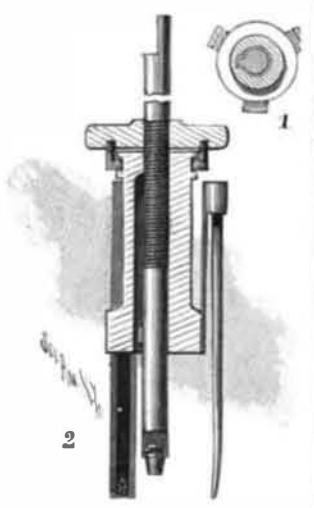
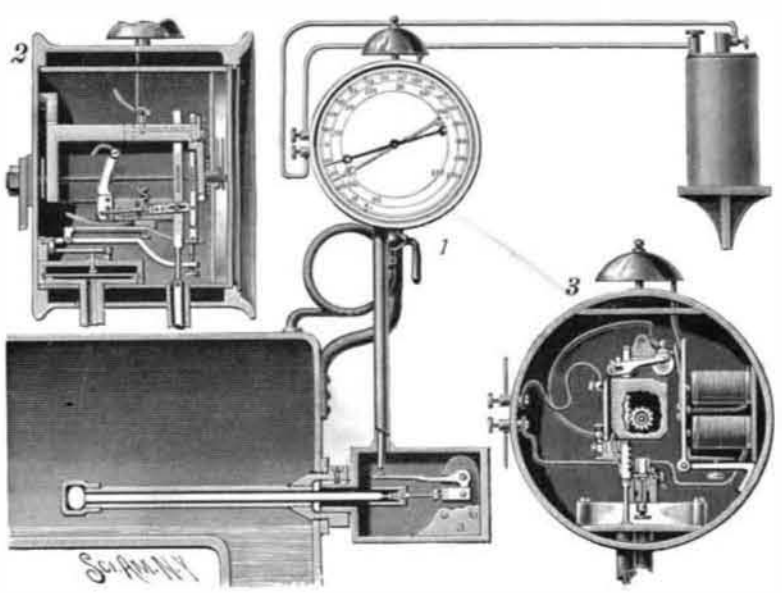
PHILBROOK'S DENTAL TOOL.

This tool, patented by Dr. B. F. Philbrook, of Dunlap, Iowa, is especially adapted for reducing a root to receive a cap, crown or bridge, and may be used in connection with dental engines, hand pieces and right angled attachments. Fig. 2 is a central longitudinal section and Fig. 1 a plan view through the tool. The mandrel is exteriorly screw-threaded, and has an interchangeable pivoted point adapted to enter the nerve seat of a tooth. A hub or tool carrier sliding loosely on the mandrel has in its inner wall a longitudinal groove receiving a feather on the mandrel, so that the tool carrier is free to slide upon, but revolves with the mandrel. An annular groove at the upper end of the tool carrier receives fixed pawls fast to a threaded milled nut, by rotating which the carrier is moved up or down on the mandrel. Two, three or four springs, secured at one end to the lower end of the tool carrier, have at their other ends each a socket to receive the shank of a cutting tool extending in the direction of the operative end of the mandrel. These tools are adapted to engage the peripheral surface of the root at the top, are preferably made of copper or aluminum, and have diamonds or diamond dust in their inner surface at their working ends. The tools are also longitudinally grooved to hold corundum or emery, and in operation, as they are rotated, the springs constantly hold them in engagement with the periphery of the root, which is thus reduced without changing its contour. The tool holder being adjustable upon the mandrel and controlled by the milled nut, the cut can be increased or lessened at will, one size hub or tool carrier being well adapted to reduce any of the human teeth or roots for crown or bridge work.



A GAGE INDICATING PRESSURE AND TEMPERATURE.

Both pointers of this gage are designed to move in unison as long as the boiler is working under normal conditions, the heat indicator hand traveling faster than the pressure gage hand when an abnormal increase of heat takes place in the boiler, an alarm being at the same time sounded. The improvement has been patented by Mr. Albert F. Mallick, Jamestown, North Dakota. Fig. 1 is a side elevation of the improvement as applied and Figs. 2 and 3 are sectional views of the gage. Extending into the boiler just above the crown sheet is a pipe on whose inner end is a cap forming a socket for the head of a rod extending loosely through the pipe and into an outer casing. The rod is preferably of glass or of any material that expands and contracts less than the pipe. The outer end of the rod is pivotally connected with the short arm of a bell crank lever, on the free end of the long arm of which rests a vertical rod connected with the indicator casing. The upper end of the rod is connected by a rack and pinion with a shaft which moves a pointer on the face of the dial, the expansion and contraction of the pipe within the boiler communicating a corresponding movement to its inclosed horizontal rod, and through the bell crank lever to the vertical rod connected with the indicator, and thus indicating the changes of temperature in the boiler.



MALLICK'S BOILER ALARM GAGE.

On the same dial is also indicated the pressure of steam in the boiler, a pipe from the steam space connecting with a diaphragm which is also connected by adjustable levers with a rack in which meshes a pinion on the shaft which carries the pointer. But when the temperature in the boiler becomes abnormal, a swinging motion is imparted to a lever pivoted on one of the racks, whereby a battery is brought into circuit with a magnet within the casing to actuate an armature lever and sound a bell. The alarm is sounded when the steam pressure is reduced and heat is not withdrawn from the water, or when the temperature is increased and steam pressure remains the same, abnormal conditions of the boiler being at once indicated, so that the attendant may apply the proper remedy to avoid or prevent an explosion.

How to Repel Train Robbers.

"How to Repel Train Robbers" is the title of a short paper in the North American Review for February by Lieut. John T. Knight, of the United States Army. His principal suggestion is that the express car should be placed at the rear end of the train, so as to compel the attacking party to divide its forces. The express messenger should be able to communicate instantly to the cars by electric alarm bell or other effective means, and the passengers should be able to get repeating shotguns from a glass-front case in each car. Thus a messenger could give warning as soon as any one approached his door at an unusual time or locality, and the passengers and trainmen, being between the robbers attacking the engine and those attacking the express car, would have a decided advantage. Moreover, it would be necessary, in order to cover the engine, the express car and a sufficient number of points between, to employ so large a force of men that the probable profits per man would not be large; and this would discourage the industry. Mr. Knight has been in the cavalry service in Oklahoma Territory; in sending a guard to protect a paymaster he always ordered it to keep 100 to 150 yards behind the wagon carrying the money, so as to compel the attacking party to divide its forces.

The lieutenant's suggestion seems sensible. If we are going to fight train robbers, the advice of expert fighters is worth attention. But, as we have heretofore said when discussing this subject, the only rational remedy is to civilize our country. Repulsing or punishing the robbers is not a satisfactory remedy, certainly not satisfactory to passengers, most of whom, in any train, even in the Wild West, come under the appellation "tenderfoot." To deter would-be robbers from getting together is the desideratum. That is the main element in the success of the police in large cities in repressing violence; they keep suspicious characters on the move as much as possible, so as to have them out in sight and let them know that they are being watched. Indeed, Lieutenant Knight evidently regards the idea of making robberies unprofitable (by forcing the robbers to see that they will have to have a large force of men in order to accomplish their object) as his most valuable suggestion. This will deter them, if anything will, for their sole object is money, says the Railroad Gazette.

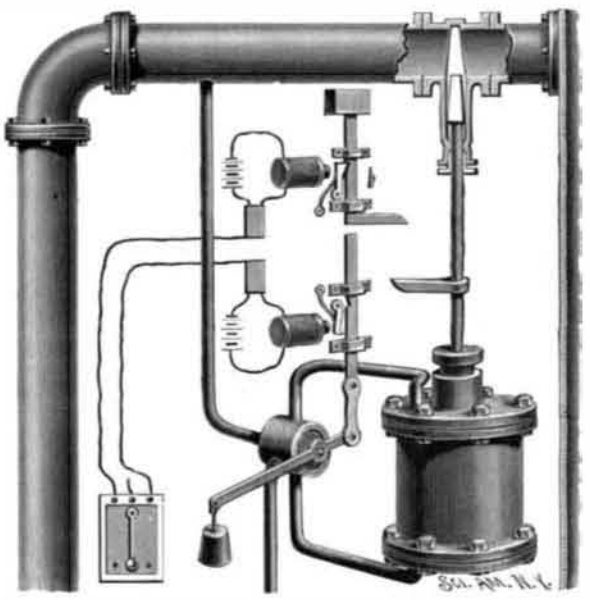
Economy in Cotton Transportation.

It was noted in our columns, says the Manufacturers' Gazette, a month or more ago, that an experiment was to be tried of fetching from Galveston a large lot of cotton by steamer, with a barge in tow. This has been successfully accomplished, and the cotton landed in good condition at one of the Boston wharves. It was an undertaking of more or less concern to marine insurers, and of some interest to those in the cotton trade, because of its originality and the doubt surrounding its success. The barge was a four-masted schooner, and was capable of taking care of itself had it broken loose from the steamer by the parting of the hawser. The latter was nine inches in circumference and was payed out 1,500 feet. At no time was it brought taut, because of its great weight and length. The steamer and barge carried together 7,059 bales, the former 2,962 bales and latter 4,097 bales. The consignees state that there was a saving on the shipment in freight over ordinary ocean transportation of $6,500. What there is in the future for this method of shipping cotton to New England ports we do not venture to say, but it is suggestive of what may be done in lowering the cost of freight from Southwestern points to a figure that will do away with Southern advantages in this particular that now exist.

With favorable freight rates for New England mills, long-stapled cotton from the Mississippi bottom lands and from the Southwest, such as is required for fine counts of yarn, can be landed at these mills as cheaply as at the mills in the Piedmont district. For fine yarns, cotton can or may be soon delivered to Northern mills as cheaply as to the mills of the South Atlantic States. If the mills of South Carolina, for instance, attempt to go into fine yarns, they will have to go outside of their own vicinity for any considerable quantity of the cotton that they may require.

ELECTRICALLY CONTROLLED VALVE GEAR FOR PUMPING STATIONS.

The improvement represented by the illustration is more especially designed for use in controlling supply pipes connecting a pumping station with a distant stand pipe, to enable the engineer at the station to open or close the supply pipe, connecting it with or disconnecting it from the stand pipe. A patent has been granted Mr. William Engberg, of St. Joseph, Mich., for the invention. The gate valve in the supply pipe is on the upper end of a piston rod passing through suitable stuffing boxes to a piston head in a cylinder connected by pipes at its upper and lower ends with the casing of a valve in which is a hollow valve plug, and the latter is connected by a small pipe with the supply pipe, so that water under pressure may pass to the valve plug. In this valve are opposite ports, adapted to alternately register with the pipes from the top and bottom of the cylinder, a channel also connecting with a discharge pipe. A lever carried by the stem of the valve plug supports at one end a weight and is connected at its opposite end by a link with a bar sliding in suitably arranged bearings, a notch in the bar being adapted for engagement by a spring-pressed armature operating in conjunction with an electro-magnet connected through a relay with a switch at the distant pumping station, under control of the engineer in charge. In vertical alignment with the sliding bar is another sliding bar, its upper end carrying a weight, its lower end having a foot adapted to engage an arm on the piston rod, and having in one side a notch adapted to be engaged by the spring-pressed armature of another magnet, also connected through a relay with the switch, the movement of the switch lever closing the circuit for either relay, and causing the corresponding magnet to attract its armature. As represented, the gate valve is open and the piston in its lowermost position. To close the valve, on the movement of the switch lever, the upper magnet attracts the armature lever and thus unlocks the upper sliding bar, which is moved down by the weight at its top and strikes the upper end of the lower bar, moving the latter downward and turning the valve plug to supply water under pressure to the lower end of the cylinder, and open the channel connecting its upper end with the discharge pipe. The piston consequently moves upward and closes the gate valve, the arm on the piston rod at the same time engaging the foot of the upper bar and elevating it, where it is held in locked position on the breaking of the circuit, and the releasing of the armature lever, which then engages the notch, the other bar being also locked in its lower position by the other armature lever. The operator always turns the switch lever to normal position after the circuit is temporarily closed.



ENGBERG'S VALVE GEAR.

A New Russian War Ship.

The Fremdenblatt gives the following particulars of the new Russian ironclad Georgi Pobiedonostzeff. This great war ship, the construction of which was begun on August 12, 1889, has steel armor from 8 inches to 16 inches thick on the sides, while the casements are protected by 12 inches and the traverses by 9 inch to 10 inch plates. The total length of the ship, including the ram, is about 340 feet. The vessel is 69 feet broad and 26 feet 7 inches deep, with a displacement of 10,280 tons. It is supplied with two engines constructed in England, which will develop 10,600 horse power under ordinary pressure and 16,000 horse power under forced draught. The new man-of-war is armed with six 12 inch and seven 6 inch guns, as well as 14 quick-firing guns of English manufacture.