

NEW ELECTRIC CURRENT REGULATOR.

In a certain number of applications of electricity, such as the incandescence of platinum wires by the electric current, it is a very important point to maintain the current flowing at a certain strength, above or below which it must not vary appreciably. One of the most effectual means of doing this is to have a resistance in the circuit which can be varied according to the fluctuations in the current strength. M. Hospitalier, a young French engineer, has devised a very simple regulator on this principle.

The apparatus is composed of a resistance bobbin formed of insulated wire wound on in a single layer, and having each turn stripped of its insulating covering for about a centimeter of distance at the same spot. A lever, A B, slightly convex, can be made to touch at any particular part of its length the bared portion of the turn of wire immediately beneath that part. This lever, or "divider," has a joint at A, to which is connected a second lever having an armature, C, fixed near its outer extremity, which armature is placed in front of the electro-magnet, E. One end of the wire of the electro-magnet is connected to one end of the wire on the bobbin, the other end is connected to the metal piece on which the end, F, of the upper lever is swung. The other end of the wire of the bobbin is attached to a terminal on the lever part of the bobbin.

A spring, R, attached to the end, B, of the lever is adjustable by means of the thumbscrew, V, and by its tension draws the end of the lever to which it is attached forward; and the lever, by rocking or rolling on its curved surface, has its upper portion drawn in the reverse direction, that is, it pulls away the armature, C, from the electro-magnet. Under these conditions the lower part of the rocking lever will be in contact with the bare place on the lowest turn of wire on the bobbin, consequently the major portion of the current conveyed by the wires connected to the two terminals on the bobbin flows from the bare spot on the wire, up the lever, and thence through the electro-magnet back to the second terminal. The armature being consequently attracted, the curved lever is made to rock or roll on the bared surfaces of the wires, thus making contact with turns of the wire higher up the bobbin; but when this is so, the current entering the lower terminal has to traverse all the turns up to the turn with which the lever may be in contact, and the current is thus weakened. Hence it is easy to see that when the spring, R, is adjusted to a certain tension, the current flowing will, by pulling the armature, C, pull the lower lever on to such a turn of the wire on the bobbin as will introduce an amount of resistance sufficient to produce equilibrium, and if the current weakens or strengthens the lever will move backward or forward until the resistance adjusted by the decreased or increased number of turns in the circuit again produces equilibrium. To adapt the apparatus for alternating currents the electro-magnet is replaced by a bar of wire, which expands by the heating effect of the currents.

For dynamo-machines the apparatus is arranged to be worked by the machine itself. This is done by connecting the rocking lever to a Watt's governor. Under these conditions the apparatus regulates the velocity of the machine, and not the strength of the current.

It is hardly necessary to call attention to the utility of the invention, but the importance may be well understood when we consider that the apparatus bears the same relation to the regulation of the electric currents as the Watt's and other governors, or to the regulation of the flow of steam in steam engines.—*Telegraph Journal.*

The Fire Department of Topeka, Kansas.

Topeka is a city of about 12,000 inhabitants, situated in a region so new that the first white child born in the county is scarcely more than twenty-five years old; but it now supports three good daily newspapers and at least ten weekly and monthly ones. This is a good showing, but it will surprise no one who knows the character and habits of Kansas people. So says a correspondent of the *Fireman's Journal*, who gives the following interesting particulars:

There are two fire engine houses in the city, one in the main part of the town, and the other in North Topeka, 1½ miles away. They are substantially alike, but I shall speak only of the main one, designated as the "headquarters."

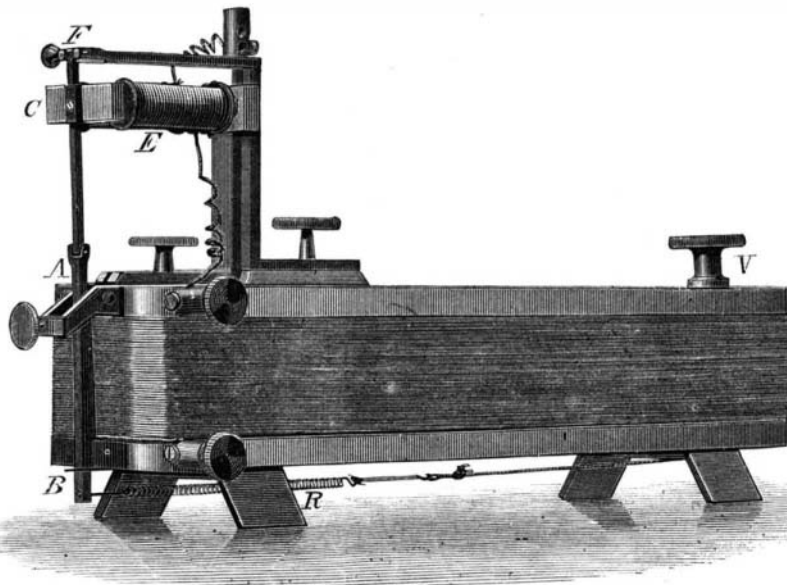
Mr. Wilmarth, the Chief of the Department, has occupied his present position for about eight years, and is a gentleman of intelligence. The present "headquarters" were built under his supervision. The first floor of this building is arranged with places for a steam engine, a Babcock engine, hose-cart, hook and ladder carriage, etc., and stables for the horses, six in number. The second floor contains a place for feed for the horses, a bath and wash room for the "boys," a reading room well supplied with books and newspapers, and sleeping rooms for eight men. Both the first and second floors are kept as clean as a building can well be kept.

This part of the building is surmounted by a tower some 60 feet in height, with machinery for drawing up the hose to be drained and dried. On its top is a station for a watchman, where he is constantly on duty at night, looking out for the first indications of fires.

The fire engines, hose-carts, etc., stand facing the double doors opposite each machine, and the horses stand in the rear, also facing the front of the building, with feed boxes on the sides of their respective stalls. They are kept in their places by short chains, covered with gutta percha, stretched in front of them, and fastened by iron pins, which also secure the horses' halters.

In the front part of the building is an opening through the second floor, some 3 feet square. A pole as smooth as glass is erected on the first floor, and passes up through this aperture into the sleeping room of the firemen. There is also on one side of the building a wooden tube or slide, perfectly smooth on the inside, leading into a room where four other men sleep. At an alarm of fire the boys drop through these places almost instantaneously. The floor at the foot of each of these places is well cushioned to prevent injury to the men as they strike it.

As soon as the watchman on the tower discovers a fire he sounds a shrill whistle located in the end of a tube in the engine room, directly over a bunk where a mansleeps. This man immediately jumps and touches an electric key at the head of his bunk. This sounds a gong, drops the chains in front of the horses—which are always harnessed and bitted—releases the halter straps, and the horses are so trained that each one springs to the place where he belongs at the tongue of the engine or hose-cart. The same touch of the electric key lights the fire in the steam engine; sounds a gong at the head of the bed of the chief at his residence, which is near

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by; and also releases the horses, sounds the gong, and lights the fire in the other engine at its house, 1½ miles away. It will be seen that these arrangements are very complete.

Under rules which are strictly enforced no intoxicating liquors are permitted to be brought or used in or about the engine houses; gambling of all kinds is prohibited; loafers and idlers are excluded; no person of questionable character is permitted to be placed on the rolls of the department; and any man "who refuses to pay any just and honorable debt of his own contracting will be liable to discharge." "No person not a member of the department is allowed to sleep at the engine houses, and all firemen who sleep at the engine houses are required to be in bed at 11 P.M."

By enforcing such rules as these, and by strict discipline, this fire department has become an ornament to the city and the pride of her people. T. S. S.

American Manufactures in Cuba.

The British Consul-General at Havana, in a recent report to his government, says that the English are yearly becoming less and less in the commerce of Cuba, and the United States more and more.

"Machinery and hardware, in which we (the British) were once unapproachable, are falling into the hands of our rivals, the only remnant being a limited import of cutlery and large pieces of machinery, such as steam plows, sugar engines, etc.; but even these, from various causes, are now coming from other countries, notably the beautiful machinery from France, such as centrifugal machines, vacuum pans, and those connected with distilling. One of the largest imports from England was the large cane knife or machete; some of these are still imported from England, but the fact cannot be, and is not, disguised from the buyers, that these knives are inferior to those made in the United States and in Germany at equal prices; the only advantage possessed by the English article is superiority of polish, hence the increase of the import from England. Take the English plow; it has no chance against the American, for not only is the latter one third cheaper, but the American manufacturer makes a study of the island of Cuba, and his plow is consequently perfectly adapted to its requirements. So with heavy machinery on sugar estates; the planters find that, as a matter of course, an article whose prime cost is less, which has less freight to pay, and which is made expressly to suit the island, is preferable to the English one, which does not

possess these advantages. In railway plant, also, the Americans are beating us, for the same objection is raised to the English manufacturers; rails, for instance, of the section required here, have to be rolled expressly in England, so that the purchaser has to give his orders four months in advance, whereas in the United States he finds his rails ready for immediate shipment, and cheaper into the bargain."

RECENT MECHANICAL INVENTIONS.

Messrs. A. O. Kaplan and A. Illoy, of Cincinnati, O., have patented an improved device for attachment to wagons, carriages, and other vehicles, which is so constructed that the horse may be instantly detached and the advance of the vehicle checked, preventing the passengers from being injured and the vehicle from being broken.

Mr. Andrew A. Armstrong, of Milford, Pa., has patented an improved sash lock for windows which is simple, convenient, and reliable, and is so constructed that it cannot be unfastened from outside the window, whether the sash be locked when closed or when partly raised.

A caster, in which the frame is made in two parts, the plane of division passing longitudinally through the pivot or stem and transversely across the middle part of the journal, has been patented by Mr. George L. Donovan, of West Meriden, Conn.

An improved machine for applying cane and other flexible seats to the seat frames of chairs, has been patented by Mr. Robert Fitts, of Lunenburg, Mass. It is so constructed that the seat will be drawn taut as it is being applied.

An improvement in wagon brakes has been patented by Mr. O. A. Kenyon, of McGregor, Iowa. The brake is made easily adjustable at several points, and without trouble or expense can always be kept in an effective condition.

An improved wagon brake, which is so constructed that it will be applied by the forward pressure of the load in going down hill, and will be gradually taken off by the draught as the wagon comes to a level, has been patented by Mr. A. M. Van Ness, of Seymour, Ia.

Messrs. George W. Marsland and Arnold Hitchcock, of Pana, Ill., have patented an improved rack for wagons to adapt them for the transportation of hay, grain, fodder, and similar articles, as well as for transporting hogs, sheep, and products of various kinds.

An improved device for holding the brasses for car journal boxes, while being bored, has been patented by Messrs. Richard H. Briggs and James H. Dougherty, of Whistler, Ala. It is so constructed as to hold the brasses securely in place while being bored, and will insure the brasses being bored true, and it may be adjusted for boring brasses for journals of different diameters.

An improvement in that class of wheel hubs in which the spoke tenons are in lateral contact and form a continuous circumferential band, being supported by and clamped between metal flanges that encircle the wooden body of the hub, has been patented by Messrs. John D. Bultz and Joseph L. Baker, of Jacksonborough, Ohio.

An improved machine for plastering walls has been patented by Mr. Gustavus Stevens, of East Tawas, Mich. This invention consists in a receptacle for the mortar, which in shape is the longitudinal segment of a cylinder. It is provided with a hinged leaf or press-plate that moves radially against the mortar, and as the receptacle is moved upwardly against the wall presses the plaster out through a narrow-gauged opening at the bottom.

Mr. William B. Killough, of Larissa, Tex., has patented an improved wrench for holding and turning bolts, pipes, taps, etc. It consists of one fixed and one movable jaw, placed on a shank and pivoted to a sleeve controlled by a screw, and carrying a lever with a cam-face working under the pivoted jaw. The jaws have serrated V-shaped recesses to grasp the larger objects, while projecting from the front there are lips with serrated concave recesses for taking hold of the heads of bolts.

An improved trumpet-guide for carding-machines, patented by Mr. Edward B. Tibbetts, of Holyoke, Mass., consists of a pan provided with a shield and oval tubes or casings placed in front of and under the doffer, so that the shield partially covers the lower calender-roll, and the tubes or casings entirely cover the shaft, the pan catches the litter, and the incasing of the roll and shaft prevents the sliver, when broken, from catching and winding.

An improvement in crozing-machines, patented by Mr. Oscar J. Pennell, of Williamsport, Pa., consists in mounting the cutter-head in a swinging frame, which is vibrated, to cause the cutter-head to act on the staves, by means of a treadle-lever and friction-pulley; and in making the swinging frame adjustable in its bearings to change its radius, for the purpose of enabling the cutter-head to move through the arc of a greater or less circle, and thus adapt it to cut a deeper or shallower croze, as required for staves of larger or smaller barrels or other casks.

A CEMENT peculiarly adapted to stand petroleum or any of its distillates is made by boiling 3 parts of resin with 1 of caustic soda and 5 of water. This forms a resin soap, which is afterward mixed with half its weight of plaster of Paris, zinc white, white lead, or precipitated chalk.