IMPROVED DEVICE FOR USE IN PAYING HELP.

The illustration herewith represents an improved device for use in paying off the employes of business establishments, and facilitating the proper payments to each, without danger of accidental or designed miscarriage. It has been patented by Mr. David W. Bundy, of Toronto, Ontario, Canada. Fig. 1 shows the device as arranged for use, and in Fig. 2 it is closed for Street, Toronto, Canada.



BUNDY'S LABOR SAVING PAY DEVICE.

transportation. The main portion consists of a box like tray provided with a series of pockets, opposite each of which is the name and a number for an employe, these pockets being adapted to receive a number of money boxes, each box bearing the number of its respective pocket. The boxes have their respective numbers on the outside of both ends and on the interior of the hinged lid. A cover which is entirely removable

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is provided for thetray, the device being so constructed that the cover can be locked in closed position. To each end of the tray is pivoted a slotted bracket piece, which slides within the limits of the tray or can be adjusted to project outwardly, as shown in Fig. 1, to hold the tray in an inclined position, to enable the characters on the tray and boxes to be more readily observed, and for convenience in placing and removing the boxes, the bracket pieces being adapted to be locked in any position to which they may be adjusted.

This inventor has likewise designed a special form of time and pay roll, to enable business men to record in the most simple and condensed manner the details of the time made by workmen and facilitate making up the amounts due them. In this form, shown herewith, the small letters "M," "A," and "O," under each designation of the days of the week, indicate respectively "morning," "afternoon," and "overtime." There are two lines opposite each man's name, a mark in the lower divisions of this line indicating attendance,



while a figure in one of the upper divisions indicates short time in either morning or afternoon, as a figure in the "O" column would indicate overtime.

This inventor has established a factory provided with special machinery for the manufacture of his improved pay device, and may be addressed, for further particulars in reference thereto, at 211 and 213 Lippincott

Tracing Curves by Photography.

In the Bulletin of the Académié des Sciences de Belgique, M. Eric Gérard describes a new method of automatically registering observations by means of photography. Engineering says: In making a research in the variable current supplied by alternate current machines, he had got very good curves by using an extremely delicate and aperiodic galvanome ter, the inertia of the moving parts also being extremely small. A beam of electric light was reflected from a very small concave mirror attached to the moving portion of the galvanometer through a lens, falling finally on to a sheet of sensitive paper, on which it cast a very minute image. After some trouble very good results were obtained in this way, but not being completely satisfied, he cast about for some other method of obtaining the same end, the arc light in particular being costly and troublesome. His new arrangement consists of a moderate-sized Ruhmkorff coil, the spark from the secondary coil of which plays between a piece of aluminum wire and the point of a carbon for an arc lamp. The two electrodes are fixed at least one millimeter apart. The spark is projected on to the movable mirror aforesaid, and thence to the sensitized paper, which may be wrapped round a drum, or more conveniently simply stretched on a frame, which can be allowed to fall between guides. The period of the sparks depends solely on the elasticity of the spring of the vibrator of the primary coil, and the number of spots photographed in unit length of the curve on the sensitized paper forms a convenient time scale. By connecting the electrodes of the secondary coil to a couple of small Leyden jars, a very short and white spark is obtained, the position of which is invariable. This plan has the advantage of reducing the dimensions of the numerous spots which make up the curve photographed.

IMPROVED FURNACE FOR DESTROYING REFUSE.

The accompanying illustration represents a furnace for burning or carbonizing refuse, utilizing the same as fuel or fitting it for use as a fertilizer. It forms the subject of a patent issued to Mr. W. H. Bliss, of Newport, R. I. The furnace is constructed principally of masonry, and is preferably about 22 ft. long, 11 ft. wide, and 20 ft. high. There is a space inside the walls at each end, about 6 ft. wide and 9 ft. high, for the removal of carbonized matter when it is desired to use it as a fertilizer, brick division walls separating these spaces from the furnace proper, these walls extending to the top of the structure, and forming the sides of flues on each side, closed at the top and connected with the ash spaces. The retorts are preferably made of wrought iron, and funnel-shaped at the bottom, being tightly closed at the top by large annular covers, in each of which is formed a small cover for are held in chambers communicating with the furnace through inclined flues, so arranged that the heat of the furnace first strikes against a deflecting wall of firebrick, separated from the cone by an air chamber, thence circulates around the cones of the retorts below a horizontal plate, as shown by the arrows, and then around the main body of the retort above such plate, from which there is a passage to the chimney flue. Below the lower ends of the retorts are inclined chutes, each provided with two valves, operated by means of rods reaching to the outside of the furnace, whereby the contents of the retort can be discharged into the furnace, or into one of the chambers beneath the retorts, to be conveyed away for use as a fertilizer. Pipes connect the interior of the retorts with the fiues built into the walls, for conveying away the steam and gases generated in the process and discharging them under the grate bars. The space above the furnace is adapted

AN IMPROVED PILLOW BOLSTER.

The accompanying illustration represents a combination of pillows, or what may be used as pillows and bolster, in one pillow slip, which has been patented by Mr. William T. Doremus, of No. 150 West Twenty-third Street, New York City. Each roll is made an independent pillow covered by its own ticking, while the slip or removable cover is made up of longitudinal compartments adapted to separately receive and hold in parallel relation with each other the independent rolls or pillows, the slip being left open, or made to open, at either or both ends. In use it is designed that the top roll of the pillow bolster should always be in contact with the neck, and in asthma or lung



DOREMUS' PILLOW AND SLIP.

troubles, etc., a roll of feathers may support the neck and head, while one or more of the other rolls may be filled with balsam or hops, without incurring any of the discomforts usually attendant upon the use of the ordinary balsam or hop pillow. This combination also tends to facilitate one's getting into a "comfortable position for sleep " with case and comfort-a matter which is often a subject of considerable vexation and difficulty to those troubled with insomnia.

AN IMPROVED FOLDING CAR STEP.

Extensible car steps, which may be held folded to the permanent steps while the car is moving, and be almost instantly lowered or extended when the car stops, to promote the convenient exit or entrance of passengers, are illustrated herewith, and form the subject of a patent recently issued to Mr. Henry A. Merritt, of No. 49 Third Street, Brooklyn, N. Y. The extensible step is hung at each end to the permanent steps by two links pivoted at their upper ends to the permanent stringer and at their lower ends to the step, a transverse shaft being journaled on the permanent steps and having crank arms connected by bars with the suspension links of the extensible step, whereby convenience in inserting small substances. The retorts the latter may be folded up or extended. These crank arms have wrist pins, with which the opposite ends of a transverse operating bar are pivotally connected, one of the wrist pins being engaged by the lower end of a lever fulcrumed to the car platform, and projecting upward where it may be conveniently reached and operated for extending or folding up the steps. To the wrist of the inner crank arm of each shaft is attached one end of a spiral spring, its other end being connected to a rod fixed to the stringer of the permanent steps, these springs holding the steps in either position to which they may be adjusted, independently of the locking tendency of the bars and crank arms.



BLISS' FURNACE FOR DESTROYING REFUSE.

to receive a steam boiler, that the refuse treated may be thus utilized as fuel in generating steam for power. For further information relative to this invention, address Mr. Edward Newton, administrator of the estate of W. H. Bliss, deceased, P. O. Box 703, Newport, R. I. +++++

Exhibitors to the French Exposition.

Manufacturers and others intending to exhibit at the Paris exposition next summer, and wishing some one to represent them and attend to receiving and entering their goods, will find a capable representative in Mr. Wm. Herrick, an American gentleman who has resided with his family in Paris a number of years. Mr. Herrick is favorably known in the American colony and to American travelers accustomed to visiting Paris. His office is at 32 Rue de Paradis, where letters may be addressed and information as to entering exhibits obtained.

MERRITT'S EXTENSIBLE CAR STEP.



Fig. I-PLAN OF THE PARIS EXHIBITION.



FIE 2-PLAN OF THE CHAMP DEVMARS PALACE.

THE PARIS EXHIBITION 1889.

[For description see page 68.]

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Admission of Air to Rooms.

Air should be introduced and removed at those parts of the room where it would not cause a sensible draught. Air flowing against the body at, or even somewhat above, the temperature of the air of a room will cause an inconvenient draught, from the fact that, as it removes the moisture of the body, it causes evaporation or a sensation of cold. Air should never, as a rule, be introduced at or close to the floor level. The openings would be liable to be fouled with sweepings and dirt. The air, unless very much above the temperature of the air of the room, would produce a sensation of cold to the feet. It may be regarded as an axiom in ventilating and warming that the feet should be kept warm and the head be kept cool.

The orifices at which air is admitted should be above the level of the heads of persons occupying the room. The current of inflowing air should be directed toward the ceiling, and should either be as much subdivided as possible by means of numerous orifices, or be admitted through conical openings, with the smaller openings toward the outer air and the larger openings toward the room, by which means the air of the entering current is very rapidly dispersed. Air admitted near the ceiling very soon ceases to exist as a distinct current, and will be found at a very short distance from the inlet to have mingled with the general mass of the air, and to have attained the temperature of the room, partly owing to the larger mass of air in the room with which the inflowing current mingles, partly to the action of gravity in cases where the inflowing air is colder than the air in the room.-D. Galton, in the the following sketch : Architect, London.

Foreign Trade Marks—a Dilemma.

The Californian Fig Sirup Company, of Reno, Nevada, U.S., having registered the trade mark "Sirup of Figs" in the United States in 1885, demanded in January of this year to have the same mark registered in this country. In the Act of 1883 (Section 103) it is provided that, if her Majesty should be pleased to make any arrangement with the government of any foreign State for mutual protection of inventions, designs, and trade marks, then any person who has applied for protection for any invention, design, or trade mark, in any such State, should be entitled to a patent for his invention, or to registration of his design or trade mark (as the case may be), under this Act, in priority to other applicants; but in the case of a design or a trade mark, he must make his application within four months of his application in the foreign State. The same section, further on, provides that any trade mark the registration of which has been duly applied for in the country of origin may be registered under this Act. In March, 1884, her Majesty did please to accede to a convention to which France, Italy, Spain, and Belgium had previously agreed. The United States acceded in 1887. Article VI. of the convention thus acceded to provides that "everytrade mark duly registered in the country of origin shall be admitted for registration, and protected in the form originally registered in all the other countries of the union." Under that article the California company claimed the registration of their trade mark "Sirup of Figs" in this country. The comptroller demurred, and argued that he was only bound by the Act of Parliament, and in that the limit of four months was clearly named, and had not been complied with by the applicants. They replied that in the convention such a limit was not mentioned, and they appealed to the board of trade, who referred the case to the court. The point at issue was evidently whether the convention should override the statute, or whether the statute ruled the convention. If the former, then we are bound to register every foreigner's trade mark here if he has got it on the register of one of the countries in the union. If the latter, we are in a degree breaking faith with the co-signers of the convention. Mr. Justice Stirling has ruled against the applicants, but he evidently perceived the dilemma, and said that her Majesty's government would no doubt consider what steps ought to be taken in the way of harmonizing the conflicting claims.-The Chemist and Druggist (London).

making an electrode of each of the pieces to be welded, a small space being left where the welding is to take place. If a strong current be sent through, it forms an arc of great heat at this space and the metals are melted, and, running together, form a compact whole. The second consists in connecting both of the parts to be welded to one end of the circuit, while the other end is connected to a movable point, which is brought into close proximity to the joint, and, the arc being formed, gives the same result as before.

For many pieces of work these methods are not practicable. For instance, oftentimes when two pieces are brought into their proper relative positions, if a current be sent through after the first method, arcs will be formed at several places, and junctures will be made in places not desired. Again, in the employment of the second method, the use of two hands is often essential in the manipulation of the work, in which case a second person is necessary to apply the second contact. It is well known that two persons cannot co-ordinate their movements in the efficient manner in which one can those of his two hands, and the result is often an inferior grade of workmanship.

Now, the peculiar behavior of the electric arc, when placed in a strong magnetic field, affords at once a simple and efficient means for welding. A dynamic attraction or repulsion occurs between the rectilinear current of the arc and the amperean currents of the field, and this results in the drawing or driving out of the arc into a point, which is very similar to the point of flame projected from a blowpipe. The form may be seen from the following sketch :



THE ELECTRIC BLOWPIPE.

The heat at the point of the arc is intense, and suffices to melt any of the metals. A piece of No. 14 copper wire held at the apex melts instantly.

This extreme heat in such a convenient form can be the means of bringing electro welding within thereach of all shops where arc lamps are employed for illumination. By a mere nominal alteration the lamp may be made to perform the double function of illumination and welding. To attain this end, a straight electromagnet wound with coarse wire is only necessary. This is placed with one end toward thearc, and may be fixed in one position (to be determined by experiment, and depending upon the direction of the desired point of the arc), or made movable in a horizontal plane on a level with the arc. The two terminals of the magnet coil are inserted anywhere in the main circuit, or, if found necessary, may be shunted from the same. The connections, once made, can remain undisturbed, and, without influencing the main line, the lamp performs its two functions.

In the employment of the arc for electro welding, the operator must, of course, wear colored glasses for the protection of the eyes. Care must be used in theselection of these, for some of the coloring matter used (especially in blue and red glasses) absorbs the light given out at the apex of the arc, and this would be detrimental to fine work.

The electric arc, when in a strong magnetic field, e

THE PARIS EXHIBITION.

In June, 1883, a few French members of Parliament, among whom were MM. Herve-Mangon, Liouville, and Million, urged M. Herisson, minister of commerce, to consider the desirability of holding a national exhibition in Paris in 1885. Public discussions in the press and elsewhere followed, with the result that it was considered best to hold a "universal" exhibition in Paris in 1889, the centenary of the French revolution in 1779. M. Jules Ferry, who was then president of the council, considered that such an exhibition would be not alone good in itself, but tend to keep peace in Europe. On November 8, 1884, M. Jules Grevy, president of the republic, signed, upon the recommendation of M. Rouvier, minister of commerce, a decree that a universal exhibition should be opened in Parison May 5, 1889, and should be closed on the 31st of October, in the same year. A deliberative commission was at the same time appointed to consider the best method of carrying out the project, and it recommended that other nations should be invited to take part in the exhibition, centennial of industrial freedom. Later on, under the Freycinet ministry, M. Lockroy, minister of commerce and industry, asked credits from the chambers for the purpose. The government resolved to leave the matter to private initiation, and that the whole cost of the enterprise should not fall upon the state, as in 1878. It pronounced, therefore, in favorof a system of organization by the state in alliance with a guarantee society, as in 1867, which had been found to work well. This society guaranteed the state eighteen million francs receipts, and gave certain guarantees in the event of the expenses exceeding the amount calculated. The society acted by means of a board of control and finances, composed of eight municipal councilors, seventeen senators, deputies, and agents of the state, and eighteen subscribers to the guarantee fund, each commissioner representing one million francs. This commission enjoys, with the state and municipal council, the right of being consulted by the minister of commerce on all questions relating to the financial aspects of the exhibition. In short, the state has control of the exhibition, the city of Paris has a voice in the control, and the guarantee society does not lose sight of its capital. The state will be reimbursed to a large extent by the great circulation of money and extra surplus from its indirect imposts. The city of Paris will be largely reimbursed by increased receipts in octroi duties, and the guarantee society is safeguarded by the receipts of the exhibition. A law, dated July 6, 1886, sanctioned this combination, and a few days afterward, on the 28th of July, a decree regulated the organization of the services. M. Edward Lockroy, minister of commerce and industry, received the title of commissionergeneral of the exhibition ; M. Alphand, that of directorgeneral of the works; M. Georges Berger, that of director-general of the exploitation; and M. Grison, director-general of the finances. M. Bartet was appointed engineer-in-chief, MM. Contamin, J. Charton, and Perron have control of the metallic constructions, MM. Bouvard, Duturt, and Formige are the architects of the exhibition, and MM. Laforcade and Lion have charge of the gardens and plantations. A ministerial order, dated August 26, 1886, appointed a consultative committee of three hundred persons, under the title of the grand council of the universal exhibition of 1889, and this was subdivided into twenty-two consulting committees to watch over various departments of the works. Foreign committees, established at the request of the French government, were each invited to be represented by a delegate charged to deal with questions interesting to the nation he represented. The minister and the commissioner-general do not correspond directly with foreign exhibitors.

The ground plan of the whole exhibition, published herewith, will make clear the general arrangement. The portions devoted to exhibits from Great Britain are represented by the darkest areas. The exhibition is divided into three great parts. One part, bounded on the north by the Trocadero, is on the north bank of the Seine, and devoted chiefly to exhibits relating to horticulture and arboriculture. It is connected with the chief part of the exhibition in the Champ de Mars by



THE ELECTRIC BLOWPIPE.

BY SAMUEL SHELDON, PH.D., PROF. HARVARD UNIVERSITY.

The application of dynamo-electric currents for the welding of large pieces of metal, in the mechanic arts, has been practically demonstrated as a success. But its employment has been, of necessity, limited to large workshops, where the amount of work of this character would warrant the purchase of a dynamo. Furthermore, the danger attending the use of powerful currents has deterred many from making use of them, because they have had in their employ mechanics of only ordinary attainments, with no especial knowledge of electricity.

Besides the Thomson-Houston system, which employs a current of very great strength but small electro-motive force, and where the pieces to be welded are brought into contact, two general methods employing the electric arc have been used. The first consists in

hibits another peculiarity. It is known that if a cirthe Pont de Jena, and the main thoroughfare passes under the center of the Eiffel Tower-the positions of cuit, traversed by a strong current, be broken under ordinary circumstances, a moderate spark will ensue, the four feet of which are represented in the map. accompanied by a snap similar to that given by a toy In that part of the exhibition which covers the Esplacap when exploded. If, however, the break be made nade des Invalides are many scattered buildings. One in a strong magnetic field, an extremely large spark of them is for miscellaneous exhibits, and some of the follows, accompanied by a peculiarly sibilant report, as others for exhibits by the French naval and military intense as that of a pistol. The effect is very startling authorities. Others are for exhibits from the French when unexpectedly made. colonies. Places are being built in the Seine for float-

If a strong field be brought to bear upon the interrupter of the primary circuit of a Ruhmkorff coil, the launches are expected to be there.

spark emitted by the simple secondary coil equals in magnitude and length that which would be produced under ordinary circumstances were the secondary in communication with a large condenser. This simple means may often be employed to advantage in work with a Ruhmkorff, when a long spark is desirable and, at the same time, any electrostatic residue, owing to the condensers, is to be avoided. At one time the plan was under consideration of connecting the Champ de Mars and the Esplanade des Invalides with a railway denoted by the dotted line, R. Unfortunately for the public, this idea has been abandoned, and they will have to go an immense way round by the route marked W Y. This length, however, will be traversed by a railway, which will carry passengers for a small fee.