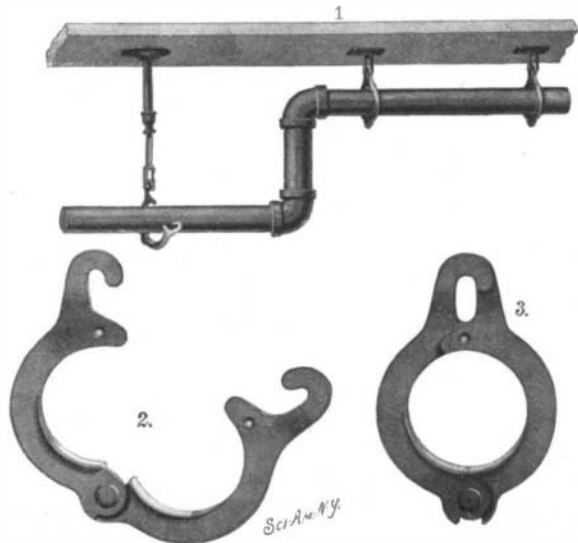


**A SIMPLE PIPE-HANGER.**

A most effective pipe-hanger is now being made by the American Twist Drill Company, of Laconia, N. H., the construction of which is noteworthy for the novel means employed to obtain greater strength.

The hanger is composed of two sections hinged together at one end. Each section is formed with a semicircular pipe-receiving portion with a projection constituting part of the semicircular portion, and with a hook-shaped end by which the device can be suspended. In operation, when the two hanger-sections are brought together, the semicircular portion will form a circular opening to embrace the pipe and



**THE WORBALL PIPE-HANGER.**

the hook-shaped ends will form an opening to receive the suspending means.

In order to prevent the separation of the hanger-sections the projections are provided with registering holes, which are adapted to receive a locking-pin. In order that the hanger-sections may brace each other and thus strengthen the device, they are oppositely bent, so that when brought together the hook-ends and projections will interlock. The locking-means employed will effectively prevent the accidental unfastening of the hanger-sections after having been applied to a pipe.

**THE MULTIPHONE.**

We publish herewith the latest development in talking machines, the multiphone, conceived and recently constructed by Mr. E. Berliner, the well known inventor of the loose contact transmitter, the gramophone, and other inventions. It is a gramophone in which a number of records, copies of one original, are played simultaneously.

Gramophone records are pressed from dies or matrices, like seals, under heat and pressure, and consequently all records of one catalogue number are exactly alike in every detail.

It has long been the aim of talking machine people to increase the loudness of their records without changing their quality, and, while others have worked in the line of special diaphragms, larger size of record waves, and enlarging by photography or leverage, Mr. Berliner has vastly increased the loudness of the talking machine by the simple device of rotating a number of records from one motor and playing them together. They sound like only one record, and with a loudness proportionate to their number.

The illustration shows a sextuplex multiphone consisting of six turntables run by one motor. Each has a sprocket wheel underneath, and a perforated leather belt rotates them with precision and without noise. Six records of the same catalogue number are placed on the turntables, so that the needles of the reproducing sound boxes all strike the records on the same peripheral line, which is most easily accomplished. The needle points are then slid from the edge into the first record line—an operation requiring no special skill.

After being placed in position, the switch is turned and the reproduction follows without a hitch.

It has long been known that the carrying power of the ordinary gramophone is most astonishing. It fills a hall the size of the Metropolitan Opera House, in New York, and on the water, on a quiet evening, it has been

heard over two miles. Multiply these effects by six, and you have the performance of a sextuplex gramophone.

Any mechanic can also see that there is no difficulty in constructing a multiphone with sixteen or sixty records. The reproduction, particularly of talking records, is striking, and the possibility of producing a giant human voice is now within easy and safe reach. The experimental machine is at present in the hands of the Berliner Gramophone Company, of Philadelphia.

**New Composition for Matches.**

Messrs. Sevene & Cohen, engineers of the French state manufactories, have recently succeeded in producing matches with a phosphoric combination that is less deleterious than the one that has hitherto been employed. The period of trial terminated some time ago, and for a few months past all of the manufactories of France have been using nothing but the new composition.

The substance recommended by Messrs. Sevene & Cohen is sesquisulphide of phosphorus, which has all the advantages of white phosphorus without the drawbacks of the latter. It is obtained through the combination of amorphous phosphorus and sulphur. It cannot be obtained in starting with white phosphorus, and so it can contain as impurities only red phosphorus and water. It melts at 142° and emits no vapors at ordinary temperatures; and neither odor nor smoke is observed in the works where the product is used. The toxicity of the substance is quite feeble. Messrs. Sevene & Cohen gave repeated doses of 3 centigrammes per day to guinea pigs without the latter appearing to suffer therefrom. This corresponds for an adult of medium size to 35 grammes, that is to say, to the weight of sesquisulphide contained in 6,000 matches.

In order to give the matches the necessary degree of inflammability, a certain proportion of chlorate of potash must always be added to the paste. The following is the composition of the paste at present employed and which permits of the manufacture of a new type of paraffined wooden matches that will ignite upon any surface whatever upon which they are struck:

	Parts.
Sesquisulphide of phosphorus.....	6
Chlorate of potash.....	24
Zinc white.....	6
Red ochre.....	6
Powdered glass.....	6
Glue.....	18
Water.....	34

The composition varies slightly according as the paste is designed for sulphur, paraffined, or wax matches. Not only is this product free from the inconveniences of white phosphorus, but the process of manufacture remains sensibly the same.

**The Proposed Execution Prison.**

Plans for the proposed State prison for executions for New York State have already been drawn. They provide for a stone fireproof building to be situated inside the walls of the Clinton prison, entirely separate and distinct from it, but near enough to obtain electric light and power from the plant of that prison. The structure will be divided into two sections, the administration department and the prison proper, which consists of cells and the electrocution chamber.

There is only one entrance to the building, which is

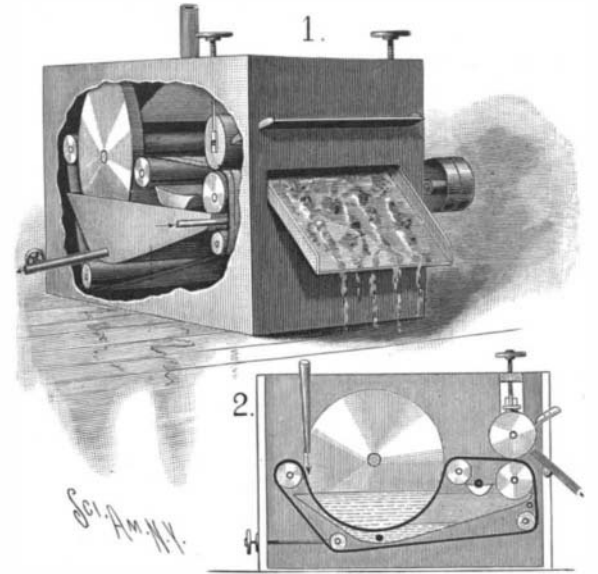
through the office, from the rear door of which the guard is able to obtain a view of every cell in the prison. The cells will be located in the long structure one story high. They will be constructed of steel, with running water and all modern appliances. They will be twenty in number and will be situated in two rows in the cell department. They will have no windows, but will open on the central corridor. The corridor will also run around them. The cell department will be 92 feet long and 40 feet high, and the cells will be 8 feet square.

**A MACHINE FOR FILTERING LIQUIDS.**

In order to remove the foreign matter from dense liquids, such as oils, in a more rapid manner than has hitherto been possible, Mickael B. Koerper and Edgar C. Talley, of Waco, Tex., have devised a filtering machine in which an endless belt of filtering material is employed, coacting with a series of rollers.

Fig. 1 is a perspective view of the machine, parts being broken away to show the construction. Fig. 2 is a longitudinal vertical section through the machine.

The filtering machine is inclosed in a casing, in the sides of which the rollers are journaled. These rollers support the endless belt of filtering material. The belt is driven through a tank in the bottom of the casing by means of a driving-roller, above which there



**A MACHINE FOR FILTERING LIQUIDS.**

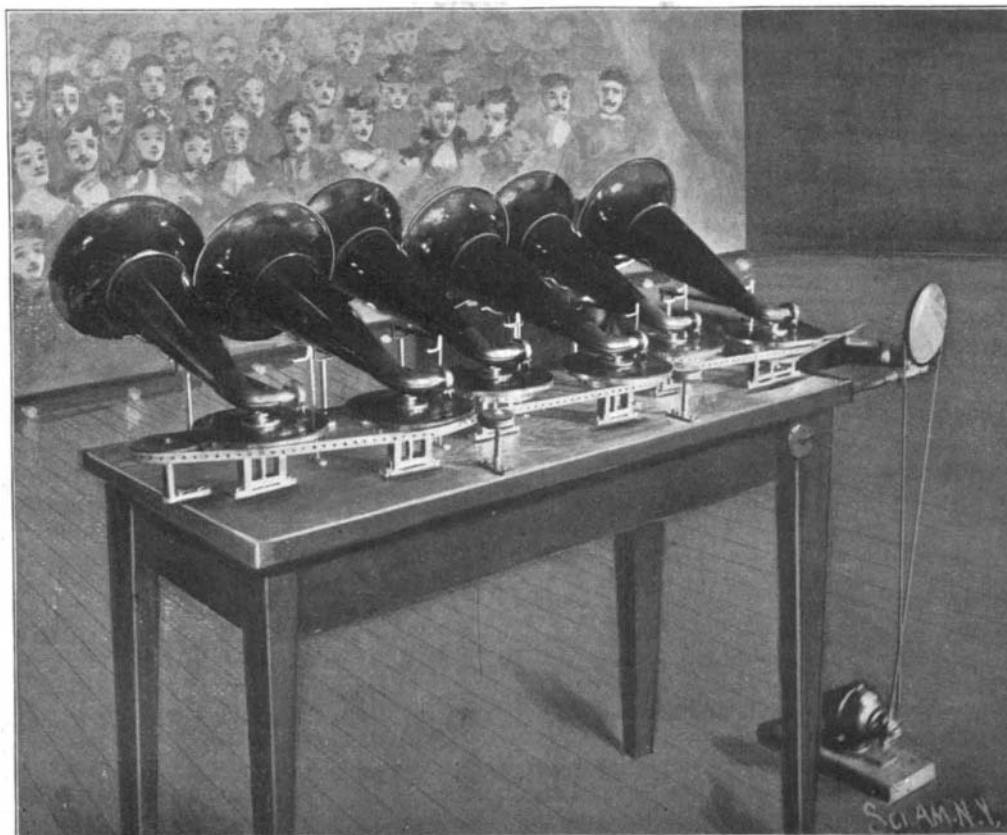
is adjustably mounted, as shown in Fig. 2, a discharge roller which receives the refuse matter. Partially submerged in the liquid contained within the tank are two large filtering disks, which are mounted on a shaft journaled in the casing, and which engage the belt.

The oil to be filtered is poured in a broad stream upon the belt between the disks by a spout having a flaring delivery end. By reinforcing the edges of the belt with a double thickness of material, a tight and liquid-proof connection is produced between the belt and the disks; for it is here that the greater portion of the filtering is accomplished. The oil, after having been cleansed, passes into the tank. The refuse matter is carried by the belt between the driving and discharge rollers, is compressed upon the discharge-roller, and is removed therefrom by a knife and discharged from the machine by means of a chute. The oil which has been filtered will be drawn from the tank by means of a pipe.

Since in the filtering of oils froth is produced, the inventors have mounted between the driving roller and one of the supporting rollers a small receiving trough. An outlet in the side of the casing permits the discharge of the froth collected by the trough. Beneath the driving roll a steam or air pipe has been introduced for the purpose of cleaning the filtering material when the oil is very heavy.

After the parts of the machine have been once adjusted, the inventors state that the filtering can proceed uninterruptedly.

THE officers and sailors of the "Yale" have received their share of the prize money accruing from the sale of the Spanish boat "Rita." After this vessel had been captured by the "Yale" it was purchased by the government for \$125,000. The prize money to be divided amounted to \$59,000. Captain Wise, of the "Yale," received \$8,091; the smallest sum received by a seaman was \$76.



**THE BERLINER MULTIPHONE.**

**The Heavens in April.**

BY GARRETT P. SERVISS.

April is a good month in which to begin the use of the opera glass among the stars. The increasing mildness of the nights, and the beauty of the constellations in sight, attract people out of doors and fix their attention on the sky. Overhead two striking star groups are visible—the "Sickle" of Leo, south of the zenith, and the "Great Dipper," in Ursa Major, north of it. That is their position at 10 P. M. at the beginning of the month, and at 8 P. M. at the end of it. At the same time Sirius will be seen near the horizon in the southwest, with Orion settling in the west and Capella, very bright and as white as a diamond, well up in the northwest. In the south is Hydra, with but one conspicuous star, situated in a barren region of the sky. West of Leo gleams the "Beehive," a cluster of minute stars in Cancer, which becomes interesting when viewed with a strong opera glass. Over in the east are Spica, glittering white, Arcturus, reddish yellow and looming large, and farther north the half-circlet of the Northern Crown.

**THE PLANETS.**

Mercury is an evening star, visible after sunset for a few days at the beginning of the month. On the 12th Mercury is in conjunction with the sun, after which it becomes a morning star. It remains in Pisces throughout the month.

Venus is also a morning star, gradually approaching the sun. She moves from Aquarius to the border of Pisces and Cetus, steadily losing brilliance.

Mars, which, in the course of the month, passes from Gemini into Cancer near the "Beehive," has faded since midwinter to the brightness of an average first magnitude star. It is still receding from the earth, and early this month attains its greatest distance from the sun.

Jupiter, near the border between Virgo and Libra, is very bright, rising between eight and nine o'clock and getting into good position for observation about midnight. On the 25th Jupiter will be in opposition to the sun, and consequently in an admirable position for telescopic study. It is an interesting experiment to look for the satellites of Jupiter with a field glass. One or more of them are certain to be visible, almost any clear night. The belts of the planet are now exceedingly beautiful when viewed with a glass of four or five inches aperture.

Saturn, which does not rise until about midnight, being situated in Ophiuchus, carries off the honors this month on account of Prof. Pickering's recent discovery that the great ringed planet has a ninth moon. The discovery was made by photography at the Arequipa observatory, and is very remarkable on account of the faintness of the new moon and its immense distance from the planet. The outermost moon of Saturn heretofore known, Japetus, is about 2,225,000 miles from Saturn, but the new moon, Prof. Pickering announces, is three and a half times as far from its primary as Japetus is. That makes its distance 7,875,000 miles, or more than thirty times the distance of our moon from the earth. Its stellar magnitude is given at 15.5; so that only a few of the most powerful telescopes in existence can be expected to show it. Its period of revolution is about seventeen months. Contrast this with the period of Saturn's nearest moon, Mimas, which goes round in only 22 hours and 37 minutes, and the extraordinary extent and variety of the system of which Saturn is the center becomes apparent. The period of the largest moon, Titan, is 15 days, 22 hours, and 41 minutes, while that of Japetus is 79 days, 7 hours, and 54 minutes. The discovery is another vindication not only of the value of photography in astronomy, but also of the independent manner in which Prof. Pickering has applied this powerful means of research.

Uranus is in Ophiuchus about 5° north of the red star of Scorpio, Antares. It rises one hour ahead of Saturn.

Neptune is rather more than a degree northwest of the star Zeta in Taurus.

**THE MOON.**

New moon occurs on the morning of the 10th, first quarter on the afternoon of the 17th, full moon on the afternoon of the 25th, and last quarter on the morning of the 3d. The moon is nearest the earth on the 6th and farthest from the earth on the 18th.

The lunar conjunctions with the planets occur on these dates: Saturn 1st, Venus 7th, Mercury 10th, Neptune 14th, Mars 18th, Jupiter 25th, Uranus 27th, Saturn 28th.

**The Metric System in Our Colonies.**

The advocates of the metric system in the House of Commons are greatly interested; according to a cable dispatch to The Sun, to know what decision the United States will arrive at regarding the system of weights and measures to be used in Cuba, Porto Rico, and the Philippines. They hope that the American government will not compel the abandonment of the metric system for the cumbersome English system.

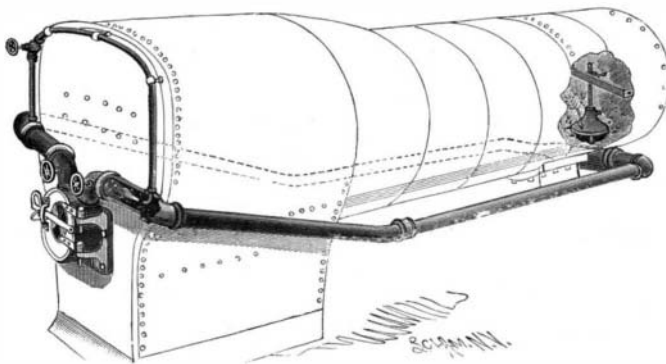
**Vegetable Monstrosities.**

Considerable attention has been given by botanists to the subject of vegetable monstrosities. These abnormal growths are not well understood, but it seems to be well established that many of them are the result of disease. It has been believed that not a few of them may be reproduced from seeds grown on abnormal plants. M. Hugo de Vries has been cultivating these strange anomalies for twelve years past and the results of his studies have been published in the Comptes Rendus. He says, with the exception of the plants which have been turned abnormally green by parasites, every plant developing unnatural growth with which he experimented was reproduced from its seed. He has, therefore, proved the heredity of the monstrous types. He isolated all the plants he raised, and a large proportion of their descendants were of the normal type, but the abnormal individuals were sufficiently numerous to prove the theory of heredity as well as disease as the cause for the multiplication of monstrosities.

**AN IMPROVEMENT IN SMOKE-CONSUMERS.**

There has recently been patented by James W. Alexander, of Bridgeport, Ohio, an ingenious device which is designed to draw the smoke, sparks, and cinders from the smoke-box of a boiler into the fire-box, in order that they may be consumed with the burning fuel.

The accompanying engraving shows the invention applied to a locomotive-boiler. At its forward end the boiler is provided with the usual smoke-box into which open the smoke flues extending from the fire-box. In the bottom of the smoke-box an opening is formed leading to a casing, from the sides of which suction pipes extend, running alongside the boiler to the fire-box. Near their rear ends the suction-pipes are fitted with valves. To each suction-pipe is connected a steam pipe, in order that steam may be forced through the suction-pipe to create a suction therein, in order to draw the smoke and cinders from the smoke-box into the fire-box. An adjustable bell-shaped deflector is

**ALEXANDER'S IMPROVEMENT IN SMOKE-CONSUMERS.**

located in the smoke-box above the opening and serves to distribute the sparks, cinders, and smoke uniformly.

When the suction-pipe valves are opened, and steam under pressure is allowed to pass through the suction-pipes, the smoke, gases, and sparks will be drawn over the deflector, down into the casing below the smoke-box, and through the suction-pipes to the fire-box.

The smoke-consumer possesses the merits of being simple in construction and effective in operation. It can be applied not only to locomotive-boilers, but to other boilers as well.

**Manufactories in Turkey.**

Dr. Cabell Whitehead has been tendered and has accepted an important position in the service of the Turkish government, and he will shortly enter upon his new duties. He will be virtually Director-General of Industries. The present Turkish Prime Minister has recognized the wonderful technical and scientific progress of the American nation, and has labored to introduce into Turkey American methods, American products and machines, as well as American scientists and technologists. Just now several large establishments are to be built, and the general management of them will devolve upon Dr. Whitehead. Dr. Whitehead was born in 1863 and is a graduate of Lehigh and Columbia Universities.

**An American Bridge for the Soudan.**

An erecting gang from the Pencoyd Iron Works will leave Philadelphia in a few days en route for Africa, for the purpose of building a bridge across the Atbara River, in the Soudan, near Khartoum. The order was placed with the Pencoyd Iron Works by the British War Office, less than six weeks ago, and the seven parts of the bridge, with a total length of 1,100 feet, have already been shipped. The Pencoyd Company was given the preference over English bridge builders, because the latter said it would take seven months to complete the structure. The British War Office was anxious to have the bridge completed before the fall, in order to facilitate the operations of Gen. Kitchener against the Mahdi.

**The Windsor Hotel Fire.**

For a quarter of a century the Windsor Hotel, at Fifth Avenue and Forty-sixth and Forty-seventh Streets, New York city, has been one of the most famous hotels in America. It was built in 1871 and opened in 1873. The hotel had a frontage on Fifth Avenue of 200 feet and on Forty-sixth and Forty-seventh Streets of 160 feet. It was seven stories in height, was built of brick, and had no architectural pretensions. The Windsor Hotel, although intended to be fireproof when it was built, was really a most excellent fire trap. On each floor five broad corridors intersected, and in the middle of the building were two wide shafts, constructed for the purpose of admitting additional light and air. Broad staircases led from the office floor to the parlor floor, and other broad staircases connected with the succeeding floors. This scheme could hardly have been improved upon for hastening the destruction of the house by fire. It was built upon a plan really obsolete, at the time it was constructed. Many times the building authorities had insisted upon adequate fire escapes being built on the fronts of the building, but their efforts had been unavailing.

Never within the knowledge of the fire department of New York has the uniformed force acted with greater heroism, but their efforts were in many cases futile, owing to the bad construction of the building. Fifteen minutes after the alarm had been turned in, the roof of the big hotel had fallen, and the fire was spectacular to the last degree.

Iron fire escapes on a building, if they are well constructed and numerous, will, perhaps, save a great many lives, but it must be remembered that with flames pouring out of the windows below, often those who try to descend by such means find themselves cut off from escape before reaching the ground. The intense heat soon makes them red hot gridirons, and then they are worse than useless. The ordinary rope fire escape in its present form is almost useless, as few men and almost no women understand the art of descending fifty or sixty feet with the aid of a rope. The friction soon cuts into the flesh, and the user falls to almost sure death or severe injury.

It seems as though inventors could devise some practical form of fire escape which would answer in cases of this kind. A fire escape to be really practical must be simple and easily understood by the user, who has no time to read instructions or to do much adjusting of the apparatus in an emergency. The individual fire escape for hotels and buildings which are not fireproof or provided with a fireproof stairway really seems to be a partial solution of the difficulty. Of course it would have been very easy to have constructed an absolutely fireproof tower in this hotel, doors leading to the stairways from every floor, but would the guests have known where to go to reach this point of safety?

The fire has resulted in many suggestions as to the protection of hotels and similar buildings which are not fireproof. Asbestos curtains, sprinklers, alarms in every room, and other well-known schemes have been advocated. The real solution of the problem is to build hotels which shall be really fireproof, so that if a fire starts in one room, it can be confined to it.

There have been fires in several modern fireproof hotels and we believe that no serious injury other than the gutting of one or two rooms has resulted. Many hotels in New York city which conform to the building and fire regulations of the period when they were constructed are now very little better than was the Windsor Hotel. As they are substantially built, however, nothing can be done in the way of condemning them. Already the proprietors of New York hotels have had several meetings and have expressed a desire to co-operate with the authorities in framing building laws and fire regulations which would tend to increase the safety of their guests and prevent another horror like the Windsor Hotel fire.

**Prizes for the Care of Cars.**

In Birmingham, Ala., the street railway company decided to offer prizes to the men for the care of cars. Conductors on the electric cars and motormen of fare box cars who have kept the neatest cars will be given \$10, while those whose cars have been habitually dirty will be discharged. All motormen who have not cost the company anything for damages will be given \$20, while those who have not cost the company over \$5 for collisions or breakdowns will get \$5. All those who cost the company over \$25 damage will be discharged, unless they can prove that the accidents were not caused by carelessness. Similar schemes might be applied to advantage on many of our Eastern lines.

ACCORDING to the Bulletin de la Direction de l'Agriculture et du Commerce, published by the government of Tunis, the Bey, on December 3, 1898, decreed that, after the date mentioned, all irrigating machinery and the windmills used in driving the machinery shall enter the regency of Tunis duty free, provided that the two apparatus in question be imported at the same time.