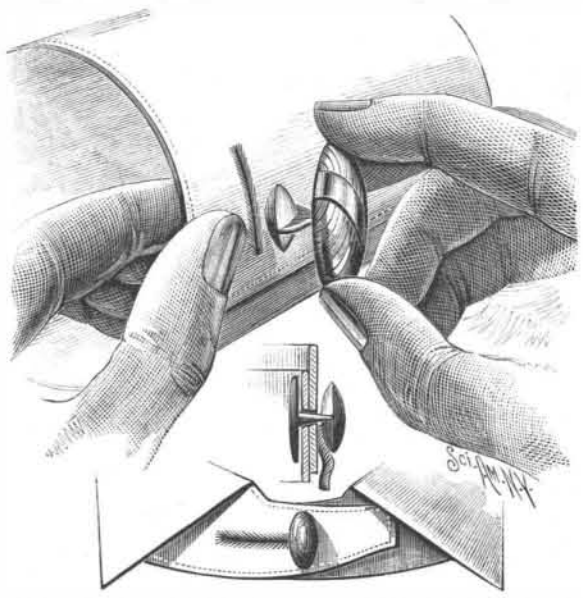
shallow mortise or groove adapted to receive one of the pieces for nearly its full depth. A cross bar, with a piece cut out transversely, so as to form a notch 1¼ inches wide in the present case, is also necessary. Within the notch the wood is best rounded off. One of the pieces of lead is placed in the shallow mortise, with the smooth face uppermost. The other is placed upon



BENEDICT'S COLLAR OR CUFF BUTTON OR STUD.

it, but smooth face downward, the two clean surfaces of lead being in contact. By means of the cross bar the upper block of lead is pressed down with the full weight of the experimenter, and at the same time two or three slight twists or wrenches are given. The notch enables this to be done effectively. The latter wrenching movements are quite essential. In extent they may cover an angle of ten degrees.

The two pieces will now cohere or adhere strongly to each other. If all is properly done, they will resist a fair pull of one hundred and fifty pounds. A very slight transverse strain will immediately separate them. When pulled apart a slight roughness characterizes the points of attachment. The object of the holes is to supply places for the insertion of handles or cross bars, with which to pull them. If the experimenter is not too heavy, he can hang with his full weight suspended from them.

The stress here produced is analogous to shearing. To obtain the direct strain, two square blocks are cast upon the same metallic face, a differently shaped upper mould being used. This only requires one extra piece of board. Two square blocks of lead are made by the same process in general, and in each case a wire loop is inserted while the lead is yet soft. By using the notched bar and slotted block these are pressed together. A hole has to be made in the center of the slot for the loop of the bottom piece to pass through, and the cross bar can be passed through the loop of the upper piece.

They are pressed and twisted, as already described, and adhere about as strongly or nearly so as the others. From a pair of such pieces, 1¼ inches square, a weight of 103 pounds was suspended.

A DEVICE FOR UNLOADING AND STACKING HAY.

An invention providing means by which hay may be readily unloaded and formed in a stack is represented in the accompanying illustration, and has been patent-

HOYT'S HAY UNLOADER AND STACKER.

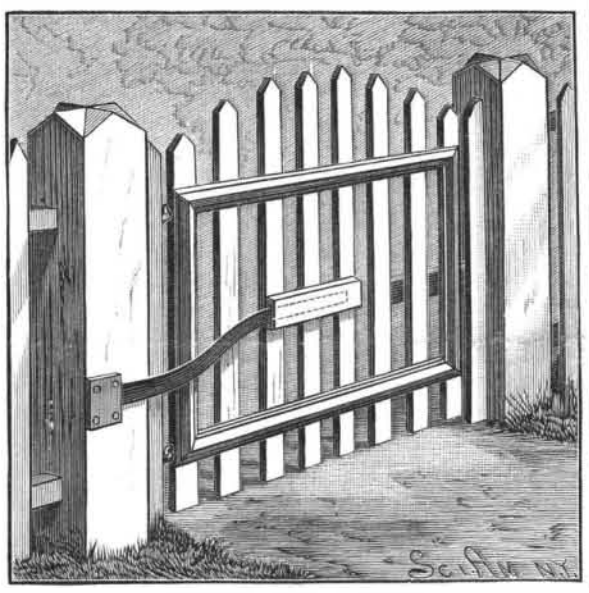
ed by Mr. Ovando Hoyt, of Ovando, Deer Lodge County, Montana Ter. The device consists of a novel construction of rack, to be placed near the spot selected for the stack, and used in connection with a pole held in perpendicular position, carrying pulleys and a hoist rope, to be drawn upon by a team of horses. The slings to be used in the wagon consist of lines secured at their outer ends to poles, which hang longitudinally over the basket sides of the wagon as it is being loaded, and the pole next the rack is provided with short chains, which are to be hooked over pins on the opposite side of the rack when the load is to be lifted. This invention is designed to facilitate the handling of a large quantity of hay at one time, without much strain upon the team, as the load is rolled from the wagon upon the slatted table of the rack, and from thence deposited on the ground or stack, the slats on one side of the rack preventing the hay from scattering beneath.

AN IMPROVED COLLAR OR CUFF BUTTON.

A special form of collar or cuff button or stud, designed to facilitate its insertion into and removal from the button hole, has been patented by Mr. Read Benedict, and is shown in the accompanying illustration. The shank is made flat upon two sides, to permit the button hole to close under the head of the button, the flat surfaces being brought parallel with the edges of the button hole, and the lower surfaces of the head of the button are curved or beveled from the flat surfaces of the shank upward to facilitate the passage of the head out of the button hole. For further particulars with reference to this invention address Messrs. Benedict Brothers, 171 Broadway, New York City.

AN IMPROVED GATE SPRING.

A gate or door spring which is easily applied and effective in operation is illustrated herewith, and has been patented by Mr. Theodore Clough, of Dobbs Ferry, N. Y. To the face of the gate is secured a housing in which there is fitted to slide the end of a plate spring, the other end of the spring being rigidly connected to the post by a plate, the arrangement being such that when the gate is swung back the spring will be drawn out of its normal position, its outer end sliding



CLOUGH'S GATE SPRING.

somewhat in the housing, and when the pressure upon the gate is relaxed the spring will act to return it to its normal position, the throw of the gate in closing being limited by a stop secured to one of the gate posts.

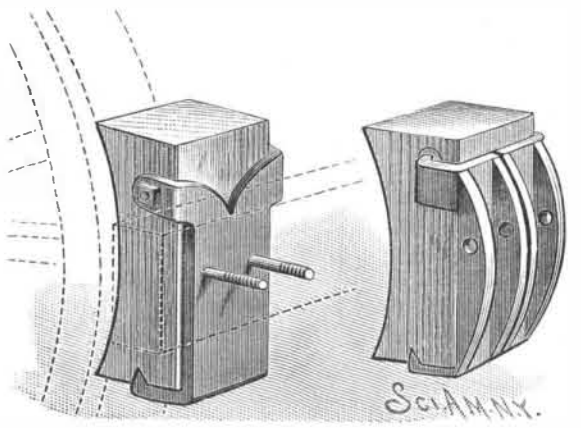
Apantlesis.

Having observed that on several occasions the upper part of an alcohol thermometer column, after having slowly risen from a considerable contraction, was colorless, and that no deposit of the coloring matter (probably cochineal) had taken place, Mallet was led to make further experiments in this direction. It seemed as if the colorless alcohol had by its expansion separated itself from a still perfect solution left behind. The solutions used were partly aqueous, partly alcoholic, of several colloid substances, starch, tannin, caramel, albumen, and gelatin. Each solution was placed in a flask of about half a liter capacity, surrounded with ice, the mouth of the flask being closed with a cork carrying a glass tube about 4 mm. in diameter and 15 or 20 cm. long, having a glass tap near its middle point.

The ice being removed, the liquid was allowed to rise in temperature until the column, originally a centimeter or two below the tap, was as much above it. The tap was now closed and the liquid above it submitted to examination in comparison with an equal volume of the original solution. In all cases the liquid above the tap contained a less amount of material in solution, in some cases very notably less; while in two or three cases there was practically none. As all the solutions were carefully filtered at the outset, there could have been no settling of particles. The conditions influencing the result seem to be: First, the proportion of the colloid solid in solution; and second, the time occupied in the rise of temperature. The author has given the name *apantlesis* to this phenomenon, signifying a draining away of some of the molecules of the solvent from those of the colloid while the solution was undergoing expansion.—*Chem. News.*

AN IMPROVED BRAKE BLOCK FOR VEHICLES.

An invention providing means whereby a brake shoe for vehicles can be easily and quickly removed when worn out, and a new one inserted, is illustrated herewith, and has been patented by Mr. George A. Posson, of Angwin, Napa County, Cal. The brake shoe may be of rubber, wood, or other suitable material, and has a metallic back formed with upper side flanges, embracing the sides of the block, and a bottom flange having upward-projecting points entering the lower end of the shoe, bolts projecting from the rear face by which the brake block is secured to the brake bar. For buggies and spring wagons, as well as for farm wagons, a modi-



POSSON'S BRAKE BLOCK.

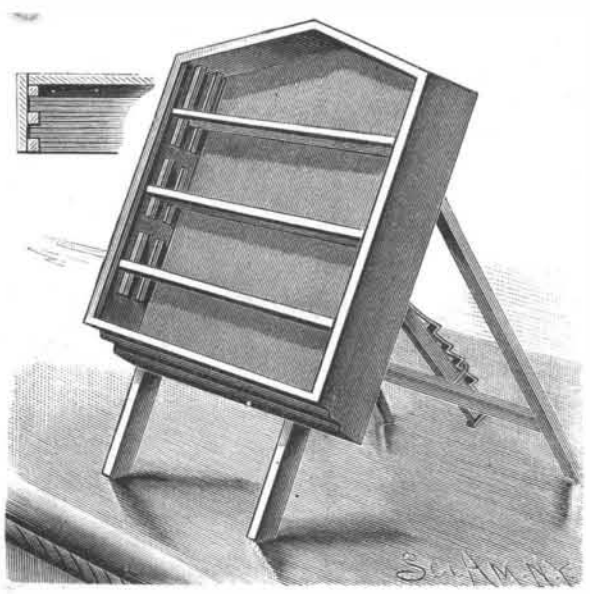
fied construction is shown in the figure to the right, in which the metallic back is made in two halves, each half having ribs fitted to the brake bar, and with apertures through which passes a bolt for holding the halves on the brake shoe and the brake block on the brake bar, the upper flanges in this case having side projections passing into apertures in the sides of the brake shoe.

An Ingenious Experiment.

Herr J. Puling, of Vienna, has devised an ingenious method of rendering visible the form of a stretched string set in vibration by having one of its extremities attached to one prong of a tuning fork, which was kept in motion electrically, and gave a definite note, the pitch of which was carefully determined. The vibrating string was lighted up by a vacuum tube connected with a Ruhmkorff coil, the rate of discharge through the tube being alterable at will, and when this is made equal to or some aliquot multiple of the number of vibrations made by the string, the latter was only illumined when occupying some one definite position, and owing to the persistence of its image on the retina, appeared as if at rest. In this way the shape of the string and the positions of the modes and vertical segments were rendered clearly visible.

AN IMPROVED STAND FOR DISPLAYING GOODS.

A frame or open casing containing removable adjustable shelves and an adjustable and folding brace support, making a stand designed to be mounted on a counter or in other suitable position for conveniently displaying goods, is illustrated herewith, and has been patented by Mr. Ralph H. Maxson, of Richburg, N. Y. The frame is adjustably held in open position by a brace bar pivoted to a strip on the back, and having a spring catch at its free end formed with shoulders



MAXSON'S STAND FOR DISPLAYING GOODS.

which engage a bent rod or loop on a cross bar of the frame. The sides of the casing are made with short strips forming grooves and spaces, and the shelves have projections on their ends whereby they may be mounted in the casing by sliding them to place in an inclined position, and sliding the projections in the grooves until a space is reached, when the shelves may be slid back in a horizontal position.