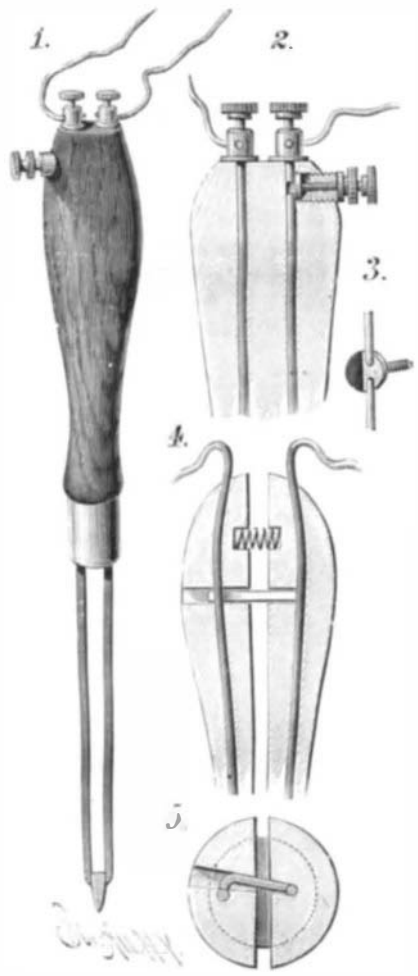
SOLDERING BY ELECTRICITY.

The engraving shows a soldering iron heated by the electric current, and capable of melting all kinds of solders, such as gold and silver solder, which have heretofore required a blowpipe to melt them. It may also be used for the more fusible solders employed in making tin ware. Now that the electric current is distributed so generally and is used



ELECTRIC SOLDERING IRON.

for all manner of purposes it seems quite practicable to employ it for soldering.

Figs. 1, 2, and 3 show one form of electric soldering iron, Fig. 1 being a perspective view, Fig 2 a section showing the switch for controlling the current, and Fig. 3 a detail view of the switch button. Figs. 4 and 5 are views of a modified form of the device. In Figs. 1 and 2 the electric conductors extend through and project beyond the handle, and embrace a piece of platinum or other material offering sufficient resistance to the passage of the electric current to become heated more or less according to the strength of the current. One of the conductors is separated near the upper end of the handle, and bridged by a button made partly of electrical conducting material and partly of insulating material, so that by turning the button the circuit may be completed or broken as circumstances may require. The device shown in Figs. 4 and 5 is on the same general principle, the only difference being that the handle is split lengthwise and the two portions are pressed apart by a spring. When apart to their fullest extent a hook attached to one of the conductors touches the other conductor and short circuits the current in the handle. When the two halves of the handle are pressed together the current passes through the refractory point.

When the point is heated to incandescence the tool may be used for melting either silver or gold solder. For melting soft solder the heat may be less intense.

This invention was recently patented by Mr. C. E. Ball, of Philadelphia, Pa.

Marketable Weight of Fish—Amendment of the Game Laws Suggested.

At a recent meeting of the Long Island Sportsmen's Association, held in this city, certain amendments of the New York State game laws, pertaining to the capture and sale of fishes, were suggested.

In the close season, if a box of trout should be sent to a dealer and he should open it on his stand in the presence of a citizen he might be heavily fined, although he had not sent for the trout, and did not know what the box contained

Mr. Eugene Blackford said that he had a lot of trout once sent to him on which he might have been fined $40,000. He thought the laws should be amended in such manner that only the guilty should be punished.

The marketable weight of fishes was also thought a proper subject for legislation. The following weights and sizes for different fishes were agreed upon; Bluefish, not under three-quarters of a pound; weakfish, not less than half a pound; sea bass, half a pound; porgies, half a pound; black bass, half a pound; yellow perch, one-third pound; white perch, one-quarter pound; mullet, one-quarter pound; butter fish, one-quarter pound; flounders, half a pound; sunfish, one-quarter pound; Spanish mackerel, one pound; brook trout, not less than four ounces. It was decided that dressed eels should not be less than twelve inches long, while eels not dressed might be sold fifteen inches long.

A motion was carried that between the sundown of Friday and sundown of Saturday, shad fishing in the Hudson river should be suspended and nets hauled up on the shad poles. This was to let the shad run up the river and spawn.

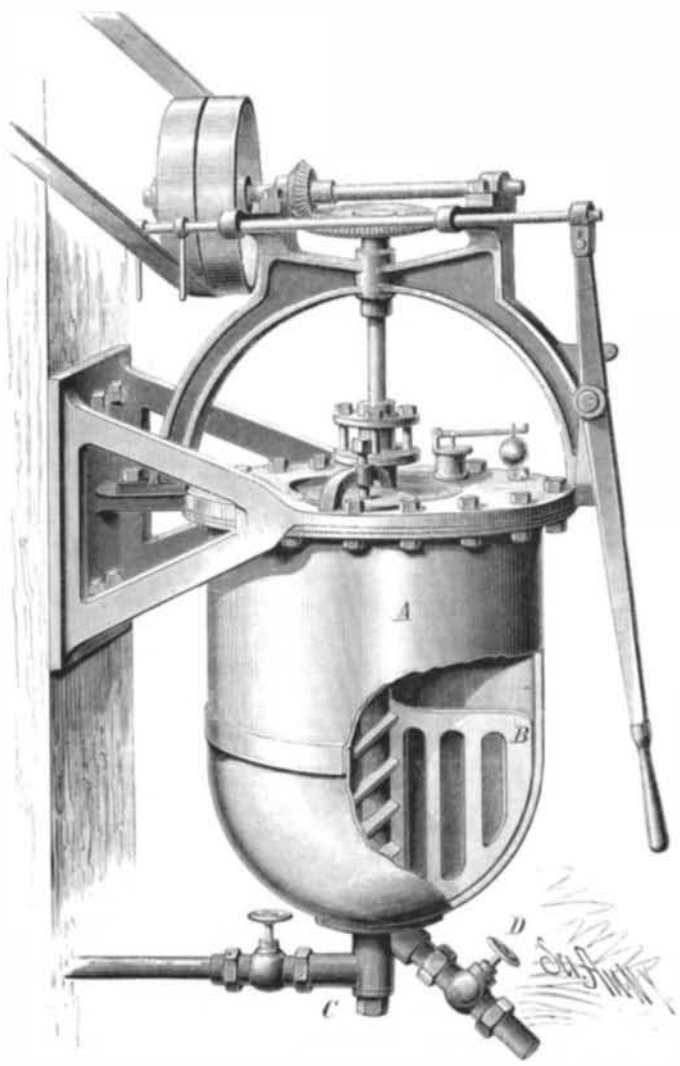
The Lick Telescope.

At a late meeting of the San Francisco Academy of Sciences, Professor Davidson read a letter from Dr. Hugo Schroeder, of Ober Ursel, near Frankfort-on-the-Main, intimating that he would like to undertake to make for the Lick Observatory a fifty inch refractor upon a new principle, with single in place of double lens objectives. Dr. Schroeder has been very successful in the manufacture of lenses; but his proposal failed to interest the Lick trustees, for sufficient reason that a contract had already been signed with the Clarks, of Cambridge, to make for the Lick telescope an achromatic object glass having thirty-six inches clear aperture. The cost is to be $50.000. The glass is to be finished within two years after the rough disks are obtained, and it is expected that these disks will be had before November 1, 1883.

APPARATUS FOR PREPARING STARCH FOR FINISHING LINEN AND COTTON GOODS.

Starch used for finishing linen and cotton goods has usually been prepared in open boilers with a double bottom by the action of direct or indirect heat, and alum was added to give the starch the desired quality.

Mr. F. A. Hempel, of Plauen, in Saxony, has greatly improved on this method by boiling the starch in a closed vessel under a pressure of five atmospheres, while continually agitating it. The apparatus, which is shown in the annexed cut, consists of a copper kettle, A, the lid of which is covered with copper on the underside. A vertical shaft is journaled in the lid, and is rotated by a horizontal shaft through beveled gear wheels. Wings, B, are attached to the vertical shaft and agitate the contents of the kettle. The lower end of the vertical shaft is bored axially, and diagonal channels lead from the central longitudinal channel. Through these channels steam, at a pressure of five or more atmospheres, can be admitted into the kettle, the pressure being regulated by the valve. The starch is passed into the kettle through the opening in the lid, and can be drawn from the kettle through the pipe, D. Steam is admitted through the pipe, C, and the kettle is provided with a pressure gauge safety valve. The operation requires three-quarters of an hour, and the starch is as clear as water. The starch thus obtained is of excellent quality and does not require alum.

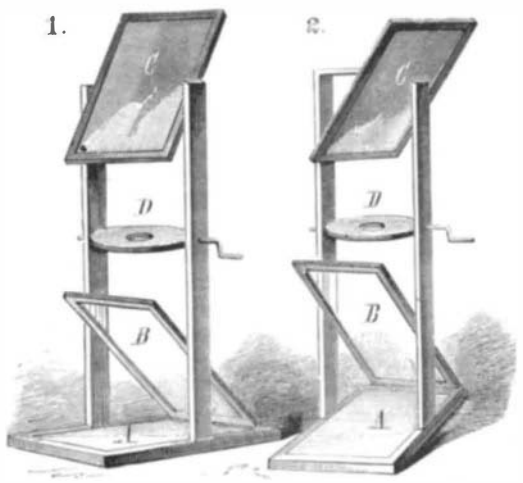


APPARATUS FOR PREPARING STARCH FOR FINISHING LINEN AND COTTON GOODS.

A SIMPLE EXPERIMENT WITH POLARIZED LIGHT.

Scientific toys sometimes awaken a love for further investigation, and experiments in optics often prove more fascinating than was expected. Few of our young readers, we presume, are aware that by the exercise of a little ingenuity and patience they may construct for themselves, without the expenditure of a cent, and from materials to be found in every old garret or store room, a very pretty scientific toy that will afford profit and pleasure for many an idle hour. Many who have seen or read of the Noremberg apparatus have no idea of how easy it is to make one of tolerable excellence. Two pieces of good window glass, a small piece of looking-glass, some strips of wood, and a jack-knife are the principal articles required in its construction.

The principle employed in this form of apparatus is simply the fact that when a ray of light is reflected from a piece of unsilvered glass, making an angle of 35½° with the glass (or 54½° with a perpendicular to the glass), it becomes polarized. Such a ray of polarized light will not bear reflection from a second plate of glass turned at right angles to the first, if it strikes it too at an angle of 54½°. But if a thin plate of mica or other biaxial mineral is placed in the path of this ray it will not only be rendered visible, but be beautifully colored, the color depending upon the thicknass of the mica and its position.



POLARIZING APPARATUS

It is evident, then, that we need, first of all, some means of measuring and constructing an angle of 35½° and 54½°. If a circular protractor or scale of chords be not at hand, the following will give sufficiently accurate results:

Take a large sheet of paper or cardboard having a right angle at one corner, and measure off 10 inches in one direction and 14 inches in the other. Join the point thus formed by a straight line, and you will have a right angled triangle, one angle of which is 54½° (that opposite the longer side) and the other angle is 35½°. An ordinary business card is cut so as to have the same sized angles and used in constructing the apparatus. Procure a piece of thin wood 3 inches square for a base, two strips of wood ½ by ¾ inch, and 9 and 10 inches long, respectively, for uprights. From a broken mirror cut a piece 2¼ inches square. A piece of quartz or very sharp steel will answer instead of a diamond to scratch the glass if care is used in breaking it. Also two pieces of clear window glass, each 2¼ by 4 inches. One of these is covered on one side with dull black paper, over which is laid a piece of cardboard, and the whole bound together with a strip of black paper. A circle is also cut from cardboard, and a hole cut in it as large as a nickel five cent piece. A groove is cut in each of the uprights about two inches from the lower end in a slanting direction, so as to have an angle of 35½° with the upright, and 54½° with the base. At a height of about 8 inches are two similar grooves, at the same angle, but in the opposite direction to the lower ones instead of parallel to them. This groove is made wide enough to receive the glass backed with cardboard. Two uprights are now attached to the base, by tacks or otherwise, at such a distance apart as to allow the strips of clear glass to slide tightly in the grooves, while the mirror, placed flat upon the base, is received in notches at the foot of the uprights. The blackened glass is slipped into the upper pair of grooves face downward, the transparent one is slid into the lower grooves, and at a point midway between them the circle of black cardboard is held in position by short pins passed through the uprights on either side. Place the apparatus thus arranged before a window so that the upper edge of the upper glass is about on the level of the eye, or a little below it. On looking into this upper glass a bright circle will be seen reflected in it. Take some pieces of clear mica, and place them one, two, or three at a time, in various positions on the pasteboard disk, which can also be turned at various angles. In certain positions the circle, as viewed in the upper plate of glass,