through lever, 13, and spring, 14, to the battery. The light armature, 5, will be attracted by a feeble current, bringing the spring, 3, in contact with screw, 1; shunting the commutator, which will be moved away from its contact with the hand by the mechanism of the instrument. The armature, 11, being attracted by magnet, M′, brings the spring, 9, in contact with the screw, 7, dividing the current which passes through the line, L^2, magnets, M^5, of the intermediate magnet, M^6, of the receiver to the base of both instruments; through the lever, 13, and spring, 14, to the battery. The armature of the magnet, M^3, is attracted, carrying the fork or pallets which propel the wheel, W, and also by means of the pin, 18, pushes lever, 15, so that it strikes the adjustable screw in the lever, 13, throwing it away from its contact with spring, 14, breaking the circuit and allowing the instruments to return to their normal position.

In Fig. 6 is shown the application of the tele-thermometer to a japanning oven. The thermometer spiral extends into the oven, and its shaft passes through a tube to a transmitting instrument attached to the outer surface of the oven wall. This tele-thermometer with ordinary pipe fittings can be attached to any boiler tank or pipe to show the temperature of the liquid, gas, or steam contained therein. Wires leading out of the top of the instrument extend to a receiver at a distant station.

In Fig. 7 is shown one of the important applications of the telemeter. The transmitting steam gauge upon the boiler in the distant boiler house sends its indications through the wires to the receiving instrument, where it indicates the boiler pressure, and also makes a continuous and accurate record, the receiver being removed to a safe distance from the boiler house, where the records will be out of danger of destruction by an explosion, should one occur. It will be noticed that in this, as in the other receiving instruments, an alarm bell is shown which is set in operation by an extreme movement of the index in one direction or the other.

A similar application of the telemeter is shown in Fig. 8. In this case the transmitting instrument is connected with a gas holder, and the indications of the height of the gas holder are transmitted to the receiver at the distant station. Here, also, a record is made from which at any time the cubical contents of the holder may be determined.

In Fig. 9 is shown a tele-thermometer located in a mine, the receiver being above ground; and in Fig. 10 is represented a water level indicator capable of giving the height of the water in reservoirs, dams, and streams, and showing the rise and fall of tides at distant points. This application of the telemeter will be readily understood from the illustrations.

It is obvious that there are various other uses to which these instruments may be applied. For instance, they will prove of great value in connection with meteorological instruments, transmitting dynamo-meters, speed indicators, etc. They may also be utilized to advantage for indicating the height of water or oil in boilers or tanks under pressure. They may also be employed as deep-sea thermometers and for indicating the temperature of the sea in the track of sea-going vessels, keeping a record of the temperature during their voyage.—*Scientific American.*

THE NEW PROCESS FOR SOFTENING STEEL.

The new process for softening steel known as Dalzell's process, has recently been brought into practical use, and seems to be attracting much attention because of the remarkable softness produced. It is said that by this process any of the ordinary steels, of the usual lengths and shapes, for making machine tools, punches, and dies, will, when treated, become so soft as to effect a most material saving in the cost of making the desired tool. After having been softened and cut to the required form, the steel is handled in precisely the same way as any of the well-known brands, such as Jessup or Black Diamond. It is claimed that the process, which is kept secret, affects in no way the chemical composition of the metal, but so alters its physical structure as to impart the qualities mentioned. A piece of Jessup steel which had been softened by this method was taken to the Stiles and Parker Press Co., who made a punch to cut a five pointed star seven-eighths inch in diameter and unusually sharp at the points. According to the instructions given, the punch was to be made and then tested by the Stiles and Parker people. In the making of this punch they saved about 20 per cent in the cost, owing solely to the softness of the metal. After having cut it, they tempered it in the usual way in water. The punch was then forced through German silver 3.32 inch thick, and through wrought iron 3 16 inch thick, and as a final test was forced through metal which cut only a part of the star, thus giving an unbalanced pressure tending to bend the punch. It was given a series of tests, not only unusual, but which would not be tried except under like conditions, where the manufacturer is instructed to give the tool the severest trial possible, and where, as is natural, he passes from one test to another more severe. The tool came out at last as perfect as when it left the makers' hands.

According to this it seems evident that the process while softening the steel, at the same time so changes it that when tempered it possesses greater strength than the same quality of metal untreated. The process is particularly applicable to die-sinking, where the hub, being of softened steel, can be made in much less time, while the die, also being softened, can be sunk cold instead of hot, as is now the common practice, thus saving time and labor. The die is then tempered and hardened in the usual way. It is claimed that this process changes what we might name the final quality of the metal, so that its strength in high grades is increased at least 25 per cent. In handling the steel during the making of any tool, it is absolutely necessary to perform all operations cold, as the heating of the metal destroys the qualities imparted to it in the softening process. After having been treated, the steel can be forged cold, can be twisted or bent in a way it would not stand before treatment, and can finally be tempered as desired. Any of the well-known brands of tool steel can be subjected to this process, and can afterward be treated in the usual way.—*Mining and Scientific Press.*

THE LUSTER OF METALS.

Dove was the first to attempt an investigation of the causes of metallic luster. He had examined, by the aid of a stereoscope, two images of a pyramid, one being colored blue and the other yellow, expecting to find a relief image of a green color. He was, however, astonished to find that the mixture of colors gave a reflection like that of a polished metallic surface. Having repeated the experiment, using a black and a white image, he obtained the metallic gray of lead and tin. Dove concluded that metallic luster is due to two reflections from superposed surfaces, and that the accommodation of the eye being different for each color, a perfect coincidence of the images of different colors was impossible. The luster of metals would thus be caused by a reflection from the actual surface