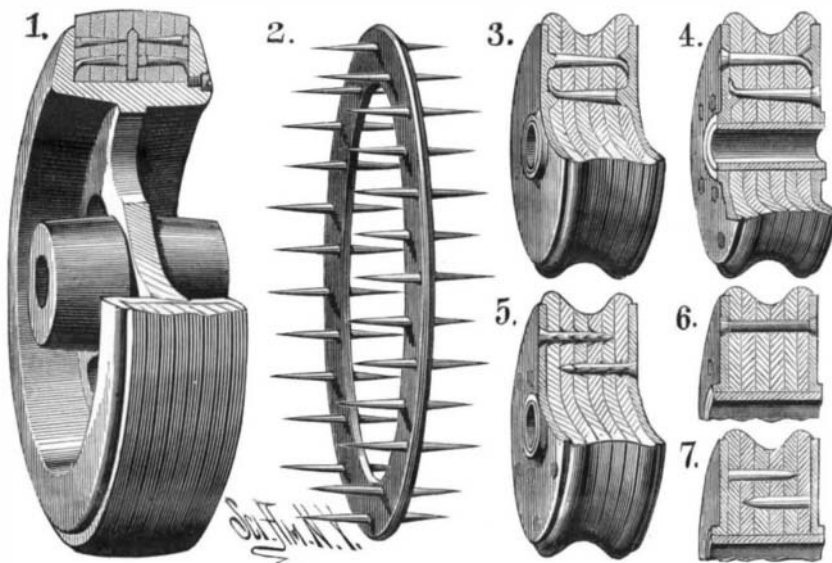


**IMPROVED WHEEL OR PULLEY.**

The engraving represents a new wheel, invented by Mr. George P. Clark, of Windsor Locks, Conn., which is composed of a body of rubber, paper, leather, or other similar fibrous or compressible material, side plates of metal, penetrating points, and a central tube. The points are made, preferably, upon the inner surfaces of and integral with the plates, and of such length relative to the thickness of the body that when forced through the body they will be turned and clinched, as shown in Figs. 3 and 4. To cause the points to clinch properly, the plates are formed in most cases with triangular ribs upon their inner faces at the base of the points, so that the points of the opposite plate, after being pressed through the body, will come against one of the inclined surfaces of the ribs, and thus be deflected and made to clinch. In forming the wheel shown in Fig. 3, the sheets forming the body are placed upon a long tube; the plates are placed upon the same tube, when the whole is put in a vise and the plates forced toward each other. The points pass through the body from each side and clinch, thereby holding the material of the body in its solidly compressed condition. The long tube is then cut off close to the side plates, the wheel is put in a lathe, and the edge of the body turned true and to the required shape, according to the purpose for which the wheel is to be used. Instead of forming the points integral with the plates, headed nails may be driven through countersunk openings in the plate and into the body, the nails being long enough to pass through and clinch as shown in Fig. 4. Barbed nails, Fig. 5, may be employed, the spurs on the nails serving to bind the parts of the body together and to securely hold the plates in place. Rivets, as shown in Fig. 6, driven through the plates and body and headed at both ends, may be used instead of the clinching nails; and in some cases the body may be held together by pegs, the plates then being plain and held in position by upsetting the ends of the central tube, as shown in Fig. 7. In making large wheels, the inventor uses a malleable iron spider cast with a flange upon only one side of the circumference; this flange takes the place of one plate, a separate annular ring holding the body, or tire, of compressed material. The penetrating points can be formed as a part of the flange and ring. The tire is made of sheets cut in annular form, and placed upon the plain circumferential surface of the spider, and then compressed between the flange and ring, the latter being held by screws. When necessary to make this form of wheel very strong, an annular plate, Fig. 2, is employed, which is formed upon each side with penetrating points.

Wheels constructed in the manner above described possess many advantages over those made of wood; they

**Electric Signaling Balloons.**  
The idea has been worked out by Mr. Eric Stuart Bruce, son of the late General Michael Bruce, and is exhibited in operation every evening for the present at the Albert Palace, Battersea Park. About 9 o'clock a balloon 20 feet in diameter, and containing some 4,000 cubic feet of gas, is allowed to ascend to a height of 500 feet, and is rendered visible by six incandescent lamps of 20 candle power fed from a battery on the ground. The material of the balloon is translucent



CLARK'S IMPROVED WHEEL OR PULLEY.

cambric, and when the lamps are in action the whole glows with a soft light which is very noticeable, and in a clear atmosphere can be seen for miles. In the conductors from the batteries to the balloon there is inserted a Morse key, by which the circuit can be made and broken, and the lamps be caused to give long and short flashes corresponding to the dash and dot of the telegraph code.

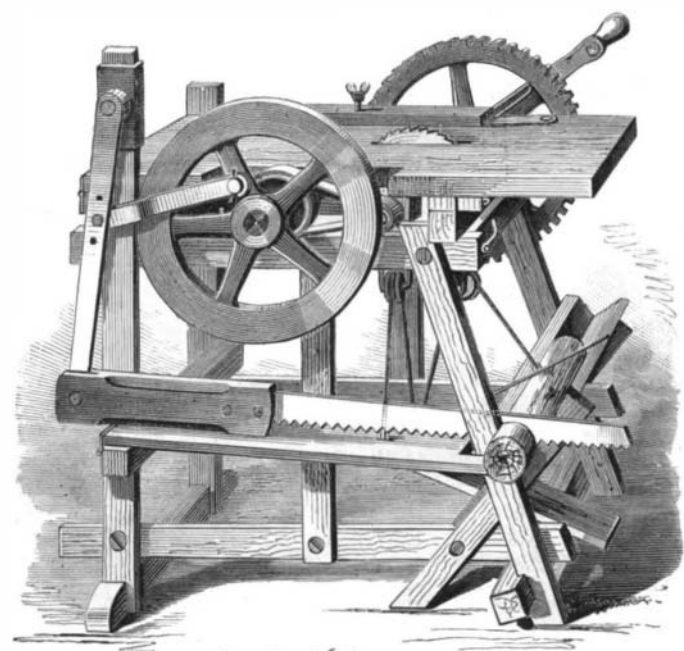
It can be used in a flat country, or between valleys separated by low hills, instead of being confined to elevated positions like the heliograph; the balloon also shows a large illuminated disk in place of the small mirror, and can be packed together with its batteries in little compass for transport.

**A HAND POWER SAWING MACHINE.**

The accompanying illustration shows a machine which can be used for sawing stove wood, ripping lumber, and other such work, and is operated by a crank handle and treadle. The teeth of the gear wheel, which is rotated by turning the crank handle, mesh into a small gear wheel, which is not shown, but which is attached to the other end of the shaft, on which is the flywheel. A crankpin and arm connect the latter with a vertical swinging bar, at the lower end of which is an arm to which is attached a saw. The vertical swinging bar has several holes to receive the pivoting pin, and thus regulate the throw of the saw, while the arm carrying the latter is made sufficiently heavy to hold it down to its work. The stick of wood to be sawed rests in a triangular trough at the front of the frame, and under the saw is hinged a board, in such position that, when the stick is sawed through, the arm carrying the saw will slide upon this board, and hold the saw teeth out of contact therewith should the motion of the machine be continued. The forward end of this board is also connected with the treadle that the saw arm and saw can be lifted, by pressing upon the treadle, to be out of the way while the stick is moved forward for an additional cut or replaced by another. The stick is held down while being sawed, by a spring, which is also so connected as to be operated by the treadle to release the stick.

For working the circular saw there is a pulley on the shaft which carries the flywheel, connected by belt with a small pulley attached to the mandrel carrying the saw. The bearings of the latter are on the lower side of the table, through a slot in which the saw projects. This table is hinged at its rear end to the rear top bar of the frame, so that when the belt to operate the circular saw is thrown off, the table, saw, and saw mandrel can be turned back out of the way, or may be readily detached entirely from the frame. The cross-cut saw can likewise be readily disconnected from its driving mechanism, so that either saw can be used separately, or both may be used together, as may be desired.

This invention has been patented by Mr. Robert Gurney, of Kirkwood, Mo., to whom all inquiries for further particulars should be addressed.



GURNEY'S DRAG SAW.

are free from all danger of chipping, will not wear off on the edges, and run easily and smoothly. The materials forming the body, being forced together under great pressure, insure the durability of the wheel. These wheels are practical for various purposes, and are particularly adapted for use in skates.

THE number of sheep in Saxony has fallen from 371,989 in 1861, to 149,037 in 1883. In Germany the reduction was 33 per cent. between 1873 and 1883.

**Second Hand Machinery.**

There is no particular risk in buying second hand machinery and shop appliances, if such ordinary caution is used as would be deemed necessary in buying second hand furniture. If the seller is a man of known integrity, and is practical mechanic enough to understand not merely the market price, but the actual value of the machines, it is enough to trust to his representations. But it is not often that the practical or judging mechanic and the honest dealer are combined. Auction sales of machinery may be traps, unless the would-be purchaser has had previous opportunity to examine the goods. Second hand machinery is frequently offered for sale, not only cleaned of gurry and rust, but painted, varnished, and polished. "Paint and putty cover a multitude of mechanical sins."

The times have put upon the market a large amount of machinery that has been used, much of it used up and fit only for the scrap heap. But the business necessities of some proprietors of small establishments have impelled the selling of shop tools and appliances at very low prices. There are plenty of good second hand tools in the market, as well as plenty of junk material.

If the purchaser is not himself a practical judge of the value of a machine, or a shop or factory appliance, it is not difficult to obtain, for a moderate consideration, the examination and opinion of a good mechanic. This will pay, even if the examiner makes a fair charge for time and trouble.

A small manufacturer wanted an additional boiler, and he bought a second hand one that had been coal tarred inside and out; it looked clean and shone beautifully. He bought it "dirt cheap," and had it put in place. It leaked like a sieve as soon as sixty pounds pressure was on; he had it calked on the seams, poured in a lot of rye flour; had the coal tar foaming over into his engine cylinder, and after three weeks of torment blew it off and had a reasonable boiler-maker examine it.

The result was patches and repairs to almost the first price paid; the combined expense would have bought a good boiler, and a small outlay for experience would have saved him a vexatious outlay of money and patience.

**A CAR BRAKE.**

A new method of operating a car brake from the top of car is shown in the accompanying illustration. Bars carrying the brake shoes are suspended from the bottom of the car, and a lever pivoted on the middle truck beam is connected by rods with the front and rear brake bars; the upper end of this lever is connected by a rod with one arm of an elbow lever pivoted at its angle to lugs held on the under side of the end beam of the car, and the other or outer arm of the elbow lever



DAUDELIN'S CAR BRAKE

is connected by a rod with a hand lever pivoted on a standard on the roof of the car at the end. By pressing down this hand lever, the elbow lever and the lever on the middle truck beam are operated to press the brake shoes against the wheels at both front and rear simultaneously, the toothed bar pivoted to the standard engaging with a pin on the hand lever to hold the brake locked in position.

This invention has been patented by Mr. Joseph M. T. Daudelin, of Jefferson, Texas.