

**A NON-LETHAL ALTERNATIVE TO ANTI-PERSONNEL LAND MINES**  
**Using Proven Technology**  
by  
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Anti-Personnel Land Mines cause thousands of civilian deaths and severe crippling injuries for many years after the mines have been abandoned by forces previously at war or who were trying to protect their territory from aggressors. Many of those innocent victims are children. Even when forces try, finding all of these deadly booby traps is nearly impossible. The public concern about the high number of unnecessary injuries and deaths from these mines has resulted in an international treaty to ban lethal Anti-Personnel Land Mines. The United States has not yet agreed to this treaty due to concerns about security in Korea. However, most military forces see the continuing need to deny enemy access to areas without committing large numbers of troops.

**SYSTEM CONCEPT**  
**NON-LETHAL, MULTIPLE TASER, AREA DENIAL DEVICE.**

Tasertron has taken its well proven, non-lethal police taser weapons and a land mine housing and mine deployment system that will be produced by our teaming partner PRIMEX Technologies and configured them as a Non-Lethal Taser Area Denial Device, similar to an anti-personnel mine. It would contain multiple, independent, standoff incapacitation devices that, when activated by any one of a number of currently available sensors, can temporarily incapacitate, without major injury, a number of subjects, including those wearing soft body armor. The Taser works well even in heavy rain as proven at a Demonstration of Quickly-Fieldable Non-Lethal Devices/Munitions, for the Dismounted Battlespace Battle Lab at Fort Benning Ga. This took place at an outdoor MOUT site in heavy rain, in December of 1995. The very low power, high voltage signal, will also penetrate a combined 2 inches or more of clothing.

To assure that short circuits, due to misses, or low voltage, due to body hits, cannot disable or degrade other dart sets, the Taser Area Denial Device will consist of seven or more independent Taser modules. Their replaceable cartridges are installed in separate firing bays over a 120 degree area, facing the expected threat. They will be mounted in a 2-3 inch thick circular plastic mine housing with a diameter of 12 to 18 inches. Each quick change Taser cartridge contains its propellant and 2 lengths of high voltage wire with contacts that touch the high voltage contacts in the firing bay. The other wire ends are tipped with small barbed darts. All of the Taser circuits will be activated and the cartridges fired simultaneously when the device is triggered by any of a number of existing sensors that could be used to detect an intruder at 70 to 80 percent of the maximum range. When triggered, a coded alarm signal will also be sent to nearby troops. The troops would then proceed to the site to capture the incapacitated intruders and secure the area. The controlling troops can also utilize the alarm circuitry receiver to remotely control the Taser device (on or off or deactivated) via secure encrypted codes. After securing any prisoners the Non-Lethal device can be quickly reloaded and rearmed in the field by the security troops.

**Feasibility:**

While more expensive than crude land mines initially, the Taser device does not destruct.

It is field reloadable and can be reused for years to reduce costs. The system uses proven technology and existing well proven devices and components that are in current military and police use. These include the Taser circuitry and cartridges with 18 years of field proven safety and effectiveness and various military intrusion detectors, remote radio control systems, and long life batteries. These are utilized in a unique new configuration mounted in a new plastic mine housing.

### MISSIONS

#### **Contribution of the Taser Area Denial Device to Mission Accomplishment:**

- It would eliminate casualties of non-combatants.
- It would reduce the number of troops required to maintain the security of an area.
- It could protect Anti-Tank mines from removal by infantry.
- It would stop an intruding enemy force or delay a major mass attack.
- It would give our troops early warning of an attack.
- It would prevent accidental death or injury to our troops.
- It would permit the capture and interrogation of enemy troops.

**Security and Area Denial:** The Non-Lethal Taser Area Denial Device is especially useful in **Low Intensity Conflicts** and **Peacekeeping** operations where there are many civilians in the area or where it may be difficult to distinguish friend from foe. It will not permanently harm either friend or foe. It can also be deployed along defensive line perimeters or around Anti-Tank mine fields and will prevent enemy infantry reconnaissance troops or raiding parties from penetrating our lines. It will hold them for capture and will automatically alert nearby troops via radio or satellite. In the event of a mass attack the Taser devices will incapacitate most of the forward line of the enemy (**and any enemy troops that touch the incapacitated troops**) and will send an alarm signal to our troops. The Taser mines will also instill strong fear into any remaining troops due to the human's inherent fear of electricity. This will give our "ready troops" time to respond and even counterattack without resistance by the enemy's incapacitated forward line of troops.

**Peacekeeping:** In peacekeeping or disaster relief missions the Taser Area Denial Device can also be used to secure storage areas as well as troop facilities and will deter looting or sabotage. It will permit the capture of looters or saboteurs without injury to either the culprit or the security forces. The non-lethal Taser Area Denial Device can also be deployed to keep opposing forces within their assigned areas to help prevent conflicts while using minimum force.

**Withdrawal:** The Taser devices may be used to prevent subjects from following our forces when they are withdrawing from an area. After the withdrawal is complete the non-lethal Taser Area Denial Devices may be deactivated from a remote position to prevent accidental triggering by civilians.

### TECHNICAL

The proposed proprietary device is a non-lethal alternative to the Anti-Personnel Landmine. The device would cover a radius of 15 feet (30 feet possible) and could be triggered by various existing mine sensors such as infrared motion detectors, trip wires, pressure plates or a combination of these.

The Taser uses a small low voltage battery and a relaxation oscillator to generate a very low power (about 0.3 to 0.4 joules), high voltage (50,000 volt) pulse of very short duration (4 to 6 microseconds), the pulses are repeated at 8 to 24 pulses per second. The amount of power that can be generated by each Taser device is physically limited by the energy storage capacity of the inductance of the oscillator transformer and, once designed, cannot be changed. This very low, 0.3 to 0.4 joule power level is about one thousand (1,000) times lower than the 300 to 400 joule level of the common heart defibrillator.

The electronic pulse will temporarily incapacitate anyone within an inch of the darts by overriding the brain's signal to near surface motor control nerves, causing uncontrollable spasms of the motor control muscles resulting in temporary loss of the subject's motor control functions. The subject will fall and temporarily be incapacitated. The subject remains conscious and alert but cannot control his muscles. A timing circuit will permit keeping the subjects incapacitated until they can be taken into custody by nearby troops. After the very low power signal is turned off, the subjects will recover within the hour. The non-lethal Taser device produces no collateral damage and poses no lethal threat to friendly forces or civilians, even if accidentally triggered.

While the Taser output is similar to that of a so called "stun gun" there are two very significant differences. The Taser contactors stay connected to the subjects body or clothing, he cannot pull away as he could from a stun gun. The Taser contacts are also much more widely separated (12 to 30 inches) than the 2 inch contact spacing of the stun gun. This means that many more nerves and muscles are affected by the Taser, causing total loss of motor control and incapacitation regardless where on the body the subject is hit.

The Taser will easily take down a person wearing soft body armor since the high voltage readily arcs through the minute holes in the weave of the armor. Metal trauma plates spread the charge over more of the body, however, it will not penetrate a non metallic trauma plate. The Taser is much more effective than a .38 caliber bullet since it is not necessary to hit a vital organ in order to immediately stop an assailant. Although the Taser device would cause no deaths or injuries if accidentally triggered, it can be permanently shut down remotely when no longer needed.

### **Implementation :**

Our concept is to mount 7 or more of our off-the-shelf Taser firing bays into the top perimeter on one side of a standard shaped mine housing made of non conducting material. See figure 4. The separate Taser circuits will be centrally mounted. The batteries will be mounted on the bottom surface of the device. The firing bays will be reversed from that of the standard Taser so that the upper dart will rise one foot for each five feet of range for the short range unit (10 ft. on long range unit).

The lower dart from each firing bay would propel straight out horizontally. The firing bay would be angled slightly so that the lower dart would hit at a height of about 1-2.5 feet at 15 foot range. This would be the positive lead. The negative lead would be angled to reach a height of 4.5 feet at maximum range. The negative lead would also be connected to an electrode imbedded in the ground (earth). This would provide a contact path from either the upper dart (negative) to the lower dart (positive) or from the lower dart to earth (negative) increasing the take down rate.

In this manner the Taser device could take down a crawling or crouching soldier (from earth to a single positive dart) or a standing soldier ( from positive dart to upper negative dart).

The area denial device could take down multiple subjects that approach at the same time. See Figure 1. The subjects will be disabled for the duration of the applied power plus at least a few minutes after the power is turned off. Therefore, the long life batteries controlling the Taser circuit will be configured to run for a minimum of 10 minutes (variable depending on battery size), with 1 second breaks every 10 seconds to allow the subject to breath freely under worst case conditions. When triggered, the mine would launch 7 or more dart pairs in multiple directions over a 120 degree arc at 20 degree angles (10 degrees for high density or long range devices) on the area facing the expected intrusion. See Figure 3.

Long range or high density devices could be assembled by stacking two of the 2-3 inch thick 20 degree deployment Taser devices so that one disc is automatically offset radially by 10 degrees. This would provide twice the number of dart sets, each offset by 10 degrees from the next dart set. In this case the upper disc and half of the lower disc must be above ground.

**Safety (Lack of Lethality):**

The Taser device has been proven safe and effective in over 18 years of police use by more than 400 major law enforcement agencies in the United States. The Taser has also been proven safe by extensive studies and testing by the Medical Director of the U.S. Consumer Product Safety Agency ( a federal agency) and other safety agencies. The Taser is so safe it is used by universities such as University of Southern California, Duke University, University of Cincinnati, Black Hawk College as well as at very crowded airports. It is also so effective it is used by many SWAT teams and by the U.S. Department of Justice.

**Tactics and Emplacement & Withdrawal Techniques:**

Tactics for this device would be the same as for standard perimeter mine deployment except that troops must be maintained near the "minefield" to capture the incapacitated intruders. The number of troops would be determined by the tactical deployment situation, but would be less than the number needed to secure the area without the non-lethal Taser devices or without mines.

The device would use modifications of current deployment systems and it would be deployed in the same manner as current mines. The Non-Lethal Taser Area Denial Device, however, must be deployed so the cartridge firing bays face the threat area and are above ground. The devices would be under control of nearby troops, who, could reach the area within 10-12 minutes and could activate or deactivate the devices by coded remote control via radio or satellite.

Withdrawal could be accomplished in a number of ways. Our troops may withdraw leaving the Non-Lethal Taser Area Denial Device active to protect the withdrawal. After safely withdrawing from the area the troops can then disarm the devices by remote control. If the threat permits, the Non-Lethal Taser Area Denial Devices may also be withdrawn by deactivating the devices, then remotely commanding the device to transmit it's coordinates or a homing signal to lead recovery troops to it's exact location.

**Maintainability:**

The only routine maintenance required is to reload the weapon in the field after it has been triggered and to replace the batteries, when they have been depleted by activating the device, or when never triggered, replace at least every two years. The tasks require no special equipment or skills and minimal training.

**Countermeasures:**

When deployed and well camouflaged the high percentage of plastic and low percentage of metal as well as the use of minimal explosives (only 7 rifle primers per device) would make the Non-Lethal Taser Area Denial Device difficult for the enemy to detect with current conventional mine detectors.

Countermeasures such as the use of physical shields would not be very effective. Metal shields would only conduct the electricity to the subject taking him down (the ground would be the return). The shoulder of the positive dart can be made magnetic to stick to steel shields assuring long term contact. Plastic shields such as small SWAT type shields would not be fully effective since darts are coming from more than one direction and in many cases at least one dart set or dart would probably bypass the shield. Large shields that could block all directions and cover from head to ankle, or the use of very heavy clothing (more than 2 inches thick ) would be effective against the Taser but would be clumsy and greatly slow the enemy force. This would make them vulnerable to attack from roving patrols.

As with Land Mines, the Non-Lethal Taser Area Denial Device could be triggered by the enemy by using armored vehicles or flails to clear the area. Unlike dumb land mines each Area Denial Device triggered will independently send an alarm to nearby troops in milliseconds. The number of alarms received would indicate the size and location of the enemy force. As with mines, saturation bombing or high density artillery fire can also destroy many of the devices.

**Development:** While each part of the system has been demonstrated to work independently, continued development is needed to demonstrate a complete functional system and to develop the actual hardware and tactics for field deployment.

**About the Author:** The author serves as Vice President of Engineering of Tasertron the exclusive manufacturer of non-lethal Taser police and military weapons. Mr. Mc Nulty is a senior Electronics Engineer with military and aerospace experience. He holds 6 Patents and has a number of published papers. He is also a law enforcement Non-Lethal weapons trainer and an author whose articles on Use of Force, Police Tactics, and Non-Lethal Weapons are published in law enforcement journals and magazines. Mr. Mc Nulty is a former sworn police officer and also served in the U.S. Army Signal Corps attached to the 25th Infantry Division. Mr. Mc Nulty is interested in comments and questions on his papers or articles and can be reached at (909) 340-0896 or Fax (909) 340-0899.

# Non-Lethal Anti-Personnel Area Protection TASER MINE

## TYPICAL CAPABILITIES:

- Integral sensor detects intruder
- 120° forward protection zone
  - Mines can be positioned for overlapping coverage zones (mine field)
  - 15 to 30 foot range
  - High voltage darts are fired from multiple ports on mine over the 120° forward protection angle
- Intruders are immobilized (but unharmed) until high voltage pulses are stopped (under automatic control or by remote operator)

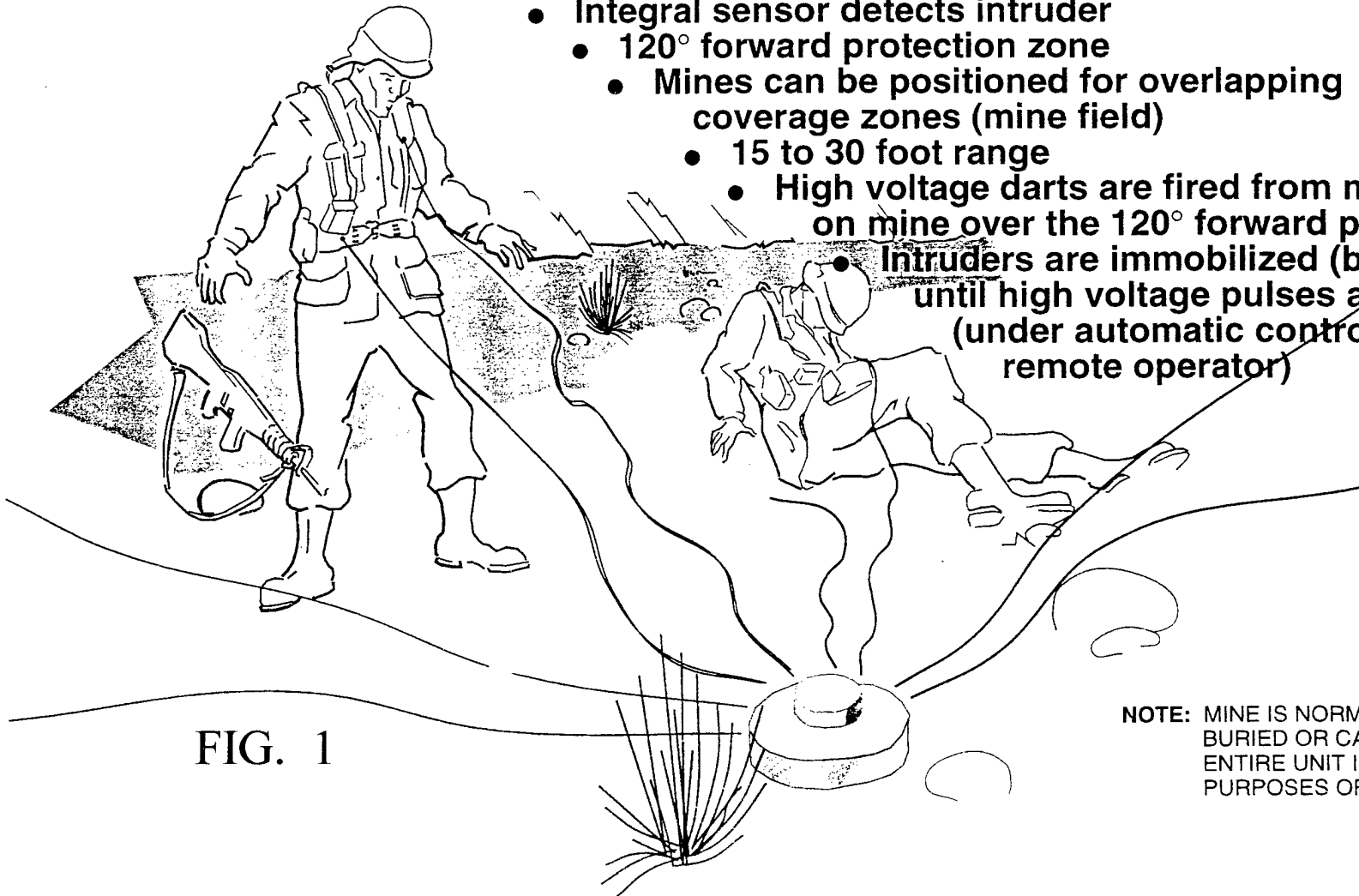
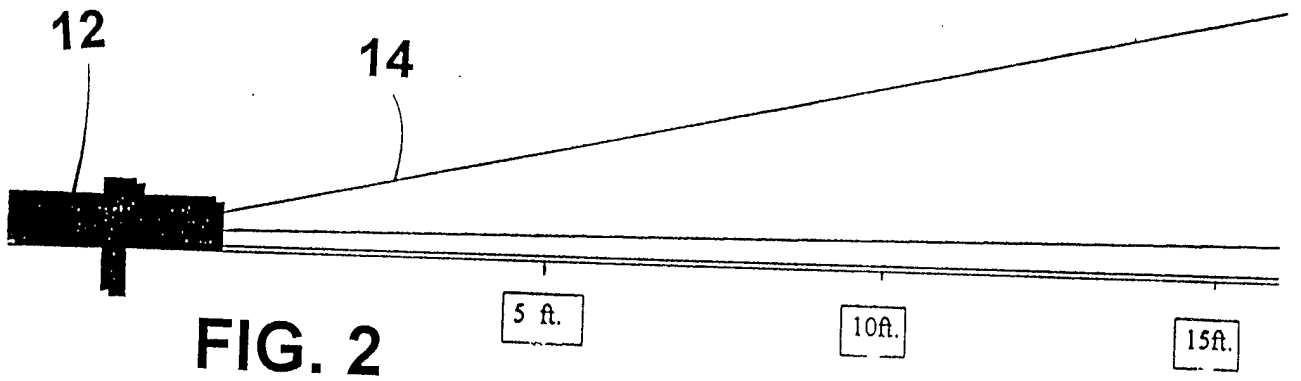
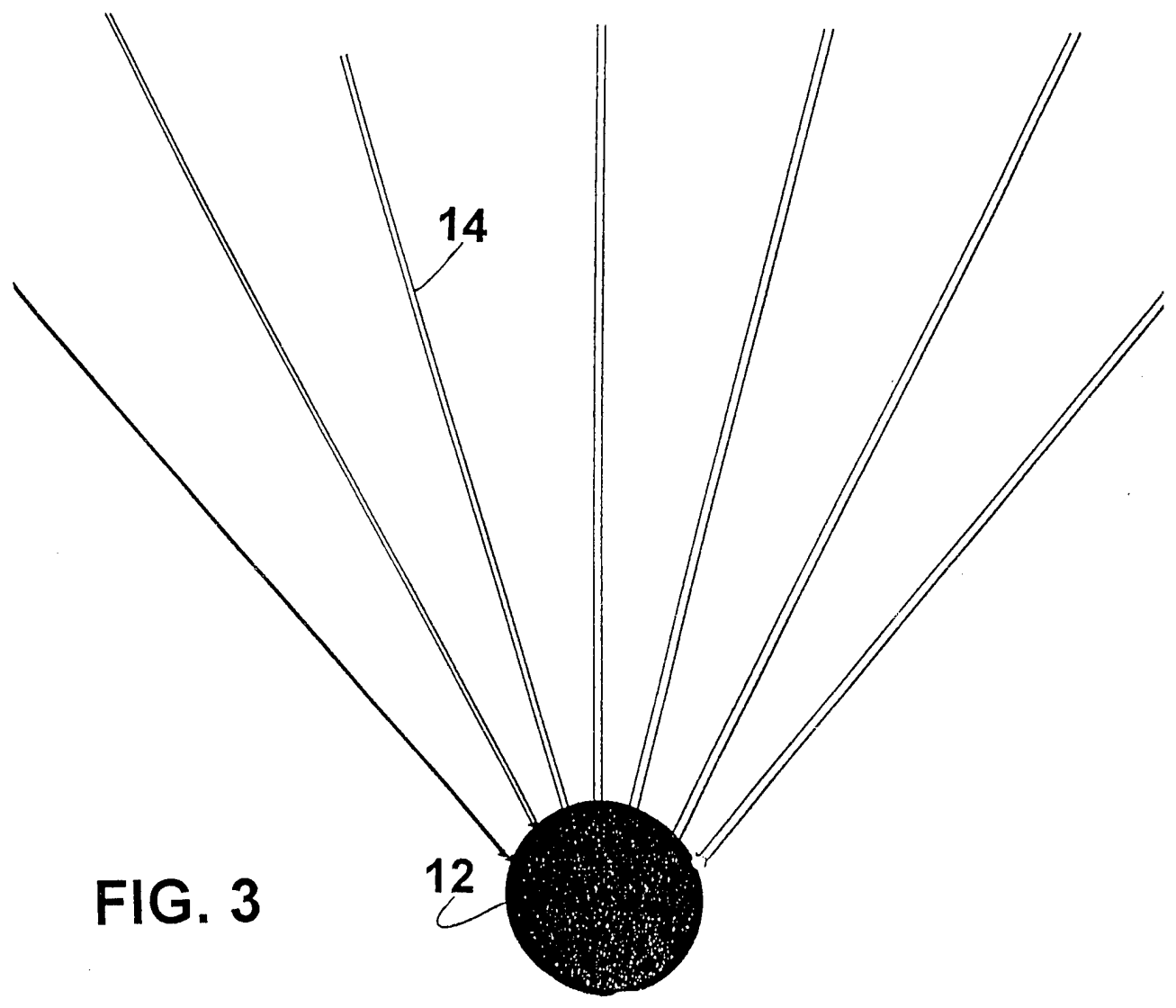


FIG. 1

NOTE: MINE IS NORMALLY BURIED OR CAMOUFLAGED; ENTIRE UNIT IS VISIBLE FOR PURPOSES OF ILLUSTRATION



**FIG. 2**



**FIG. 3**

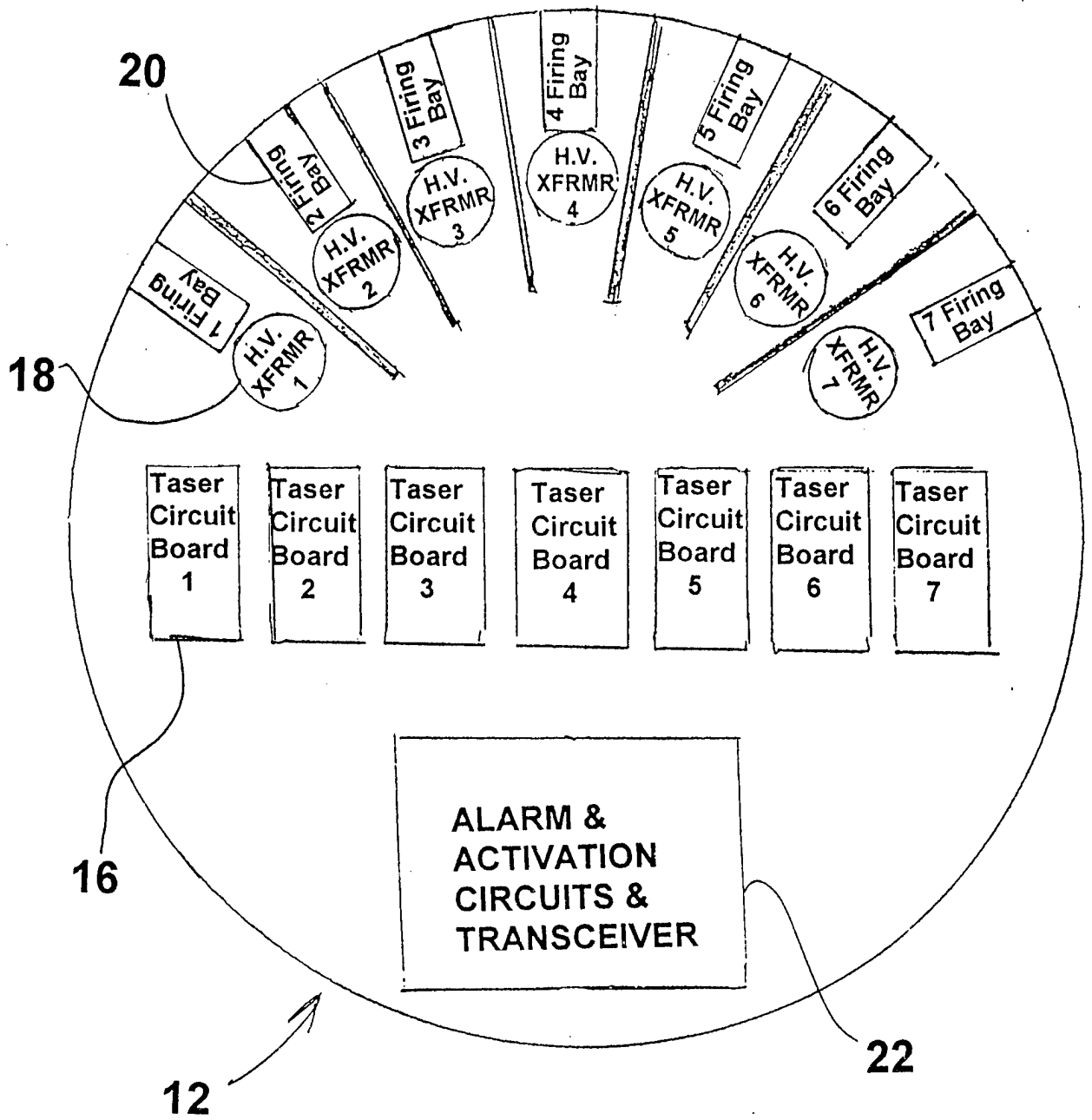


FIG. 4