accompanying drawings wherein;

Fig 1 shows a perspective view of a wheel clamp according to the invention; and

Fig 2 is a perspective view of a fail safe device for incorporation with the wheel clamp of Fig 1.

PREFERRED EMBODIMENTS OF THE INVENTION

The wheel clamp shown in the drawings, paricularly Fig 1, comprises a locking plate 1 provided with four circularly positioned holes 2 (only one of which is shown in the drawing).

The locking plate 1 may be welded to the inner side of one of the wheels of a caravan trailer, for example, (not shown).

An electromagnet 3 is mounted inside a housing 4 on a plate 5 which latter is fixed to the axle 6 of the wheel as shown.

The electromagnet 3, when energised, holds a locking pin 7 passing through an aperture A in the housing 4, away from the locking plate 1 in the position shown in the drawing, to allow the wheel to move freely. Although not shown, a support bushing may be mounted in the aperture A in the housing 4 through which the locking pin 7 travels.

The locking pin 7 is spring loaded by means of a coiled spring 8 towards the locking plate 1, so that when the electromagnet is de-energised, the locking pin 7 is able to travel forward to enter one of the holes 2 of the plate 1 to immobilise the wheel. Rigid pegs 7' extending from the pin 7 at the respective ends of a diameter thereof limit the maximum forward movement of the pin 7 as when the pegs 7' engage the housing 4.

To prevent accidental lock-up should power to the device fail when the vehicle to which it is attached is in motion, such as a caravan trailer, allowing the pin 7 to enter the holes 2, a fail safe device may be installed as shown in Fig 2.

The fail safe device comprises a support plate 9 mountable to the wheel axle 6 between the electromagnet 3 and the locking plate 1. The support plate 9 is provided with a circular hole 10, the axis of which lies on the axis of the locking pin 7 of the electromagnet 3.

Access through the circular aperture 10 in the support plate 9 is controlled by means of a closure plate 11 vertically movable in a guide member 12 fastened to the support plate 9 as shown.

The closure plate 11 is operated by means of a handle 12 which may be arranged for operation from the inside of the vehicle to which the device is attached and spring assisted to ensure efficient operation.

The closure plate 11 may be held in an open position as shown in Fig 2 by means of a screw mounted pin 13.

The fail safe device described above is purely mechanically operable, but those skilled in the art will readily appreciate that electrically operable means could readily be devised to operate the closure plate 13.

Although not shown in the drawing, an alarm may be incorporated into the system such that it will sound if an attempt is made to energise the circuit other than by some person authorised to do so.

While an electrically operated locking pin using an electromagnet has been preferably chosen to control the locking pin, such a function could be effected by simple mechanical means as will be understood by any suitably skilled person reading this disclosure.

CLAIMS

1. A wheel clamping device comprising a first locking part provided on a vehicle wheel, a second locking part positioned adjacent said wheel for movement between a first position set apart from the first locking part and a second position in engagement therewith to prevent rotation of the wheel, and electrically operable means mounted on the vehicle for moving the second locking part between said first and second positions.

2. A device as claimed in claim 1 wherein the electrically operable means is an electromagnet which when energised holds a movably mounted locking pin, forming said second locking part, in said first position.

3. A device as claimed in claims 1 and 2 wherein the locking pin is spring loaded such that when the electromagnet is de-energised, the locking pin moves to said second position to secure the wheel.

4. A device as claimed in any preceding claim wherein the first locking part is a locking plate mounted on the inside of the wheel and having at least one hole for receiving the locking pin which is mounted with the electromagnet, on the axle of the wheel.

5. A device as claimed in any preceding claim further including a fail safe device for immobilising movement of the locking pin when wheel lock-up is not required.

6. A device as claimed in claim 5 wherein the fail safe device comprises a plate member provided with an aperture axially aligned with the axis of the locking pin and interposed between the path of travel of the locking pin between said first and second positions such that the locking pin moves through the aperture from said first to said second position, and a closure plate for closing the aperture in the plate member when the locking pin is immobilised or held in said first position.

7. A wheel clamping device comprising a movable locking pin mounted adjacent a vehicle wheel to be clamped, a receiving aperture or recess provided on the wheel for the locking pin, and means for controlling movement of the pin between a first position withdrawn from the aperture or recess and a second position in engagement therewith to immobilise the wheel.

8. A wheel clamping device as claimed in claim 7 wherein the aperture or recess is provided in a locking plate mounted to the wheel.

9. A wheel clamping device as claimed in claim 7 or 8 wherein the controlling means is an electromagnet.

10. A wheel clamping device substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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Examiner's report to the Comptroller under Section 17 (The Search report) -8-

Application number
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Relevant Technical Fields

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(ii) Int Cl (Ed.5) B60R 25/00

Search Examiner
COLIN THOMPSON

Date of completion of Search
16 MAY 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE: WPI

Documents considered relevant following a search in respect of Claims :-
1-10

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2233616 A	(GAUNT)	7,8
X	GB 2049794 A	(NEIMAN S.A)	7
X	US 5133201 A	(LA MOTT)	7,8
X	US 4622833 A	(SHEPHERD) see especially column 3 lines 32-33	1,4,7,8,9
X	US 4034824 A	(LUCAS)	7,8
X	NL 8403751 A	(WARNAU)	1,4,7,8,9

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).