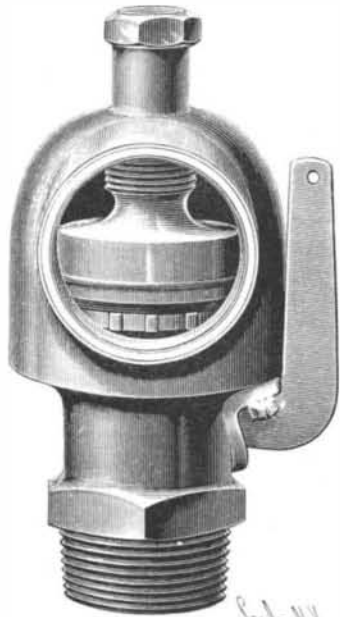


**AN IMPROVED SAFETY VALVE.**

The illustration represents a safety valve adapted for use on locomotives and steam engines generally, the device being of such construction that it cannot readily be tampered with without such interference being noticed by the engineer or other person in charge. It is a patented invention of Mr. E. B. Kunkle, of Fort Wayne, Ind. On the top of the valve body is screwed a semi-spherical cap having an outlet to be connected with a pipe for carrying off the steam, the top portion of the valve being partly seen through this opening. The valve is substantially cup-shaped, with a double flange around its top edge, and is vertically guided by a series of ribs on the inside of the valve body, the valve seat being opposite the opening. Within the valve is a central bottom depression engaged by a



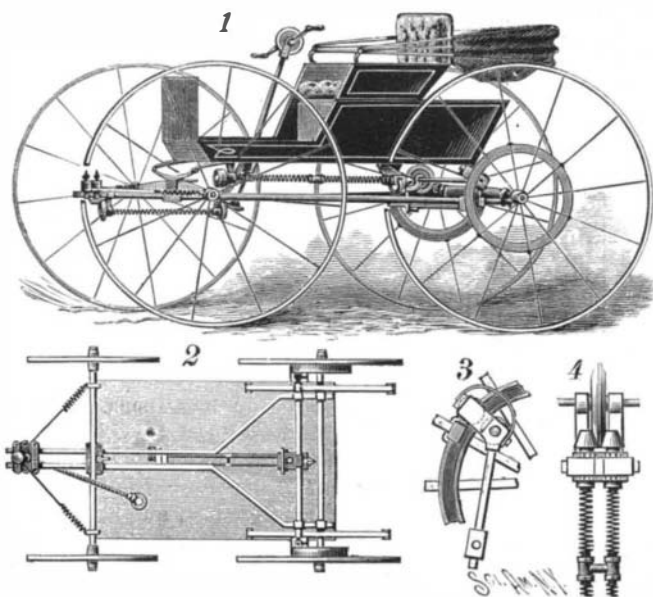
**KUNKLE'S SAFETY VALVE.**

point on the under side of a disk on which rests a coil spring, the upper end of the spring supporting a disk having in its top face a depression engaged by the pointed lower end of a regulating screw. To prevent steam or water from passing to the spring, a disk with a hub having a downwardly extending annular flange which engages the outer edge of the flange at the top of the valve, while the hub screws into the semicircular

top, the hub being also enlarged at its upper end to receive a locking nut screwing on the upper end of the regulating screw. When this locking nut is removed, the regulating screw may be turned, by means of a special form of key provided therefor, to regulate the tension of the spring, and thus determine the pressure at which steam shall be permitted to escape. Surrounding the valve seat, in the valve body, there is also a regulating collar, adapted to be screwed up or down to regulate the escape of steam passing through the valve seat, the collar serving to regulate the lifting force of the steam on the extended area of the valve. To open the valve at any time, a vertically sliding pin in a recess of the valve body is arranged to engage the under side of the flange at the top of the valve, the lower end of the pin being engaged by a projection on a lever at one side, as shown in the illustration. By placing the compression spring between centers, as provided for by this invention, all friction is obviated, and the tension at which the valve is set is not likely to be changed except by one having authority to take such responsibility.

**A PROPELLING MECHANISM FOR VEHICLES.**

A driving device for vehicles, especially designed to remove the weight and strain from the axles, by placing the weight of the body and its accessories in continual suspension on the circumference of the advancing half of the drivers, is shown in the accompanying illustration. This improved vehicle, which is styled by its inventor the "Princess of the Highway," has been patented by Mr. M. A. Libbey, of South Berwick, Me. The improvement provides a power mechanism

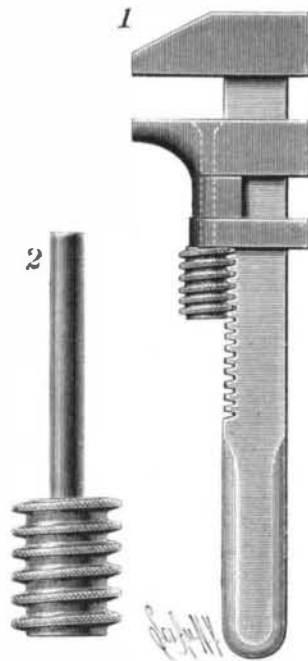


**LIBBEY'S DRIVING DEVICE FOR VEHICLES.**

adjustable for varying lengths and widths, and designed for application to ordinary light road vehicles without marring the paint or varnish. Fig. 1 is a view in perspective, and Fig. 2 is a bottom plan view of an ordinary four-wheeled vehicle having this propelling mechanism, the body being supported by suitable springs resting on the axles in the usual way, and the front and rear axles being connected by a light frame, which projects beyond the forward axle to support a steering apparatus. The frame is pivotally attached to the forward axle, and spreading rear members of the frame extend below the rear axle, to which such members are attached by clips. Depending from each of the members, a little in front of the rear axle, is a clip, these clips supporting a hollow transverse shaft, from each end of which projects a rod, the outer ends of the rods having clamps which support upwardly extending spindles which terminate in boxes or frames. Each of these frames is adapted to support in effective operative position a pair of friction rollers, pressed firmly together by a spring, as shown in Fig. 3, there being interposed between the rollers the horizontal portion of a thin metal annular flange, attached to the spokes of each rear wheel, so that the rollers will press on opposite sides of the flanges. One of these friction rollers on each side is on the outer end of a transverse shaft, and on the inner ends of the shafts are friction disks, as shown in Fig. 4, to which power is transmitted through two spiral shafts extending forwardly under the box, a motor of any approved form being used. The shafts are composed of two or more strands of wire wound spirally, and stiffened by collars, to form a shaft which will be light and strong, and flexible enough to yield to the motion of the vehicle. In the forward part of the body is a case through which a steering shaft extends downward, a gear wheel on the lower end of the shaft operating a horizontal shaft of spiral wire, passing under the front axle to another gear at the forward end of the frame, and which moves a belt connected at each end to the front axle, whereby the latter may be readily turned to the right or left. The mechanism may be inclosed or open as desired.

**AN IMPROVED WRENCH.**

The wrench shown in the illustration, patented by Mr. John Ryan, is composed of but three parts, and is designed to be very strong and durable, while being quick and easy of adjustment. The shank has the usual fixed jaw at its outer end, and its inner edge, for a portion of its length, is concaved and provided with screw threads. The adjustable jaw, held to slide on the shank by integral straps, is bored longitudinally, the end of the bore on the face of the jaw being countersunk. The operating nut, shown in Fig. 2, is made solid, and has a peripheral thread adapted to fit the threads in the concaved portion of the shank, the edge of the thread being milled. The nut also has an integral axial stem adapted to fit the bore of the adjustable jaw, the inner end of the stem being upset in the countersunk portion of the bore on the inner face of the jaw when the parts of the wrench are put together.



**RYAN'S WRENCH.**

For further information as to this invention address the inventor, or Mr. Seymour G. Smith, No. 127 Water Street, New York City.

**A SAFETY BOLT FOR SPRING LATCHES.**

The illustration represents a locking bolt independent of the latch of a door, but capable of being operated with the latch, to impart additional security to the door. The device has been patented by Mr. John Bradley, of No. 2416 Pennsylvania Avenue, Philadelphia, Pa. The latch may be of any approved make, and just above the latch, at its rear, is pivoted a vertical lever bar. A trip rod contacting with the rear end of the spring-actuated latch bolt extends through a rear aperture in the latch casing, and is pivoted upon the vertical lever bar, and the lower end of the latter bar is pivoted upon the rear end of a bolt held to slide upon the door and engage a keeper attached to the door jamb. A spring is located with-

in the lower bolt, so that when the door is closed both bolts will automatically slide into their keepers, and when the latch bolt is moved back to open the door, the trip rod, through the vertical lever, causes the lower bolt also to be withdrawn from its keeper. The trip rod may be held to slide in suitable guides,



**BRADLEY'S SAFETY BOLT FOR SPRING LATCHES.**

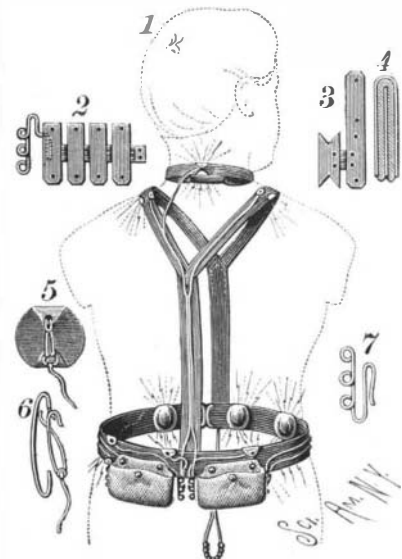
and simply contact with the rear end of the latch bolt, or the rod may be pivoted to the latter, in which case the spring in the lower bolt may be dispensed with.

**AN ELECTRIC BELT AND BODY ATTACHMENTS.**

The illustration represents a body battery with attachments to facilitate the effective sending of a current of electricity to different parts of the system, as may be desired in the treatment of acute and chronic diseases of various kinds, the electrodes contacting with the body without corroding, and without cutting or injuring the flesh. This improvement has been patented by Messrs. John A. Crisp and George F. Webb, of Jefferson, Ohio. The battery and attachments are shown in position in Fig. 1, a portion of the battery cells being shown in Fig. 2, while the blanks forming a cell are shown in Fig. 3, and a cross section through one of the cells in Fig. 4. The belt has upwardly extending straps leading to a shoulder support and neck yoke, and the cases adapted to contain the battery pockets are buttoned to the belt. The cases are preferably of leather-lined silk, and the pockets of cloth-covered rubber. Each battery is preferably composed of nine cells, each cell having a central copper plate and an outer zinc plate, with layers of felt to absorb acid placed between the copper and zinc. As shown in Fig. 3, the zinc plates are longer than the copper plates, over which they are doubled and fastened by rivets, the several cells being connected by hinges, the copper element of one cell being hinged to the zinc element of the next cell. The end cells of each battery have contact hooks by which the circuit may be cut out at any point on applying the hook to one of the hinges.

A spring-wire adjuster, shown in Fig. 7, has a bend to pass over the edge of the pocket and rings to engage the circuit hooks, with another bend adapted to clasp one of the hinges, wires leading to different parts of the body being conveniently connected with the battery through the rings, a spring snap-hook of special design, as shown in Fig. 6, being used to facilitate making such connection. The electrodes, shown in Fig. 5, are made of pure coin silver, and are made convex on the sides which are to contact with the body.

As many of these electrodes are employed as is deemed necessary in the case to be treated, and each is connected by the ordinary covered copper wire with a battery. A different form of electrode may be used when desired for the special treatment of any particular portion of the body. To prepare the batteries for use,



**CRISP & WEBB'S ELECTRIC BELT.**