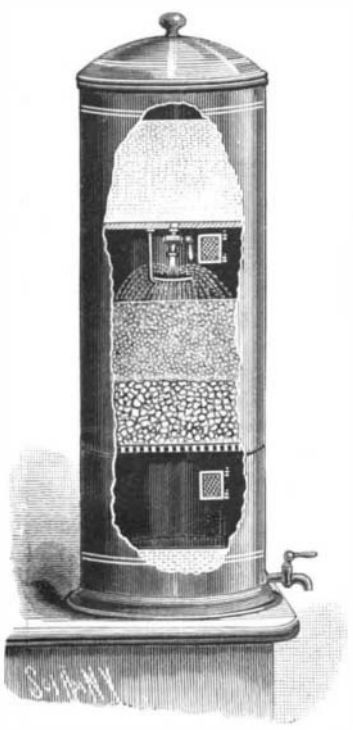
A NEW AND IMPROVED FILTER.

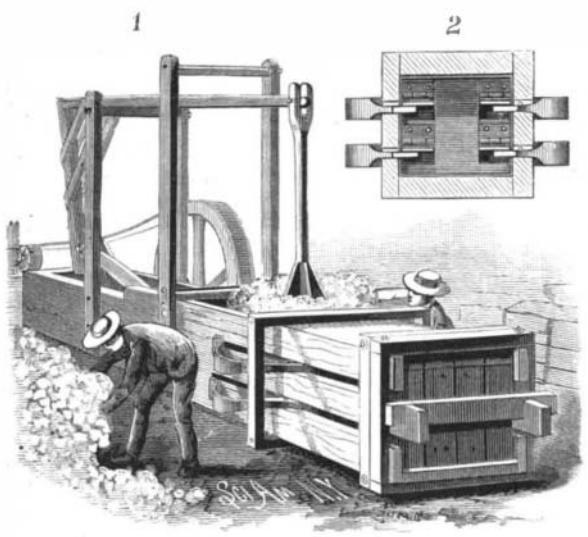
The filter shown in the engraving is continuous in action, and, owing to the complete aeration of the water, it never becomes foul, and has no substance like charcoal to become saturated after a time and useless. The inventor of this filter, Mr. Walter Dearden, of Trinidad, Colorado, has had one in use two years, and it does just as well now as at first. The body of the filter may be of wood, galvanized iron, or earthenware, and of any appropriate size. A horizontal partition forms a receptacle at the top to receive water. The flow of water from this receptacle is regulated by a cock.



Upon the perforated bottom of the next compartment is placed a body of gravel, above which is sharp, coarse sand. Under the cock is a distributing plate, upon which the stream of water strikes and is divided and distributed over the surface of the sand. Below the perforated bottom is the lower compartment, that receives the filtered water, which may be drawn out through the faucet. Formed in the body, just below the upper partition, is an opening, closed by a wire door, that permits free access of air to the compartment; through this opening the stem of the cock may be turned to regulate the flow of water. In the side of the lowest compartment is a similar opening for the passage of air to the filter below the filtering material, so that the water is plentifully aerated in the filter. This free access of air is of special importance in the center compartment, as the water, being divided into spray by the plate, will be brought into intimate contact with the air. The air will mingle with the sand, causing the water to be minutely divided, and, by oxidizing the impurities, will have a constant cleansing effect. The water is never permitted to enter in such quantity as to cover the sand.

IMPROVED BALING PRESS.

The engraving shows an improved press for baling hay or cotton, recently patented by Mr. Allen M. Brasher, of Alexandria, La. In the end of a horizontal baling box is a shaft formed at its middle with a crank, and on one end of which is a combined fly and pulley wheel. The crank is connected by a pitman with a follower block sliding within the baling box. In the top of the box in front of the follower is an opening through which the hay or cotton is fed. Journaled in two standards at the side of the box is a shaft carrying a rocking lever, provided at one end with a downwardly projecting arm which is over the opening, and at the opposite end with an inclined downwardly projecting arm braced and stiffened from the lever. The lower end of this



BRASHER'S IMPROVED BALING PRESS.

arm is so located that the rounded end of the pitman can act upon it. Pivoted in the inner ends of slots formed in the sides of the box in front of the follower (Fig. 2 is a cross sectional elevation through this part) are stops, on the outer ends of which are curved springs resting against the outer sides of the box, and thereby pressing the front ends of the stops, which are squared and larger than the inner ends, into the box. On the front end of the follower are two beveled grooves, to correspond with the slots in the box; hinged plates hang over the front ends of the grooves, and close them to prevent the entrance of hay.

At every revolution of the crank shaft, the rear end of the pitman strikes the lower part of the braced bar, and the follower is withdrawn as far as possible. The forward end of the lever is forced down, thereby pressing the hay or cotton into that part of the box in front of the follower. As the follower moves forward, the end of the pitman slides off the bar, which swings downward, thereby raising the opposite end of the lever. When the follower moves forward, the hinged plates push outward those parts of the stops projecting into the box; after the plates have passed the front ends of the stops, the latter snap into the grooves in the follower. When the follower is withdrawn, the ends of the stops swing the plates from the end of the follower, thus permitting the stops to pass out of the grooves. The stops prevent the hay that has just been pressed from moving back with the follower. It will be seen that the press is so constructed that it feeds itself automatically.

Decomposition of Blasting Gelatine.

According to Sir Frederick Abel, neither trinitrocellulose nor the less nitrated products are affected, when pure, by a temperature near 100°; but the easy decomposibility of gun cotton, sometimes observed, is due to the presence of nitro-derivatives of foreign organic substances (the incrusting matter of the cellular tissue), which, when heated, quickly decompose with the formation of free acid. In the *Journal of the American Chemical Society*, Professor Charles E. Munroe, U. S. N. A., reports the following case that has occurred under his own observation. Some camphorated explosive gelatine was wrapped in paraffin paper, then in light brown Manila paper, and laid on a shelf. After something more than a year's exposure, it was found, in the early winter, to be giving off nitrous fumes and to have shrunk considerably in volume, while the outside of the paper was covered with congeries of fine crystals. The odor of camphor was still quite strong. The mass was immediately put into a vessel of water. It was found to be friable, and, after a short immersion disintegrated. The camphor odor soon disappeared, and the water became of a straw color, gave a strong acid reaction, and showed traces of nitrous acid, but no nitric acid. On evaporation of the filtered liquid, oxalic acid crystallized out in quantity, and on evaporation of the mother liquor on the water bath a sugar-like mass was obtained, which gave the glucose reaction with Fehling's solution. The paraffin was regained unchanged, and the paper was recovered, but in a flocculent condition, and with the color bleached from the brown. Careful search failed to reveal the presence of glycerine, nitroglycerine, or gun cotton.

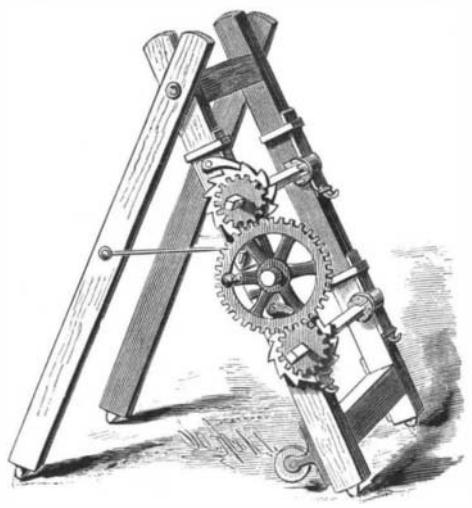
A Shoal Water Alarm.

In order to facilitate the navigation of the treacherous water of the Nile, Messrs. Yarrow have designed a permanent sounding apparatus which will notify the shoaling of the water some distance ahead. This is described as consisting of two poles about 50 ft. long, at the end of which are suspended two vertical iron rods. The bottom extremities of these come about 1 ft. below the level of the boat itself. One pole projects direct ahead from the port side, and the other from the starboard side. Attached to each of these two vertical iron rods is a wire rope which passes inboard, and is connected with the whistle on the boiler; and the gear is so arranged, that immediately this indicator touches a rock or sandbank it instantly causes the steam whistle to blow. This plan in the first instance draws the pilot's attention to the fact, and also points out to him on which side of the steamer the sandbank or rock exists, so that it gives him warning in which direction to steer.

WIRE CARRIER AND STRETCHER.

This apparatus—patented by Mr. William J. McKee, of Avon, Conn.—may be used in stretching plain and barbed wire for fencing and for rewinding the wire in removing fences; it can be operated with great facility, and requires but a minimum amount of labor. The frame consists of side bars connected by braces and provided with long arms, pivoted at one end, so that they may be set to support the frame in an inclined position, as shown. The frame and brace arms have spiked ends for entering the ground, and in the lower ends of the frame are wheels, which support the frame when it is brought down to near a horizontal position. Supported in boxes upon the frame are shafts fitted at one end with gear and ratchet wheels, the latter being engaged by pawls hung on the frame. The ends of the shafts are squared to receive crank handles, and a stud on the frame carries a large gear wheel meshing with both the small ones, and also having a handle by which it is operated. In order to weaken the bars as little as possible, and to permit of convenient removal of the parts, only the bottom portion of the boxes are mortised into the bars, and the upper portions are formed as straps, having hooks at one end passing beneath staples and held down at their opposite ends by bands around the bars. The shafts are to carry the reels of wire, and have on them sliding disks provided with sharp pins that can be forced into the wooden ends of the reels, so that reel and shaft rotate together.

The reels being placed on the machine, the latter is moved along the ground on the wheels, the brace arms being used as handles. When the wire has been run

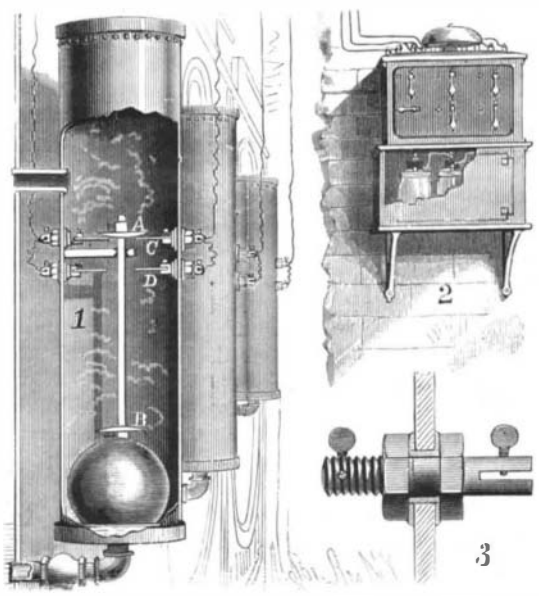


McKEE'S WIRE CARRIER AND STRETCHER.

off to the extent desired, the frame is set as shown in the cut, and crank handles are applied to the shafts—the center wheel having been removed—which are turned to stretch the wires. The pawls prevent backward movement while the wires are being secured to the posts, and the braces hold the frame against the strain. For winding wire, the braces are turned to the opposite side, and the large wheel is put in place to rotate both shafts at once.

ELECTRIC HIGH AND LOW WATER DETECTER.

A galvanized iron stand pipe about five inches in diameter, and of suitable length, is connected with the boiler by two pipes, as shown in Fig. 1. Within the pipe is a float having a stem a little longer than the range between high and low water. The stem passes through a guide, and has a copper disk, B, near the float, to signal high water, and another, A, near its upper end, to make the connection for low water. The hole in the guide is beveled to prevent the binding of the stem when the float shifts from side to side. The disks may be placed at any point on the stem. The electric circuit is completed through the binding posts, C D, which are connected with wires leading to the annunciator, Fig. 2. The inner end of each post carries a copper plate, with which the disks come in contact as the float approaches either the high or low water level, and in order to insure proper electrical contact, each plate is slitted into separate fingers in the bearing parts; the yielding of the fingers affords more certainty of connection with both plates, in case the float should happen to incline a little more to one side than the other. The disks are placed a considerable distance above the water, where they will not be liable to be



ELECTRIC HIGH AND LOW WATER DETECTER.

fouled with deposits. When several boilers are provided with the detecter, a multiplex annunciator, Fig. 2, is used, so that each boiler may be represented by a special signal. The binding posts are insulated from the stand pipe, by means of a rubber tube and washers, fitted through the holes of the pipe, and against the sides between the collar and nut, as shown in Fig. 3.

This apparatus is now in successful operation at the nail works of the Ellis & Lessig Steel and Iron Co., of Pottstown, Pa. When the alarm is sounded the annunciator not only shows which boiler is in trouble, but also indicates whether it is high or low water. Further particulars can be obtained by addressing the inventor of this device, Mr. C. H. Wickersham, P. O. Box 435, Pottstown, Pa.