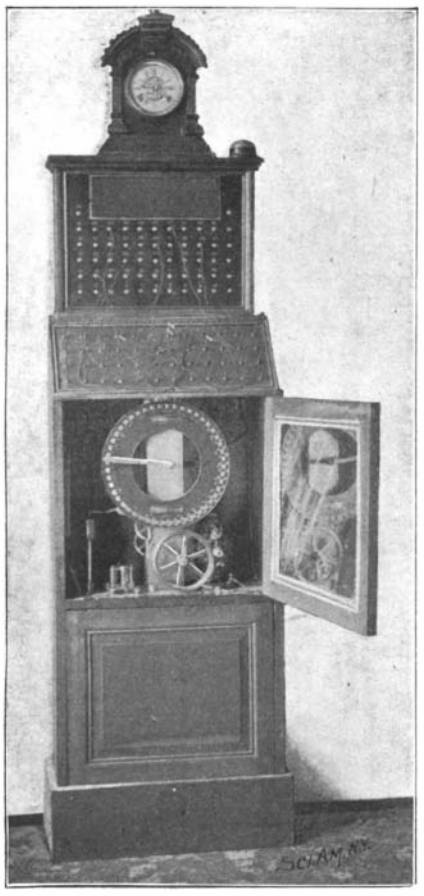
ELECTRIC CALL.

A matter of considerable importance in a hotel, and one usually dependent upon the memory of the clerk, is the calling of guests at desired hours. Negligence in this particular might put a traveler to serious in-



AUTOMATIC MACHINE FOR CALLING GUESTS IN HOTELS.

convenience, such as the missing of an important train, with its attendant complications. No such unfortunate circumstances can arise in a hotel equipped with the automatic electric call which is illustrated herewith. This machine is under control of a clock, and will automatically ring a bell in the room of a guest at any time set. The diagram of the parts clearly shows the electrical connections and the operations of the machine. A small electric motor, *A*, serves to operate a cam, *B*, and the contact finger, *C*, through the medium of a train of gearing which reduces their speed of rotation. The finger, *C*, which is electrically connected to one element of the battery, *D*, rotates intermittently, and, consecutively, at intervals of a quarter of an hour, engages the contact points on the disk, *E*. These contact points are respectively connected to a series of pins, *F*, extending upward from the top of the casing. Adjacent to these pins are a series of terminals, *G*, connected respectively with the alarm bells in the various rooms. Any of these terminals, *G*, may be connected to any pin, *F*, by a plug and cord connection so as to sound the corresponding alarm as soon as the finger, *C*, engages the contact point which is connected to that pin.

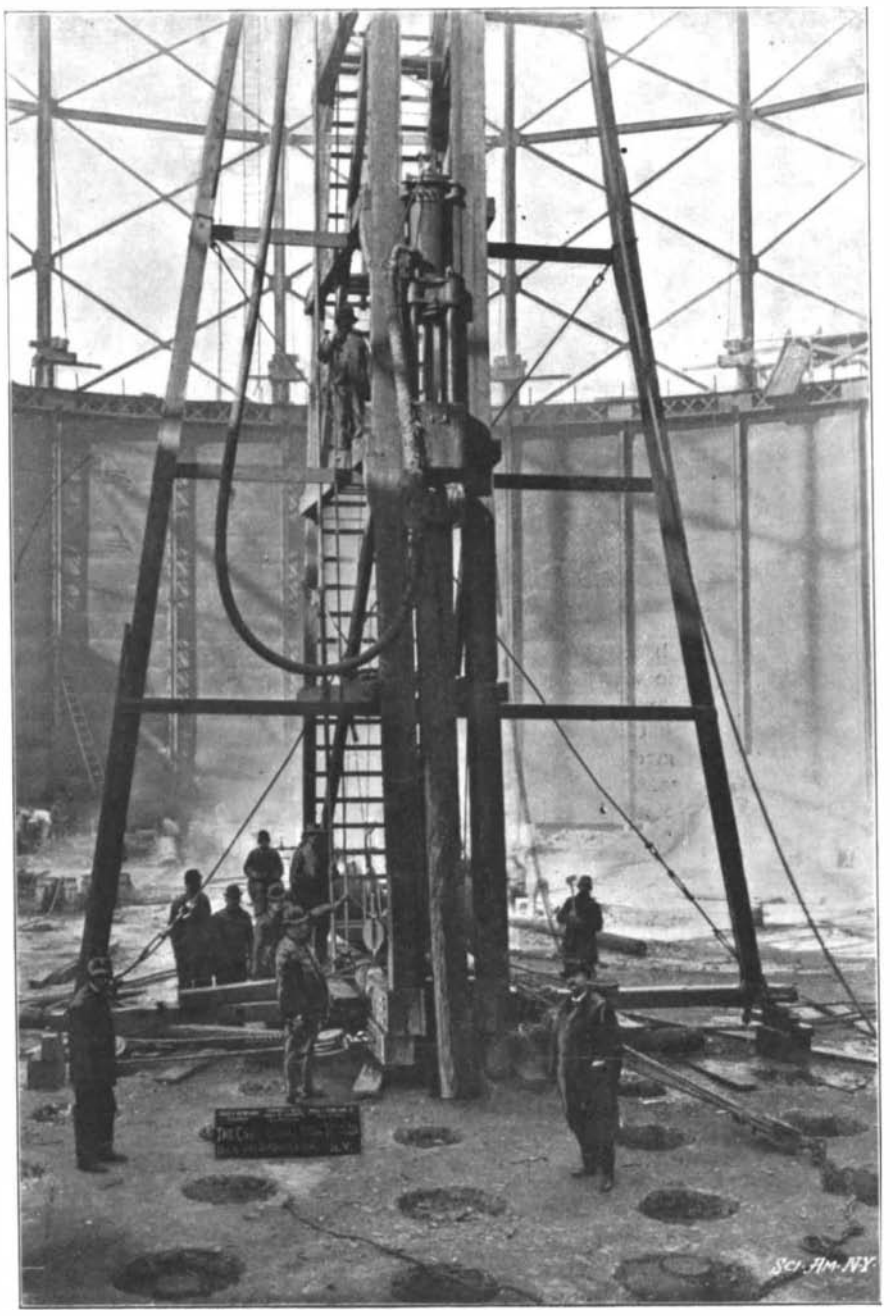
The motor, *A*, is controlled by the clock at the top of the machine. The striking hammer of this clock is actuated at every quarter hour to momentarily depress the spring-yielding contact piece, *H*, against contact, *H'*. This completes the circuit of battery, *D*, through magnet, *J*, energizing the latter and causing it to attract armature, *K*, which is thus brought into electrical engagement with contact post, *L*, a spring-catch, *M*, serving to temporarily lock the armature, *K*, in this position. An electric current now flows from battery, *D*, through post, *L*, armature, *K*, to brush, *N*, of the motor, *A*, thence through brush, *O*, back to the battery. The motor thus actuated operates the train of gearing which causes cam, *B*, to slowly rotate. The lever, *R*, which rests on the periphery of this cam, is rocked, causing the contact, *S*, to close on contact, *S'*, and contact, *T*, to close on contact, *T'*. By this act magnet, *U*, is energized, which draws back its armature, *M*, releasing the armature, *K*, and breaking the circuit through post, *L*. The motor, however, still continues to receive power through the contacts, *S* and *S'*, until the cam, *B*, makes a half turn, when the lever, *R*, rocks to its normal position and the circuit is broken. The contact points along the periphery of disk, *E*, are forty-eight in number, one for every quarter hour, and the contact finger, *C*, is so geared as to make 1-48 of a rotation while the cam, *B*, is making a half turn, so that but one contact point is engaged at each operation of the motor. Now supposing a guest in room No. 10 desires to be called at 1:30. Connection is made between the terminal for room 10 and the contact pin marked 1:30. At 1:30 o'clock the finger, *C*, would have reached the contact piece marked 1:30, and a current would flow from battery, *D*, through finger, *C*, pin, *F*, and terminal, *G*, to the alarm bell in room 10 and thence back through wire, *W*, to the battery. Since the finger, *C*, is rotated very slowly, the alarm will continue to sound for a considerable length of time, which of course may be controlled by the gearing employed. The inventor of this machine is Mr. John Salmon, 240 West 23d Street, New York city.

MODERN PILE DRIVERS.

BY WALDON FAWCETT.

A very marked advance has been made during the past few years in the construction of pile-driving machinery. The evolution which has resulted in the production of the modern automatic steam pile hammer can scarcely be said to have been as rapid as that which has characterized development in certain other branches of the engineering field, but progress has been along lines no less revolutionary. It was inaugurated with the introduction of the main features of the old English Nasmyth hammer combined with an improved valve gear. Later a type of hammer made its appearance in which the number of parts was greatly reduced and the valve actuated by steam; but difficulty was found occasionally with the steam-moved valve, and this style of hammer was gradually supplanted by the most modern types, which are designed to combine effectiveness, strength, simplicity and positiveness of action.

Some of the chief characteristics of the latest approved model in pile-driving machinery embrace a simple and positive valve gear; a short steam passage and a quick and wide opening of exhaust, the latter enabling the avoiding of back pressure during the drop. In such a pile driver turned columns are provided connecting the cylinder and base and serving to guide the ram. The guide holes in the ram are bored



A MODERN AUTOMATIC STEAM PILE DRIVER.

by the use of a "jig," and unfair strains on the piston rod are avoided. The piston is forged on its rod, and channel bars are attached on each side to enable the hammer to drive below the bottom of the leaders.

In order to perform the best work, a pile driver must be regular and continuous in its action. The machines now in use are capable of driving any kind

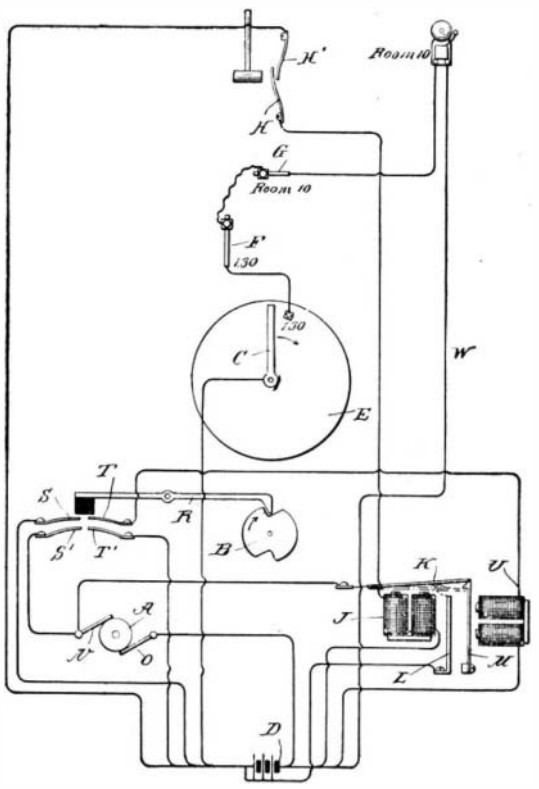


DIAGRAM OF CONNECTIONS IN THE ELECTRIC CALL

of pile, hard or soft, straight or crooked, and any pile may be driven in the hardest kind of driving sand or hardpan without injury to the head of the pile. Indeed, in the case of piles of spruce, bass and pine, the timber most frequently used, they may be driven without the use of bands. The operation of the modern steam hammer is simple in the extreme. The hammer is raised in the leaders—this being the only duty of the engine aside from hoisting the pile—and is allowed to rest its full weight upon the pile. Steam is then turned on, and the hammer pounds automatically until the pile is driven to the required depth.

The steam pile hammer of this type, which is used for foundations, docks and piers and other classes of heavy work, weighs almost 10,000 pounds, is 12 feet in length, has a normal stroke of 42 inches and is fitted with striking parts weighing 5,000 pounds. The hammer most extensively used in railroad work weighs 6,500 pounds, has a stroke of 3 feet and striking parts weighing 3,000 pounds. There are various intermediate sizes, and the smallest hammer of this general type has lately been provided especially for the purpose of driving fish-stakes for pound-nets along shore. This hammer weighs but 1,350 pounds, with a normal stroke of 2 feet and striking parts weighing 550 pounds. For the two largest size hammers engines of 40 and 25 horse power, respectively, are required.

Perhaps the severest exactions which have ever been imposed upon pile-driving machinery had to be met during the driving of piles for the Chicago post office. In order to fulfill the requirements of this governmental contract, the piles had to be driven to a depth of 70 feet below the surface in very hard material. Naturally an enormous number of blows had to be given —in some cases as many as 1,800 to one pile—and the problem of preserving the pile heads became a grave one. A steel plate was found advantageous for purposes of protection, and when it was discovered that there was more or less danger from this plate slipping and injuring the workmen, a hood with a recess was designed to hold the plate, forming a safe protector for the pile.

Although many advantages are claimed for the steam hammer over the old-fashioned drop hammers, the latter are still in use to a considerable extent, and the machines of this type have innumerable improvements over those in