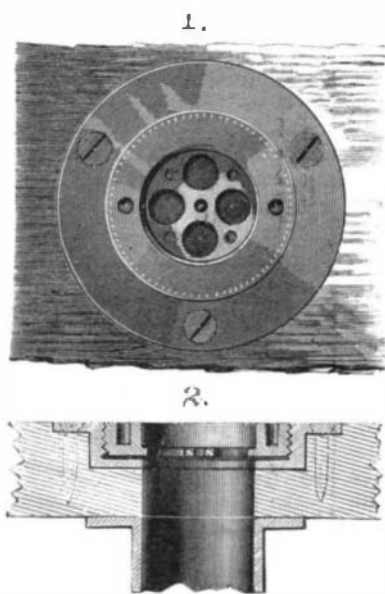


**NEW STRAINER FOR THE OUTLET OF TUBS AND BASINS.**

The engraving shows an improved strainer for the outlet of tubs and basins, recently patented by Mr. William Slow, 68 West Houston street, New York city. It can be readily removed from the washer of the outlet of a tank, tub, or basin, for the purpose of clearing it in case it becomes clogged.

The washer is recessed and internally threaded to receive the strainer, which is screwed in. A small wrench or key accompanies the strainer, and is used in removing it from the washer whenever it requires cleaning or when it becomes necessary to remove any obstruction from the pipe. The strainer may consist of an apertured plate, or it may be made of wire cloth secured to a suitable rim.



**SLOW'S STRAINER FOR THE OUTLET OF TUBS AND BASINS.**

Fig. 1 is a plan view of the strainer, and Fig. 2 is a vertical section showing the manner in which it is applied to the tub or basin.

**The World's Progress in Ten Years.**

An English statistician, Mr. Michael G. Mulhall, gives the following figures as representing the world's increase in the elements of progress in the decade between 1870 and 1880: Percentage of increase in population, 9.76; in agriculture, 8.53; manufactures, 18.60; commerce, 38.20; mining, 47.06; carrying trade, 53.32; earnings of nations, 19.84; public wealth, 10.57; taxes, 22.34; public debt, 43.39. The tangible increase in public wealth since 1870 would suffice to pay off 88 per cent of all existing national debts.

**NOVEL CHART RACK.**

The engraving represents a novel chart rack for holding charts and maps, such as are used in school rooms for instruction, and for protecting the charts when not in use. It permits of showing either side of the chart or map. A reversible chart frame is supported by two joined arms at the top and bottom in a fixed frame attached to the wall. One half of the reversible frame is covered to form a chamber into which the charts may be moved to shield them from dust and danger of mutilation when not in use. The charts slide upon rods, and may be viewed from either side by simply turning the reversible frame. The outer frame may be made portable and may be supported by an easel or movable frame. It is not limited as to size, and intended principally for use in schools, but it may be used to advantage in places of business for displaying samples, placards, etc.

This useful invention was lately patented by Mr. William C. Cadwell, of Logan, Iowa.

**Artificial Soil.**

M. Dudopy, of Saint Ouen, has been very successful in chemical horticulture. In his

garden he has cultivated legumes, flowers, and trees in parallel rows in three manners: 1, with ordinary manure; 2, with chemical manures in garden soil; 3, with a special compound, which he calls *floral*, in pure sand.

The results of the third experiments have been very striking, yielding the earliest, the largest, and the most delicate vegetables, as well as the most thrifty and brilliant flowers. The *floral* contains nitrogen, phosphoric acid, potash, magnesia, and sulphur, in a form so concentrated as to require dilution with twenty thousand times their volume of water.

The experiments have been continued for five years with uniform success.—*Les Mondes*.

**ENGINEERING INVENTIONS.**

An improved railroad signaling apparatus, patented by Mr. Robert B. Sanderson, of Bridgewater, Pa., consists of a box having signal colors painted in sections upon its side, a pivoted skeleton plate, a pulley and cord, and a cord and weight, or equivalent spring, whereby the signals can be displayed by adjusting the skeleton plate.

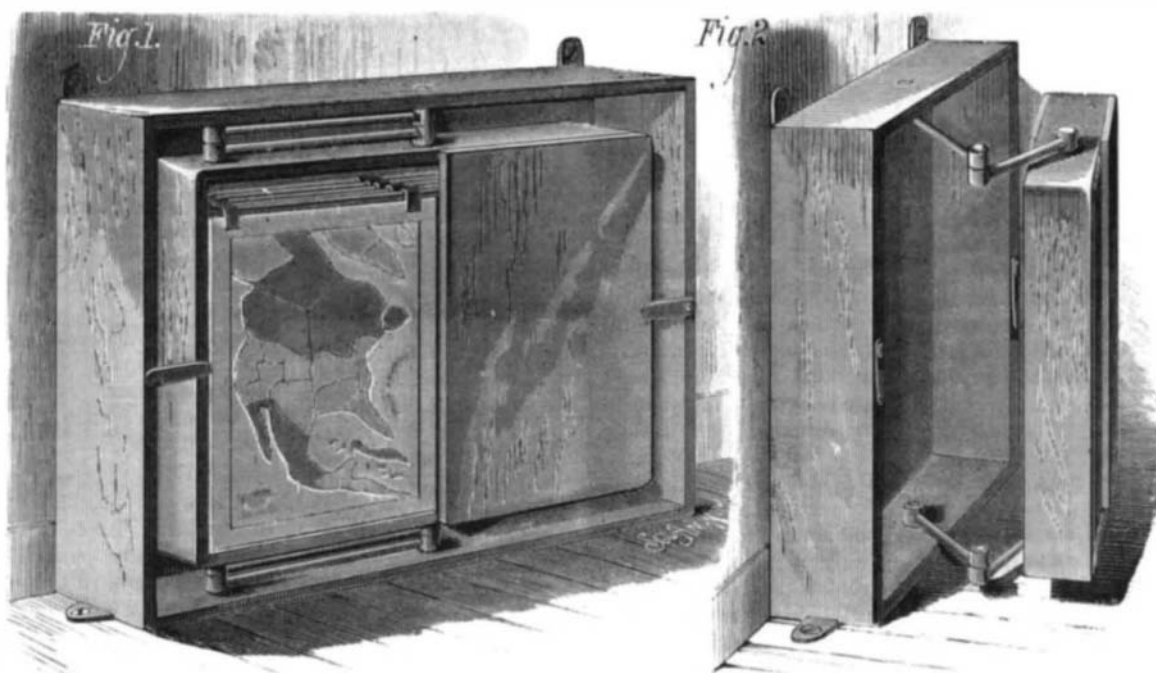
Mr. George H. Knapp, of Brockton, Mass., has patented a novel arrangement of levers, in combination with the main and switch rail rods and movable rails of a railroad, whereby the switch is operated by the contact of strikers attached to the engine and controlled by the engineer.

With the ordinary bilge pumps it is impossible, when the vessel rolls heavily and quickly, to maintain a continuous discharge of the bilge water, for as the vessel rolls to starboard the suction pipe on the port side becomes bare and the water which is in it below the lower valve flows back into the bilge while only the pump on the starboard wing draws water until the vessel rolls back to port, when for some time neither pump works until the water can collect on the port side, when the port pump will operate. Considerable time thus elapses on each roll of the vessel before a pump has filled its suction pipe up to the lower valve, and by the time the pump begins to discharge the vessel will roll in the opposite direction. Thus the pumps work poorly and the water accumulates, and the result is that at every lurch the water rushes up in the wings of the vessel and injures the cargo; and on a steam vessel the water surges up on the stoke-hole plates and carries off ashes and coal into the bilge, causing the pumps to choke. Mr. Joseph J. De Kinder, of Philadelphia, Pa., has patented apparatus to overcome these difficulties; the invention consists in a device preventing the back flow of the bilge water from the suction pipes during the rolling of the vessel by alternately closing the valves of the suction pipes by means of a self-acting pendulous weight, the operation of the parts being such that as the vessel rolls, so as to leave the bottom of either of the bilge pump suction pipes dry or out of water, the valve of the pipe will be closed and the back flow of the bilge water in the pipe will be prevented.

An improved excavator has been patented by Mr. William H. Knight, of Quebec, Province of Quebec, Canada. The object of this invention is to furnish machines designed especially for excavating snow and earth upon lines of railway in course of construction or completed, but which may be used with advantage in excavating for other purposes.

Mr. W. Clay Lutz, of Bedford, Pa., has patented an improved hollow iron railroad tie, composed of an upper and lower section bolted together, the upper section being provided with a vertical web for receiving the rail.

Mr. John F. Anderson, of Jersey City, N. J., has patented an improvement in the construction of tunnels, the object of which is to facilitate the construction of tunnels where the earth is composed of soft materials such as sand and silt, and at the same time insuring greater safety for the men engaged in constructing such tunnels. The invention consists in constructing and carrying forward in the earth, in advance of the main tunnel, a central tube or small tunnel



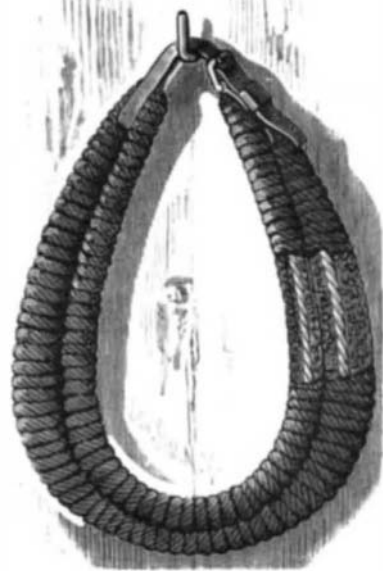
**CADWELL'S CHART RACK.**

having a metallic shell, which the inventor terms a "pilot tunnel," by which the nature of the soil in advance of the main tunnel can be ascertained, and the earth at the heading may in part be supported during the excavation of the main tunnel. Another feature of the invention consists in extending the rear portion of the shell of the central or pilot tunnel back from the heading into the completed part of the main tunnel, and in using this shell as a temporary support for the walls and shell of the main tunnel during their erection.

**AN IMPROVEMENT IN HORSE COLLARS.**

We give an engraving of a useful improvement in horse collars, patented by Mr. Andrew D. Martin, of Abbeville, La. This collar is made by winding Spanish moss on a flexible base, such as a rope. It has the proportions and general form of a leather collar, but is superior in many respects. It is always soft and pliable, and will never injure or gall the flesh, while in many cases it has been known to heal a sore or gall produced by a bad collar. It admits air to the skin, and is in all respects comfortable and easy.

The inventor informs us that restive horses have been easily broken by the use of this collar, and that it is well and favorably known in all parts of Louisiana and in some of the other States.



**MARTIN'S IMPROVED HORSE COLLAR.**

The moss is wound upon the flexible base by means of machinery especially adapted to the purpose, which the inventor can supply to any one engaging in the manufacture of the collar.

Further information may be obtained from the inventor as above.

**A Remarkable Drying Agent.**

Anhydrous phosphoric acid is believed to be the most powerful desiccating agent known. When air from which moisture has been removed as far as possible by the ordinary means, and is then carefully dried by sulphuric acid at temperatures not exceeding 25° C., it is still found that the two-millionth part of the weight of the air in the form of moisture will be removed by the anhydrous phosphoric acid.

**Central Sugar Mills in Louisiana.**

An important innovation has been made in the working of sugar plantations in Louisiana by the success of an independent sugar mill in St. Mary's Parish. Hitherto the custom has been to work up the cane of each plantation in a plantation mill; and as the small farmer could not own or operate a mill the cultivation of sugar cane has of necessity been monopolized by wealthy planters. The effect of the independent sugar mills in providing a general market for cane cannot but be much the same as that produced in dairy regions by the establishment of central cheese and butter factories, or that in wheat-growing regions in separating the work of the farmer from that of the miller. The superior economy of grinding the cane and converting the juice into sugar in a few large and well appointed factories, instead of a multitude of small and rude establishments, is obvious. But a still greater advantage is promised from the circumstance that the new plan enables small farmers to engage in cane growing, thus removing the necessity for large plantations and making possible a vast extension of the area devoted to sugar.

At the mill referred to the cane is purchased by the ton, in any quantity offered; and similar factories are being projected in other parts of the State.

ALUM water is recommended for preventing bugs and worms from infesting flouring mills. Take two pounds of alum and place it in three quarts of warm water (or in that proportion), and let it stand on the stove until the alum disappears. Apply while hot with a brush to the crevices of the bolting machine and other places that conceal the insects.