MUSICAL BUILDING BLOCKS.

An ingenious method for teaching music in a graphic manner has been patented by Mr. Herman Eckhardt, of Columbus, Ohio, through the Scientific American Patent Agency, September 5, 1876. It is a toy or game, by which almost any piece of music of a certain number of bars may be set up to be played.

In the engraving, A, Fig. 1, represents a clef block, that is equal in length to the hight of the staff and the added spaces above and below the staff. The clef block, A, contains the G clef, with the lines and spaces numbered, together with the names of the notes upon the lines and spaces, and other information, on one side, and the bass clef, etc., on the other side. The clef block, A, also forms the rest or support, against which the other blocks are placed. The different musical notes, rests, characters, and signs are placed on blocks of varying sizes, proportioned to the duration of the same—the cubical blocks, B, containing whole and half notes, and whole and half rests, on lines and spaces; the semi-cubical blocks, C, quarter notes and rests on lines and spaces; and the quarter blocks, D, eighth and sixteenth notes and rests on lines and spaces, and all the other musical characters, as sharps, flats, naturals, dots, etc. The blocks, B C D, are provided with black edge lines, *a*, that form the lines of the staff in setting up the music, some of the sides remaining without signs or edge lines, to serve to fill up the spaces above and below the staff. The measures are indicated by means of thin strips, D′, Fig. 2, of black or other colored wood, that are interposed between the blocks to form the division of the bars. A number of measure strips, B, are provided, in proportion to the number of blocks and bars that may be set up with the same. Any piece of music may be readily set up by selecting the required notes, rests, and sign blocks, and filling up with the remaining blocks, separating the blocks by the measure strips, in the manner indicated.

Fig. 1

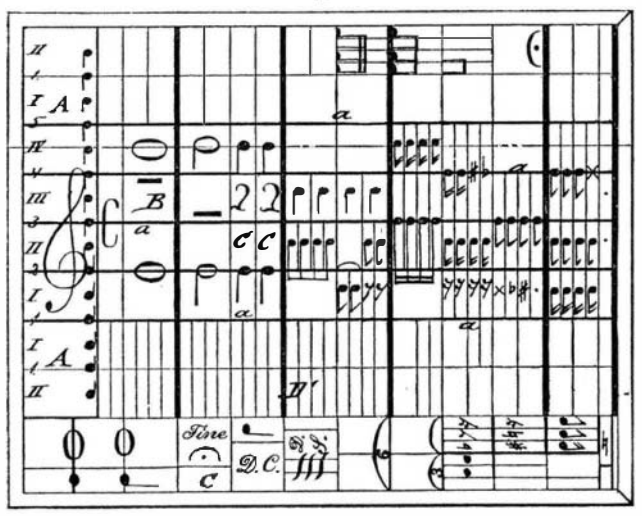
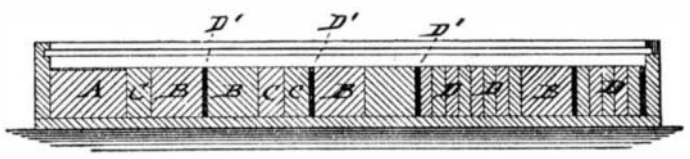


Fig. 2.



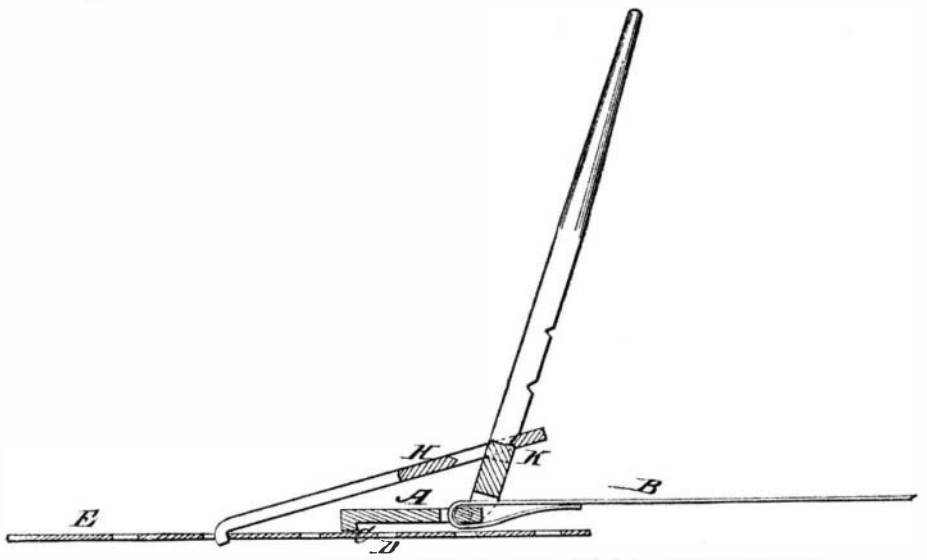
A New Safety Explosive Composition.

Messrs. L. de Soulages and R. Cahuc, of Toulouse, France, have patented through the Scientific American Patent Agency, September 19, 1876, a new blasting powder, which is claimed to produce a dynamical effect superior to the common mining powders and to dynamite, while it combines the advantages of cheapness and non-explosibility in the open air, with a reduced production of smoke and injurious gases in its explosion, leaving hardly any trace or residue of solid deposit of ashes in the bore hole. It consists of nitrate of potash or equivalent salts, sulphur, and soot or lampblack, combined with tanner's bark, sawdust, or similar separating ingredients, ground and mixed in suitable proportions. The compound is then mingled with a solution of sulphate of iron, and boiled until the mass becomes entirely liquid, with the parts so combined as to form a uniform black paste. This, when dried, produces a powder of a blackish color, and of a density of about 0·6. It may be stored for a considerable length of time without undergoing the least alteration or deterioration.

In the atmospheric air the powder takes fire and burns like any other inflammable body brought in contact with an ignited body or a flame of sufficient intensity, producing no shock or explosion whatever. Neither atmospheric electricity, nor shocks of any kind, have any action on the powder, which explodes only when firmly tamped or compressed in the bore hole, and ignited, like the ordinary mining powder, by means of a mining fuse.

IMPROVED BALE HOOP TIGHTENER.

We have had several letters from cotton press owners and others, asking for an invention which will pull together the ends of cotton bale bands while the bale is in the press, so that when the pressure is removed the bale will not expand. The object sought, of course, is to save room and consequently the cost of storage and freight. The present invention is apparently in response to this demand. In order to strain the hook around the bale, the inventors employ a lever with a forked claw and a hook, H, the former to engage the hook, A, behind its shoulders, and the latter to engage in one of the holes of the part, E, and draw them together in the manner indicated in the engraving. The hook is connected to the lever, so that it can be shifted toward and from the claw end as the resistance varies. This connection is preferably made by a yoked end of the hook, in which the lever is slipped, so that it drops into the notches, K, to be held the required distance from the end.



KNOWLES AND DERDEN'S BALE HOOP TIGHTENER.

This device was patented through the Scientific American Patent Agency, September 5, 1876, by Messrs. Thomas C. Knowles and James P. Derden, of Vienna, La.

Spontaneous Combustion of Charcoal.

The late Mr. Braidwood, superintendent of the London Fire Brigade, England, remarks that lampblack and charcoal, when the smallest quantity of oil gains access to them, are more inflammable than sawdust and the vegetable and animal textiles, and should not be admitted among ships' stores.

ECKHARDT'S MUSICAL BUILDING BLOCKS.

The kinds of wood generally used for the manufacture of charcoal for gunpowder are the black dogwood, the willow, and the alder. These varieties are all well adapted for the purpose, though for the best brands of sporting powder the dogwood is said to be preferable. The wood is converted into charcoal by heating it in iron cylinders. After the charcoal is removed from these vessels, it is placed in iron coolers provided with tightly fitting lids, and allowed to stand for some hours until quite cool. It is then sent to the mill to be ground, and is afterwards mixed with the other ingredients for gunpowder. With reference now to this process, Professor F. Hargreaves vouches that there are many instances recorded where the charcoal has taken fire the second day after grinding. With the process of this occurrence we are by this time quite familiar. The same observer, it appears, is also aware of the fact that the pulverization of the charcoal is not absolutely indispensable for such ignition to ensue, for he adds, at the conclusion of his remarks: "The absorption (namely, of oxygen) with sticks of charcoal is not so quick as with ground charcoal, and hence the spontaneous combustion of stick charcoal does not occur so often." Mr. Hatfield, in a paper containing "Observations on the Circumstances producing Ignition in Charcoal at Atmospheric Temperatures," published in the *Philosophical Magazine*, states the following: "If twenty or thirty hundred of charcoal, in a state of minute division, be put together in a heap, and left undisturbed, spontaneous combustion generally occurs." He records, in verification of this statement, the following instance: "A quantity of small charcoal was thrown into a heap that covered about ten feet square and four feet deep. In three days the temperature had increased to 90° Fah., although it was at first only 57°, that of the surrounding air. On the sixth day, it had risen to 150°; and on the seventh, combustion had commenced in several places."

Dr. C. T. Jackson, in a communication to the American Academy, gives the following piece of testimony corroborative of what has just preceded: "Three times," he remarks, "I have set fire to charcoal at temperatures below that of boiling water. My first experiment of observation was accidental. I was preparing, while at Bangor, Me., for a lecture, in which I had occasion to show an artificial volcano. I took a tray filled with gunpowder and laid it on the stove to dry. I then took a paper of pulverized charcoal, such as is sold by apothecaries for tooth powder, the charcoal being wrapped in white paper, and placed it on top of the gunpowder that was being dried upon the top of the stove. Having occasion to go out, I took off the paper of charcoal and laid it on the table. When I came back, in about twenty minutes, I observed the paper smoking. The charcoal was completely consumed. During all this time the gunpowder remained on the stove unexploded.

"My next observation was this: While at work in my laboratory, I had occasion to use a piece of charcoal for blowpipe experiments. I went down into my cellar, and brought up a piece of light, fine, round charcoal suited for that purpose. It was damp. I laid it upon the top of a column stove to dry, directly beside a tin pan containing water, which was not boiling and never did boil there. I took the charcoal off the stove and laid it on the table. A short time afterwards, I discovered that it was on fire all through its mass. I laid it aside and it burned entirely to ashes . . . I repeated the experiment again intentionally, watching it carefully, and with the same result." The explanation of the cases first quoted is not difficult to find. The charcoal possesses wonderful porosity and great power for occluding gases. This absorptive quality is supplemented by a species of selective power: in virtue of which, it absorbs oxygen with much more avidity and in much greater quantity than nitrogen. The enormous condensation which gas suffers by absorption into the pores of the charcoal is attended with the liberation of a quantity of sensible heat that is the equivalent of the work the atoms have accomplished: while simultaneously, the eminent non-conducting property of the charcoal hastens the period of active combustion by preventing the dissipation of the heat thus evolved, and concentrating it upon the porous mass.—*Polytechnic Review.*

Mineral and Vegetable Waxes.

Mineral waxes are hydrocarbons, often crystallizable, and differing from each other in their temperature of fusion. They are frequently derived from resinous trees buried in peat beds, and rarely from lignites or coal formations. The principal variety used industrially is ozokerit, sometimes called natural paraffin. It is less dense than water, of a waxy luster, and in one direction presents a conchoidal fracture, breaking into thin translucent scales. Its color is a brownish green by reflected light or yellowish brown or red by transmitted light. Powdered, it is a yellowish white. It is soft, flexible, cuts like wax, and softens at a low temperature. The odor is aromatic, and becomes more bituminous when the wax is rubbed. Friction also electrifies it negatively. It is fusible into a clear oily liquid, and burns with a bright flame. It is soluble entirely in turpentine and naphtha, more or less in ether, and slightly so in boiling alcohol, when the material separates in crystalline state on cooling. It is unattackable by sulphuric acid.

Ozokerit is found in the Caucasus, in England, and in Austria. In Moldavia, it is directly employed for illumination, being used in gas making, and in the manufacture of candles. A factory in Frankfort on the Oder prepares the material under the name of ceresine, and produces over 100,000 lbs. yearly. Ozokerit, in purified form, is largely used by perfumers and in pharmacy in place of beeswax, as it hinders medicaments from becoming rancid.

A similar substance, now but little employed, is hatchetin or mineral adipocere. This is of a yellowish white color, has a mother-of-pearl luster, is very soft and is of about the consistence of spermaceti. It is found in Belgium, Moravia, Bohemia, Wales, and England. It is scarcely attacked by nitric acid, but is completely carbonized by sulphuric acid. It is slightly soluble in boiling alcohol and in ether, leaving a viscous and inodorous residue.

Other mineral waxes are *neft-gil*, found in the island of Tschelekan in the Caspian Sea, near naphtha sources, and baikerite, from the vicinity of Lake Baikal. These are fossil waxes, or more probably bitumens, as are also kir and elaterite. The latter, often termed elastic bitumen or mineral caoutchouc, is of less density than water, of a blackish color, and is elastic like rubber. It has been found in this country, near Woodbury, Conn., and in many parts of Great Britain.

There is a large number of vegetable waxes but slightly known. Some are secreted by insects, which absorb the sap of various plants. Others are derived from the exudations of palm trees. The *Copernicia cerifera*, a Brazilian tree, bears leaves from the glands of which carnauba wax is obtained. The commerce in this material exceeds 2,000,000 lbs. yearly. In the Andes there exists the *ceroxylon andicola*, which also yields a material known as palm wax.—*La Nature.*

ON a high bluff near the Iowa river are some wonderful Indian mounds, with the remains of circular floors made of baked clay and the trunks of trees, covered with earth. Underneath the earth are human bones, copper axes with handles of polished horn and petrified wood, stone hammers, flint knives, and images of animals accurately carved and polished, made of a hard reddish stone.