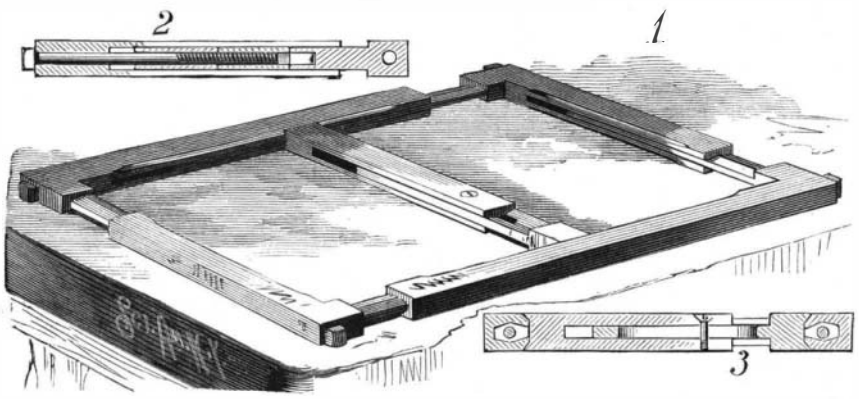
IMPROVED PRINTER'S CHASE.

The chase shown in the cut can readily be adjusted to fit type forms of various sizes, thus permitting its use in place of the assorted chases now necessary in printing establishments where a variety of job work is done. The chase being, practically, self-locking saves all time usually spent in filling out with furniture, quoins, etc. Fig. 1 is a perspective view, Fig. 2 is a longitudinal section through one of the sides, and Fig. 3 is a section through the central brace. The chase consists of four similar L-shaped pieces; one arm of each piece being made so as to slide over and inside the part of the adjoining piece. The inner arm is made in the shape of a double-dovetail tenon, and in the arm it slides in is a double-dovetail groove, which extends nearly to the angle and joins a horizontal hole in which works the adjusting bolt. A threaded nut, embedded at a suitable point in the tenon, receives the end of the bolt. The inner, upper and lower edges of the grooved arms are beveled, and against these edges rest the ends of the central crossbar, which consists of two pieces, the form of which is clearly shown in the engraving. The central part of the tenon piece is slotted to receive the body of the fastening screw, which passes through a hole in the other part. The adjustment of the various parts of the chase may be easily and rapidly made; the manner of changing the size will be understood from the foregoing and from the engraving.



BRILL'S IMPROVED PRINTER'S CHASE.

This invention has been patented by Mr. Peter Brill, Jr., whose address is care of Mr. A. C. Pleyte, 1719 Walnut Street, Milwaukee, Wis.

AN IMPROVED SAFETY ENGINE.

The accompanying engraving represents a safety engine of novel construction, invented by Mr. Henry Davey, a mechanical engineer of prominence in England, and now being manufactured by Messrs. Charles P. Willard & Co., of 284 Michigan Street, Chicago, Ill. Although the principle involved in its construction is not new, the application and combination have not before been used in small motors. It differs from a steam engine in the fact that while a small quantity of steam is used, it is not the motive power employed to do the work, the only function of the steam being to create, by condensation, a vacuum, which constitutes the motive power. There is absolutely no pressure in the generator, and consequently there can be no danger of explosion under any circumstances. The cylinder is provided with an internal cylinder, made of bronze, which is entirely surrounded by steam. The admission and cut-off are regulated by suitable mechanism operated by the engine itself. Condensation is effected by means of a surface condenser, which is contained in a pocket shown at the rear of the engine. The air pump, which connects with the condenser, and the hot well are of special construction, and are shown attached to the side of the main frame. The water supply is regulated by a valve contained in the float box shown at the side of the generator. The entire amount of steam generated is condensed, and is discharged through a small opening at the side of the hot well in the form of hot water. The engine is double acting, steam being condensed at both ends of the stroke, so that a vacuum is produced alternately at each side of the piston head. The water level of the engine is constant and unvarying, and the quantity of water actually consumed is so small as to remove all difficulty of keeping up a supply. There is no safety valve, no exhaust, no steam gauge, no boiler feed pump, no injector, nor any similar adjuncts of an ordinary steam engine. It is arranged to burn either hard or soft coal, wood, or coke, and petroleum or common gas may be used by conducting pipes into the fire box. The manufacturers claim that when hard or soft coal or coke is used, the cost will not exceed one cent per horse power per hour.

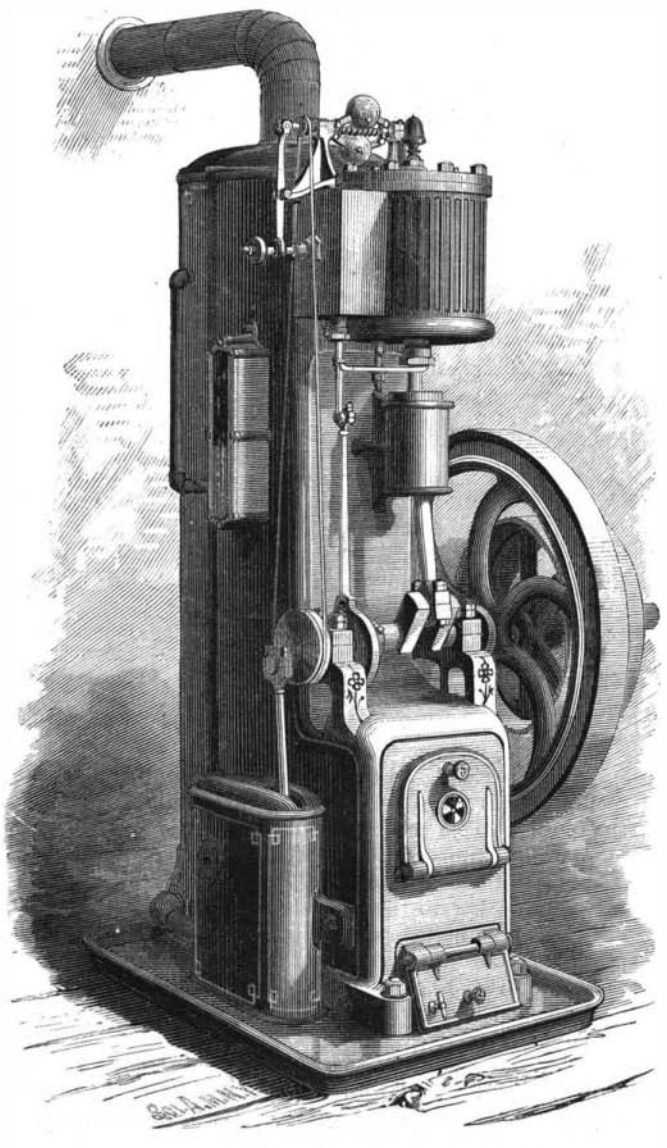
BARON VON SCHOELER, of Corpus Christi, has for a pet an immense snake of the anaconda species. It is perfectly docile, so far as the Baron has yet learned.

Natural Gas in Pittsburg.

On January 31, a disastrous explosion of natural gas occurred at Pittsburg, Pa., by which four houses were badly damaged and twenty-two persons were more or less injured. The large main of the Fuel Gas Co., conducting the natural gas from the wells at Murrysville to the consumers in Pittsburg, passes close along the curb on Butler Street at Thirty-fourth. The pipe is wrought iron with screw joints. The high pressure of the gas and its great penetrative quality make it, seemingly, impossible to prevent leakage. The gas accumulating in cellars near the corner of Thirty-fourth and Butler Streets in large quantities was ignited and exploded. These explosions are of alarming frequency. The gas companies, with all known appliances for controlling the gas, cannot master it. The Fuel Gas Co. is trying a new plan. Their pipes will be surrounded with charcoal. In close proximity to the pipe, and within the zone of charcoal, a burnt clay sewer pipe is laid. This being porous, the gas escaping from the iron main finds its easiest escape into the sewer pipe; at frequent intervals escape pipes are carried from the sewer pipe to the tops of lampposts, where the leakage is burnt. It burns in a flame from three to four feet high. The Philadelphia Co. lays a double pipe; a small one, the high pressure, surrounded by a large one, a low pressure, which carries nothing but the leakage from the inner pipe. Dwellings are supplied from the outer pipe, mills and the like from the high pressure or inner pipe.

New Brazilian War Ship.

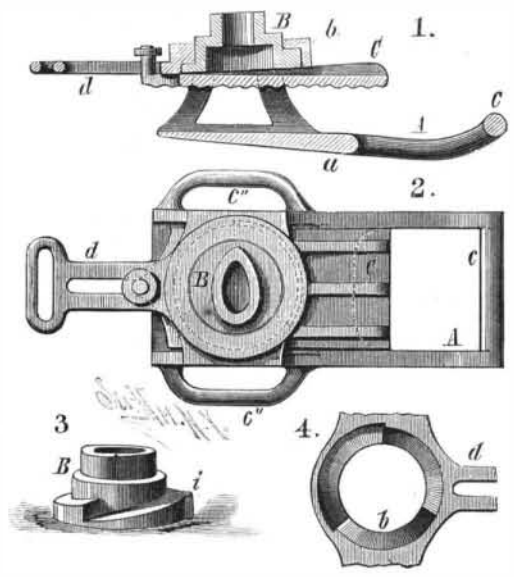
The Aquidaban, recently launched from Messrs. Samuda's shipbuilding yard at Poplar, is a twin-screw armor-clad turret ship, 280 ft. in length, 52 feet in breadth, and 18 ft. draught, with a displacement of 4,950 tons. The estimated speed is 14 knots, with 4,500 indicated horse power. The hull is built of Siemens steel, and is divided into a large number of water tight compartments, the principal of which are the four boiler rooms and the two engine rooms, which are each separate water tight tanks, so that if either of them were flooded the ship could, at a reduced speed, proceed on her course with the remaining set of engines and boilers. The bottom of the vessel to a height 2 ft. above the water line is sheathed with wood and metal to prevent fouling; the stem and stern post, upon which the wood sheathing ends, being made of massive gun metal castings.



THE DAVEY SAFETY ENGINE.

TRACE OR HAME TUG BUCKLE.

In this buckle a clamping plate, or wedge and key, is employed for grasping and holding the trace, thus avoiding the necessity of making holes in the trace, as with ordinary buckles, and facilitating also the adjustment of the trace. Fig. 1 is a sectional elevation, Fig. 2 is a plan view, Fig. 3 is a side elevation of the cam or key, and Fig. 4 is an inverted plan view of the outer part of the frame. The main frame, A, is formed with a forward extension, *c*, for receiving the hame tug, side loops, *c''* *c''*, for receiving the back strap and belly band, and the rear extension, *d*, the loop of which receives the breech strap, and the slot receives the stud of the clamping plate, C. The space between the face plate, *b*, and the back plate, *a*, is wedge shape to cause the clamping plate, C, to more firmly grasp the trace. The clamping plate is attached to the buckle by the stud passing through the slot, *d*, and is free to move longitudinally, so as to grasp traces of different thicknesses; the inner surface is corrugated, as shown in Fig. 1; it is also formed with ribs which act against the key, B, the form of which is shown in Fig. 3. The key is moved by a wrench applied to the head, and its movement is limited to about one-third of a revolution. When the key is turned in one direction, it will be forced inward against the clamping plate to grasp the trace; and when turned in the opposite direction, the trace will be released. This is effected by the cam surfaces of the key moving on those on the under part of the face plate of the frame, indicated in Fig. 4. This buckle will securely hold the trace without injuring it, and the wedging action will increase according to the draught upon the trace.



DEIBERT'S TRACE OR HAME TUG BUCKLE.

This invention has been patented by Mr. A. E. Deibert, of 585 McGee Street, Kansas City, Mo.

Iridium.

Iridium is a metal which is likely to have a much more extensive employment than it now enjoys. Hitherto it has been chiefly used in alloy with osmium for tipping gold pens. But an American pen manufacturer has discovered that by fusing the metal at a white heat and adding phosphorus perfect fusion could be obtained, with all the hardness in the resulting material of the iridium itself. For mechanical applications this combination is exceedingly useful, as in the case of pen points; and its adaptability is being proved in many ways. Agate, which has hitherto been employed for fine chemical balances, is now giving place to iridium, which takes a finer edge and is not so liable to catch or break.

Hypodermic needles for surgical use are now made of gold and tipped with the iridium compound, which is not subject to corrosion like the old steel points, and it is also being largely applied to instruments for surveyors and engineers and to electrical apparatus. Iridium can be obtained somewhat abundantly from the Russian platinum mines in the Ural, and it is found in combination with gold in California. Mr. Dudley, of Cincinnati, is engaged on experiments with the object of plating vessels with iridium, and as the metal resists the action of acids, it is likely that such vessels will be very useful in many chemical operations.—*Chem. and Drug.*

ECONOMICAL STEAM TRAMWAY. — The half year's working account of the Dewsbury, Batley, and Birstal Tramway, the first ever constructed in England, and worked by Merryweather 7 inch engines, shows the total cost of the running of the engines to be 2·57d. per mile, and the total expenses of the whole establishment, including locomotive charges, 5·16d. per mile. This is one of the most economically worked lines in England.

Trade with Mexico.

A correspondent writing recently from the city of Mexico to the New York *Sun* says:

Two half dollars, United States silver coins, containing 346 grains pure silver, are worth fifteen cents more than a Mexican dollar, containing 376 grains, an anomaly caused by the fact that United States silver coin is at par with gold. The Mexicans don't understand this, and consequently they hate Americans and prefer to trade with any other foreigners.

If the United States desires to have the good will of Mexicans and build up a trade with Mexico, it can be done quickly and simply by Congress enacting a law making the Mexican dollar receivable for custom duties, and giving it equal value with the United States silver dollar. Mexicans say they do not want to trade with a people who will allow them only 85 cents for their silver dollar, which contains 30 grains more pure silver than the United States dollar.

I suppose the people of Chili, Peru, and other South American countries producing silver, and using almost exclusively silver money, feel and talk the same way.

Cotton Seed Oil.

Several years ago, when there was a less number of mills and a full supply of cotton seed, the manufacturers of cotton seed oil were enabled to sell it from 35 cents to 47½ cents per gallon at a good profit, but, as capitalists who knew nothing about the operation of such industrial establishments were anxious to invest in schemes in which they thought thousands, if not millions, of dollars would be reaped, the mills were multiplied until there are now 117 of them in the United States, but principally located in the South. A large number were built along the Mississippi River from New Orleans to St. Louis, ten having been put in operation at Memphis alone. The competition which resulted in the demand for the purchase of cotton seed, and the difficulty of finding markets for the product, was made very apparent last year, when the price of seed advanced, and the price of oil fell to 30 cents per gallon, at which figure it has since remained.

Two hundred thousand dollars were sunk at Memphis last year in the manufacture of cotton seed oil, and when it was found that some of the mills would be forced to the wall, the necessity for a pool became so marked that all the mills from New Orleans to St. Louis were compelled to form it as a protection against inevitable loss.

Capitalists in Great Britain caught the fever, and six mills were built in its domain, and seed denuded of lint was sent in bulk from New Orleans to Liverpool or other English ports as cheaply as it could be transported from Nashville to New Orleans. Here was another competitive market introduced. Formerly cotton seed oil, meal, and cotton seed, were shipped from America, not only to England in large quantities, but to France, Spain, and Italy; the oil bottled, labeled as "olive oil," and returned to America for sale. The owners of English mills at the start-out imported cotton seed from Egypt, because there was only a small amount of lint at the end of the seed, the seed from America being covered with lint. This objection did not long remain, as the ingenuity of the Yankee was brought into play, and a process invented by which all the lint could be removed, leaving the seed as smooth and black as bits of tar. The same process has recently been adopted by the Huntsville Cotton Seed Oil Company, and has proved very successful. Many of the mills in the South have been forced to cease operations, partly for want of knowledge to run them and partly from the scarcity of seed of this season.—*Nashville American.*

Proposed Reduction of Newspaper Postage.

There are now before Congress four bills to abolish the postage on newspapers altogether. One was introduced by Mr. Townshend, of Illinois, another by Mr. Morgan, of Missouri, another by Mr. Dockery, of Missouri, and the fourth by Senator Blair, of which the *N. Y. Sun* says: "We see no satisfactory reason why the Government of the United States should frank this, or any other newspaper, while it continues to tax anybody for the use of the mails. We are against deadheading at the public expense.

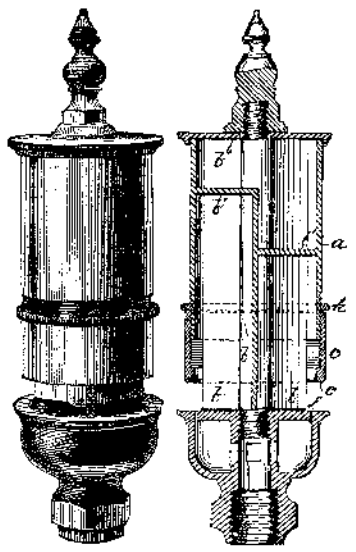
"There is a bill of a different sort before Congress which deserves more serious consideration. It was introduced by Senator Bowen, of Colorado, and it aims to reduce the postage on second-class matter from two cents to one cent a pound. We are glad to see that the Western newspaper men have decided to support the Bowen bill rather than to ask for a total remission of the postage on newspapers and other periodicals regularly mailed from a recognized office of publication. The reduction from two cents to one cent would be in line with the recent changes in the rates on other classes of matter, and would tend to secure a more equitable distribution of the cost of maintaining the postal service.

"Pass the Bowen bill. Let the deadhead bills alone."

To the above all good people will fervently say amen.

ADJUSTABLE SINGLE-BELL CHIME WHISTLE.

In the whistle shown in the engraving the bell, *a*, or upper part, is divided into three equal compartments of different heights; one of these is the full length of the bell; the second extends two-thirds the length of the bell, being cut off or stopped with an end plate, as shown in the sectional view; the third compartment is cut off so as to extend only one-half the length. These compartments form three separate whistles, and the length of each being different, each produces a distinct tone. As the lengths are properly proportioned, a musical and harmonious sound is produced, pleasant to the ear and yet penetrating and far reaching. The

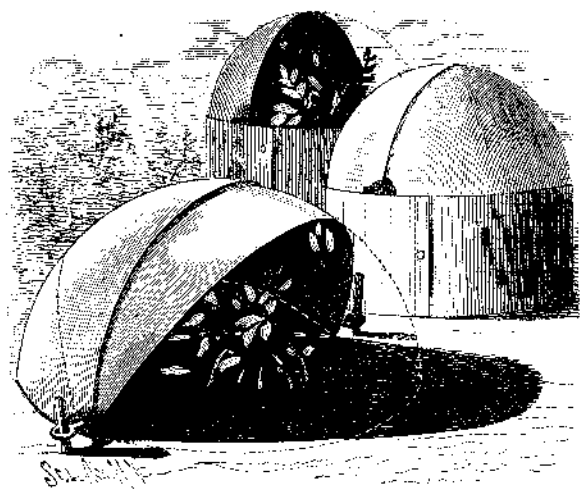


adjusting arrangement consists of a sleeve or band, *c*, covering the lower end of the bell, and so arranged that it can be brought nearer to or further away from the steam opening, as the case may be, with high or low pressure. For instance, if the lower edge of the bell should be too near the aperture admitting steam, the sound would be harsh, since the stream of steam would impinge on the edge of the bell with too much force; the adjusting band would then be screwed up so as to bring its edge away from the steam opening; or if the edge of the bell should be too far away from the opening, the sleeve would be run down. The sleeve may be moved up or down until the right focus has been obtained, and then secured by a check ring, *h*, placed above it. Once in the correct position, the adjusting sleeve will need no further attention. This whistle is applicable to locomotives, buoys, etc., and owing to the great distance the sound can be heard in foggy weather, is specially adapted to the use of steamers.

This whistle was invented by Mr. John Einig, and is now manufactured by the Crosby Gauge and Valve Company, of Boston, Mass. For particulars concerning the English and Canadian patents address the inventor, care Marine Engineers' Association, Jacksonville, Fla.

PLANT PROTECTOR.

The protector shown in the engraving, recently patented by Mr. William H. Brown, of Dunedin, Florida, is to be used as a covering for plants to protect them from heat, cold, rain, wind, etc. It is formed of two pieces of paper or sheet metal, having the shape of a pointed ellipse, each being so curved as to form a quarter of a hollow globe. The points of the sheets are provided with sheet metal strengthening plates. One section is placed within the other, and the two pieces are pivoted together by rivets which pass through the end plates. The rivets are formed with loops on the outer ends, through which stakes are driven to hold the protector on the ground. When the plant is to be covered,



BROWN'S PLANT PROTECTOR.

the protector is placed over it on the ground, and the sections arranged to form half of a hollow globe. When the plant is to be ventilated, one section is swung up more or less, and supported upon a piece of stone or wood placed beneath its edge. Either section can be raised according to the direction of the wind. When the plant is so high that it cannot be covered with the protector, the latter is placed upon a ring which is formed of two half rings pivoted to each other; this arrangement is shown in two of the figures in the engraving.

SOME one has said that the man who is curious to see how the world could get along without him can find out by sticking a cambric needle into a millpond, and then withdrawing it and looking at the hole.

Correspondence.

Straightening Old Grate Bars.

To the Editor of the Scientific American:

Your article of January 31, on "Draught of Boiler Furnaces," prompts me to communicate a fact that is not generally known, judging from the tons of old grate bars to be seen at the various junkshops, a large portion of which could be made as good as new. The bars, if not actually burned, can be brought back by heating the twisted portion to a very dull red, just enough to detect while in the fire; then nip the bar in a vise close enough to admit of its being shifted, bring a very gradual pressure on the other end with your hip, shifting the bar along so as not to take the warp all out at one place. With one heat I have taken three or four inches out of a bar. A very little beyond the right heat will cause them to break like old cheese. The degree of heat and gradual pressure that twisted the bar without breaking is the remedy to bring it back.

J. HARRY TAYLOR.

Philadelphia, February 2, 1885.

The Cause of Boiler Explosions.

To the Editor of the Scientific American:

Boiler explosions appear to occur fully as frequently as they did a year ago. On the 17th inst. a sawmill boiler at a small town in Pennsylvania exploded, killing five men; a few weeks since a boiler on a tug exploded here on the river, and a similar accident took place on a tug at Pittsburg a few days ago.

I have frequently had occasion to speak with some of the "engineers" who have taken an "active part" in some boiler explosions, and therefore venture a few remarks as to at least *one* cause why these calamities occur so often. I have discovered that in about five cases out of six the illiterate and uneducated man who has charge of a boiler believes it impossible to blow up a boiler, provided there is a sufficiency of water therein. These "engineers" will laugh at you when you question the working of the safety valve, or even hint that the iron might be torn asunder by a tremendous pressure of steam. With two gauges of water, they scorn the idea of bursting a boiler. (Two gauges is for them much safer than one!) One hundred pounds of steam on a five foot shell has no terrors for them if they *have water;* and should the engine lag on this pressure, they do not hesitate to screw or weight the safety valve, regardless of pressure or the condition of the boilers. These engineers are generally strong advocates of the "gas theory," *i. e.*, from some reason, usually low water, gas is suddenly generated in the boilers, and thus the explosion follows as a matter of course, and no one is to blame.

J. J. BOHN.

Chicago, Ill., January, 1885.

System for Steering Balloons and Maintaining a Desired Elevation in the Atmosphere.

To the Editor of the Scientific American:

Long before the experiments of Messrs. Renard and Krebbs had been made known (described in SCIENTIFIC AMERICAN, VOL. LI., No. 13), I devised a system of guiding elliptical balloons by the use of an electric current. This system, which was delivered to the Secretary of the Academy of Sciences of Paris, the 27th of August, 1883, No. 3,697, consists in an elliptical balloon inflated horizontally with gas to a suitable extent to almost balance the weight of the basket, the aeronauts, the motor, and the batteries, but in such manner that the basket should not be raised from the earth by the balloon proper, but should require a certain amount of power to lift it. The form of the balloon is that of a cylinder terminating in points at both extremities, thus offering the best possible resistance to the wind. Underneath, and extending its whole length, the balloon is provided with a sail which keeps it always head to the wind, like the tail of a windmill or weather vane. This sail acts as a sort of pivot in the air, and enables the balloon to be properly guided. The basket is provided with an electric motor connected with suitable batteries.

The motor works a horizontal propeller, which serves to impel the balloon forward and enables it to be moved out of the direction of the wind, if necessary. This propeller is movable on its axis, so that it can attain any desired inclination with reference to the sail. The motor also actuates a vertical stationary propeller situated between the sail and the basket, and which serves to raise the balloon either slowly or rapidly, or simply sustains it at a fixed elevation, according to the desire of the aeronaut. It is seen at once that this variation in the rotation of the propeller changes the ascensional force of the balloon, and sustains it at any desired height. Birds float in the air on the same principle. The basket is provided on its inner side with a semi-spherical parachute, which prevents the too rapid descent of the balloon. The guiding of the car is the most simple feature of the whole apparatus, it being necessary to raise it by mechanical power, on account of its being heavier than the atmosphere.

M. C. SENLECQ.

Ardres, France.

THE workingman's capital is health, and not wealth