

Attorney Docket No. 073433-00006

U.S. PROVISIONAL PATENT APPLICATION

TIRE DEFLATING DEVICE

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TIRE DEFLATING DEVICE

TECHNICAL FIELD

The invention relates to a means of disabling a fleeing vehicle in a police chase.

BACKGROUND

Frequent car chases by law enforcement through populated areas pose a safety problem to the officers and the public.

Officers have few options to stop the fleeing vehicle without increasing the danger to the public.

Spike strips are used to puncture tires when officers can deploy these ahead of the fleeing vehicle. Often this is difficult and dangerous.

Shooting the tires with a firearm is difficult and dangerous to the public and to the officer who must pull alongside the fleeing vehicle, possibly exposing himself to gunshot fire.

Law enforcement officers have developed a maneuver to spin the fleeing by tapping the fleeing vehicle on the quarter panel. This is usually last resort and often ineffective.

Many times in a chase, the fleeing vehicle encounters stopped or slow moving traffic or an intersection causing the chase to slow or stop momentarily.

At this time, the pursuit vehicle is often able to come up directly behind fleeing vehicle.

SUMMARY

Therefore, it would be useful to have a device that could disable the fleeing vehicle by puncturing or cutting one or more of the fleeing vehicle's tires.

During a brief stop, or at a reasonably slow speed, officer could actuate the device from a switch or lever inside the vehicle, which lowers and telescopes out to expose one or more cutting blades.

Officer need only bump the fleeing vehicle from behind to cut or puncture the rear tires.

The cutting blades may be in many forms such as knives or barbed hollow spikes at an end of an extension arm which detach or break off and remain in the tires, deflating the tires, and disabling

the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0001] Fig. 1 shows side view of Example A deployed;
- [0002] Fig. 2 shows side view of Example A retracted;
- [0003] Fig. 3 shows front view of Example A deployed;
- [0004] Fig. 4 shows bottom view of Example A;
- [0005] Fig. 5 shows detail of extension arm;
- [0006] Fig. 6 shows side view of Example B deployed;
- [0007] Fig. 7 shows side view of Example B retracted;
- [0008] Fig. 8 shows front view of Example B retracted;
- [0009] Fig. 9 shows bottom view of Example B deployed;
- [0010] Fig. 10 shows alternate means of deploying extension arm;
- [0011] Fig. 11 shows side view of Example C deployed;
- [0012] Fig. 12 shows side view of Example C spring mechanism;
- [0013] Fig. 13 shows front view of Example C retracted;
- [0014] Fig. 14 shows bottom view of Example C deployed;
- [0015] Fig. 15 shows alternate wheel or roller.
- [0016] DETAILED DESCRIPTION
- [0017] EXAMPLE A
- [0018] Referring to Fig. 1, a police car 1 is positioned directly behind a fleeing vehicle 2. An extension arm 3 of a puncturing mechanism is equipped with a cutting blade or spike 4. The cutting blade or spike 4 is arranged and configured to puncture and deflate the rear tires 5 of fleeing vehicle 2.
- [0019] Referring to Fig. 2, the mechanism is shown in storage and transport mode. The extension arm 3 is retracted inside a frame member 6. Frame member 6 is connected by an axle or hinge 7 to bracket 8, allowing extension arm 3 and frame member 6 to pivot. Bracket 8 is fastened to vehicle undercarriage or frame.

[0020] Referring to Figs. 1-4, extension arm 3 is supported by wheels or rollers 9 and by axle 10 when deployed. Rollers 9 can keep the cutting blades or spikes 4 in proper position and can prevent scraping on the pavement. Cross member 11 connects extension arms 3 and supports cutting blades 4.

[0021] Referring to Fig. 5, the extension arm 3 slides freely inside frame member 6. Extension arm 3 is equipped with teeth 12 that engage a pinion gear 13. A fixed rack 14 is also equipped with teeth that engage a pinion gear 15. An electric motor 16 drives the pinion gears 13,15 via shaft 17. Pinion gears 13 and 15 may be of different diameters. This arrangement simultaneously lowers and extends the arm 3 in synchronization. The mechanism is retracted into the stored and transport position by reversing the electric motor 16.

[0022] Referring to Figs. 1,2 and 4, a piston 18 is connected to the frame member 6. Piston 18 prevents the extension arm 3 from bouncing up when the cutting blade 4 contacts rear tire 5 of fleeing vehicle 2, or when wheel 9 contacts uneven pavement. Piston 18 is in the form of a shock absorber, however other possibilities are contemplated.

[0023] EXAMPLE B

[0024] Referring to Figs. 6,7,8,9, an extension arm 22 is fixed in an elbow or right angle position and attached to axle 23. The extension arm 22 is fitted with cutting blade 4 and wheel or roller 9 as in Example A. The extension arm 22 may be fitted with one blade 4 as in this example, or multiple blades or spikes as in Example A. Axle 23 is supported by brackets on brush guard 24.

[0025] Referring to Figs. 7,8, the extension arm assembly 22 can swing up for storage and transport, and down for deployment. Torsion springs 25 force the extension arms 22 into the down or deployed position. Torsion springs 25 keep wheels or rollers 9 against the pavement and prevent bouncing. Winch 26 and cable 27 pull the extension arm assembly back into the stored position. Referring to Figs. 8,9, hinge or axle 21 allows extension arm assembly 22 to fold in for storage or out for deployment. Pneumatic or hydraulic cylinders 28 push the arms 22 in or out. Pneumatic or hydraulic cylinders 28 are attached by axle or hinge at both ends, allowing them to pivot at both ends.

[0026] EXAMPLE C

[0027] Referring to Figs. 11,12,13,14, the extension arm 31 is attached in two pieces by spring hinge 32. The spring hinges 32 keep wheels or rollers 9 against the pavement and prevent bouncing. The extension arms 31 are connected to frame of police vehicle with axle 33 and torsion springs 34. Torsion springs 34 force extension arms 31 into the outward or deployed position. Winch 35 and cable 36 pull the extension arm assembly back into the stored position.

[0028] Referring to Fig. 15, wheels or rollers can take the form of a ball 40 and socket 41. This allows lateral movement of the extension arm assembly when in contact with the pavement thus reducing forces which may affect steering.

[0029] Any combination of the methods of movement described can be substituted for another. For instance, the rack and pinion system described in Example A can be replaced by a pneumatic or hydraulic cylinder system. In this case, fixed rack 14 and pinion gears 15 can be eliminated, as the piston 18 could be used to raise and lower the assembly. In addition, electric motor 16 and pinion gears 13 can be replaced with a pneumatic or hydraulic cylinder or spring 29 mounted inside or outside the extension arm 3 as shown in Fig. 10. Piston 18 may be combined with a winch and cable system as described in Example B to raise and lower the extension arm assembly.

[0030] The pneumatic or hydraulic cylinder system described in Example B can be replaced by the torsion spring and winch system as described in Example C.

[0031] Cutting blades 4 can take a variety of shapes such as a straight blade, curved or hook shaped such as a hunting knife or spearhead. Cutting blades 4 can be replaced with spikes or hollow quills. In some cases, hollow quills are barbed and break off and remain in the tire.

[0032] Optionally, the extension arms 3 may be fitted with power nailers, commonly referred to as nail guns instead of spikes or cutting blades. These devices may be of several designs such as electric spring loaded and solenoid variety, pneumatic using compressed air or flammable gas, or powder actuated, commonly using .22 caliber explosive cartridges, similar to blank firearm cartridges. The nailer may be fitted with a trigger that fires the nail or quill only when contact is made with the tire 5.

[0033] As another option, cutting blades may be replaced with other means of puncturing the tires of the fleeing vehicle such as fixed or rotating saw blades, cutting twist drills or router bits, plasma or water cutting jets, or lasers.

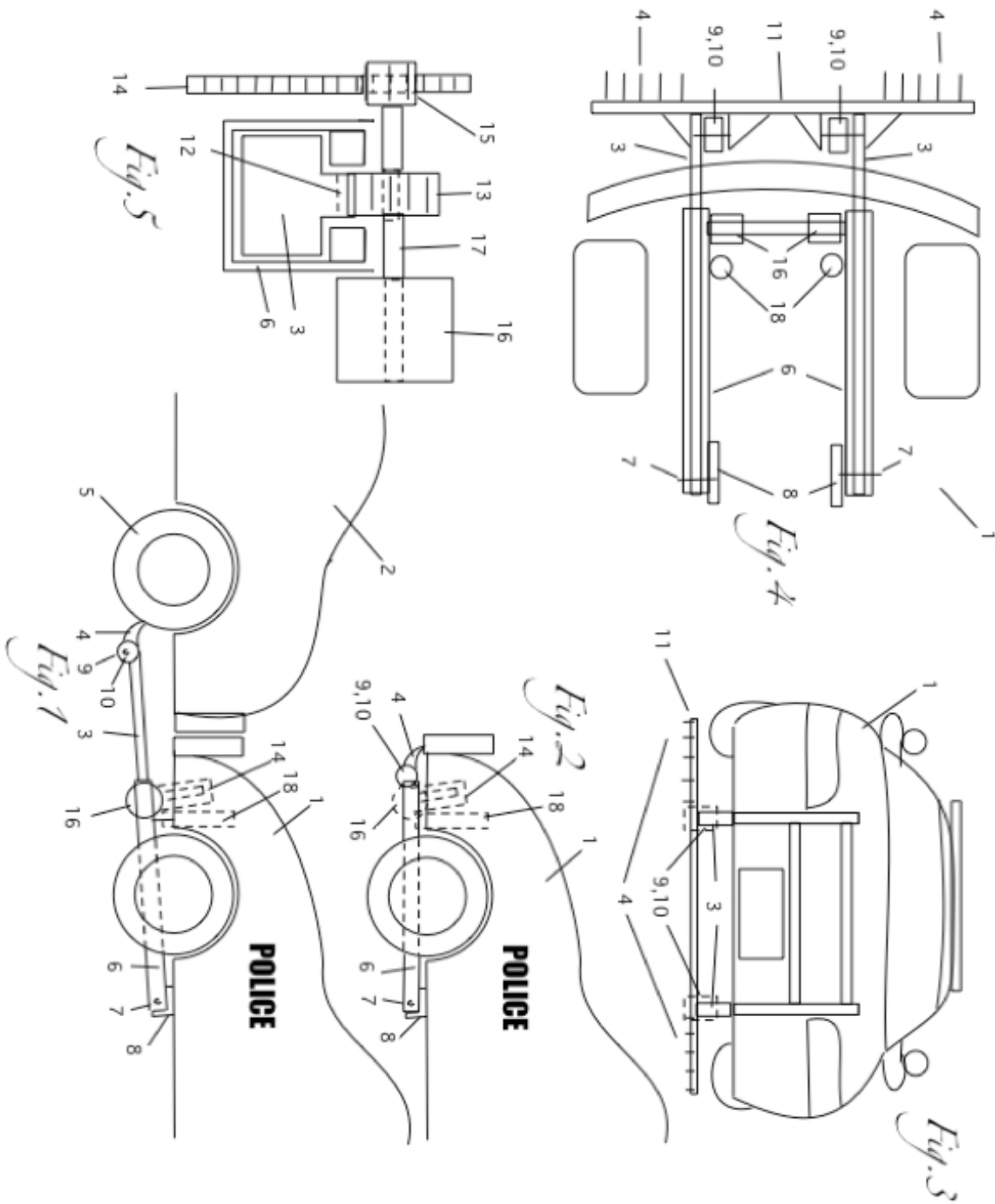
[0034] It is to be clearly understood that the above description is intended by way of illustration and example only and is not intended to be taken by way of limitation, and that changes and modifications are possible. Accordingly, other embodiments are contemplated and modifications and changes could be made without departing from the scope of this application.

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ABSTRACT

Mechanical tire puncturing device is mounted to the front of law enforcement vehicle to be deployed to disable fleeing vehicle in a car chase.

DRAWINGS



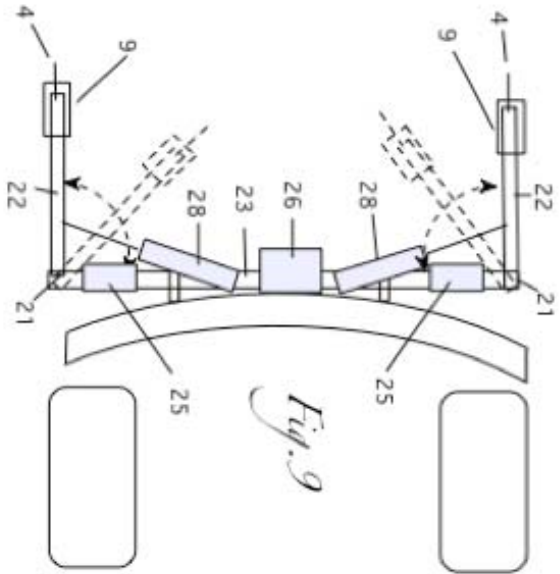


Fig. 9

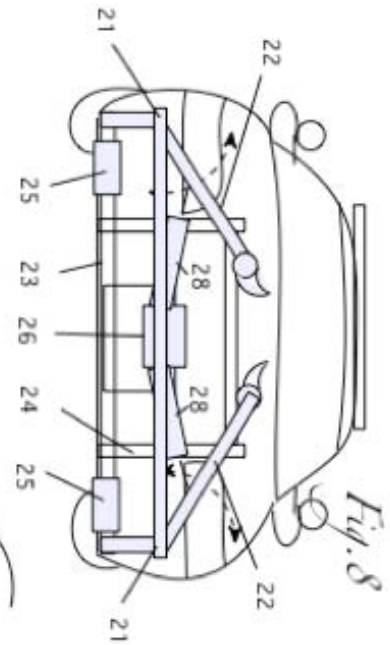


Fig. 8

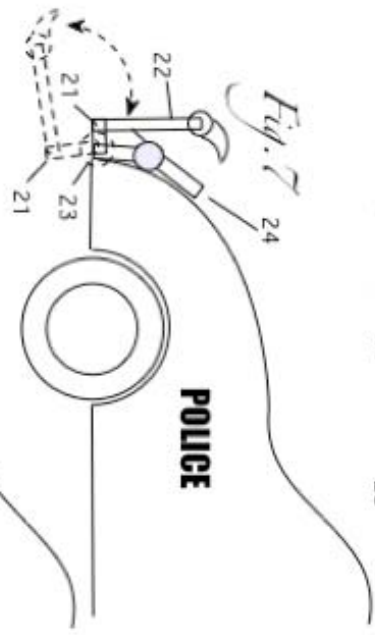


Fig. 7

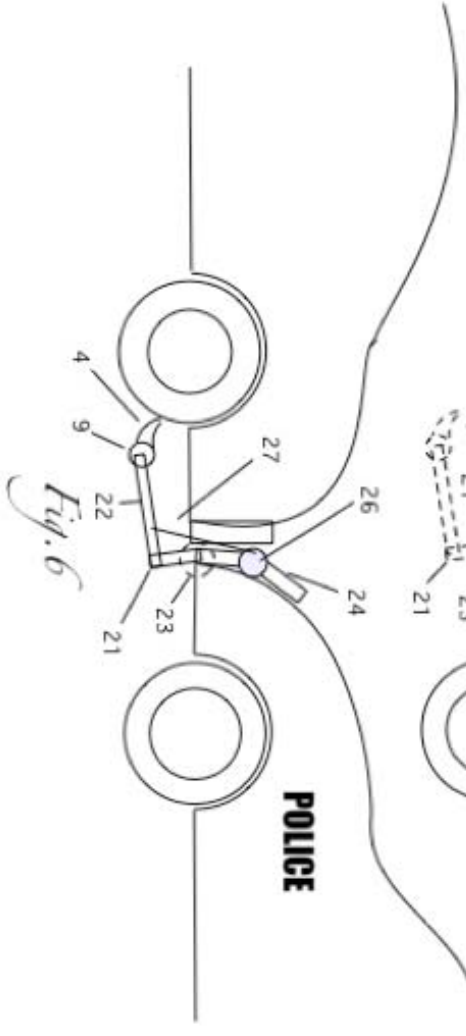


Fig. 6



Fig. 10

