

## COURSE READING ATTACHMENTS FOR TRANSITS.

This improvement is probably the most important one made in surveying instruments since the invention of the transit, some fifty years ago. The great source of error, in producing meander or preliminary lines with either a transit or a compass, has always been in the necessity of calculating the course of each line, by either adding or subtracting the deflection angle to or

new course is read at once correctly, down to the finest graduation of the instrument, no matter whether it is known which way the deflection was made or not.

The revolving movements of the ring, A, are accomplished by means of the pinion, D, which is rigidly mounted on a spindle extending through the lower plate, and provided at its lower end with a thumb wheel, G, by which it may be readily turned. The ring, A, may be clamped in any position by turning the jam nut, F, so that it will bear against the plate. The vernier, B, is attached to the upper plate, and is fitted to travel immediately outside of the ring, A, and inside of a graduated circle, C, of the lower plate. The vernier is graduated to read minutes or half minutes, as desired, and the graduation extends to both edges, so that it will read precisely the same angle upon either the course ring or the circle, C.

## The New Orleans Exposition.

The attendance at this great show, although still far below what its projectors, and probably most of the exhibitors, had anticipated, has been materially greater for a month or so past than it was previously. But now the warm weather is coming on, always so trying in New Orleans, and the date set for the closing of the exhibition is near at hand. The managers, however, have been making an effort to have the exhibition reopened next fall. With this view they have determined to solicit the government to allow the national exhibits to remain, and to station a

detachment of United States soldiers in charge of the buildings and grounds during the summer, trusting in this way to keep the most of the other exhibitors, and make the expense of continuance merely nominal.

## TRIPLE EFFECT APPARATUS.

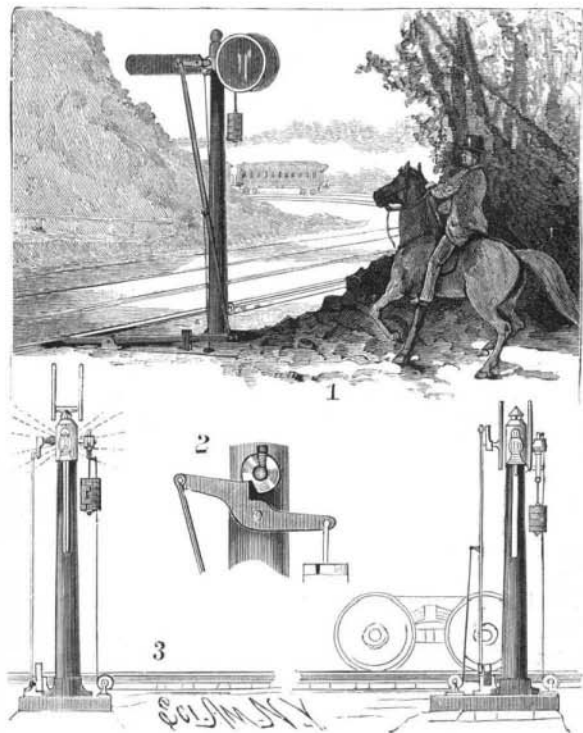
The accompanying engraving, prepared from a photograph, represents a triple effect apparatus, designed in the latest and most approved manner—the result of a long experience. The apparatus is shown connected to a patent air pump with condenser. It was manufactured by the Haslam Foundry Engineering Co. (Limited), Derby, and is of a type of which several have been made by that firm for sugar estates in Java and elsewhere. The commercial results have, in all cases, been most satisfactory to the purchaser.

The advantages of the triple effect apparatus are now generally admitted to be of the highest importance on all large sugar estates where economy of fuel is of great consideration. The mode of working the apparatus is as follows: Exhaust steam, collected from various engines working in the factory, enters the heating space of the first pan. The steam boils the cane juice; the vapor from the juice passes to the heating space of the second pan, producing a second ebullition; the vapor from the cane juice in the second pan passes to the heating space of the third pan, producing a third ebullition. The vapor from the third pan is drawn off by the aid of a powerful air pump. We thus obtain a high vacuum, which reduces the boiling point and enables the concentration to be carried on at a very low temperature. The apparatus is so constructed that the pans may be worked as single vacuum pan or as a double effect apparatus in case of need. These advantages will at once be apparent to all estate owners who are interested in high-class machinery of this kind.

## RAILROAD SIGNALING APPARATUS.

Along the side of the track and at suitable distances apart are set posts (Fig. 3), at the forward sides of which are the outer ends of levers, pivoted at a little distance from their inner ends to supports attached to the ends of the ties. The levers are at right angles with the track, and with their inner ends so near the rails as to be struck by the treads of the wheels of passing engines, and pressed downward, raising their outer ends. The outer ends of the levers are connected by rods with the outer ends of crank arms, attached to the ends of short shafts in bearings in the upper ends of the posts. To the shafts are attached signal arms, which, when displayed, project horizontally toward the track, and when withdrawn hang vertically. To the shafts, and projecting in opposite directions from the signal arms, are attached pairs of arms carrying colored glass plates which, when swung down, rest at each side of lamps. To the shafts are also attached single tooth ratchet wheels (Fig. 2), the teeth of which, when the signals are displayed, engage with teeth formed upon lever pawls pivoted to the posts, and which hold the signals securely in place when displayed. The pawls are held against the wheels by weights suspended from their rear ends, and which are of such weight as to only slightly overbalance the forward ends of the pawls. These ends of the pawls are secured to the ends of ropes passed around a pulley near the base of one post, and then around a pulley on the next forward post, and their other end fastened to the connecting rod of the forward post.

As the engine reaches each post it operates the lever and displays the danger signal on that post, and at the same time trips the lever pawl on the next preced-



BAUMBACH'S RAILROAD SIGNALING APPARATUS.

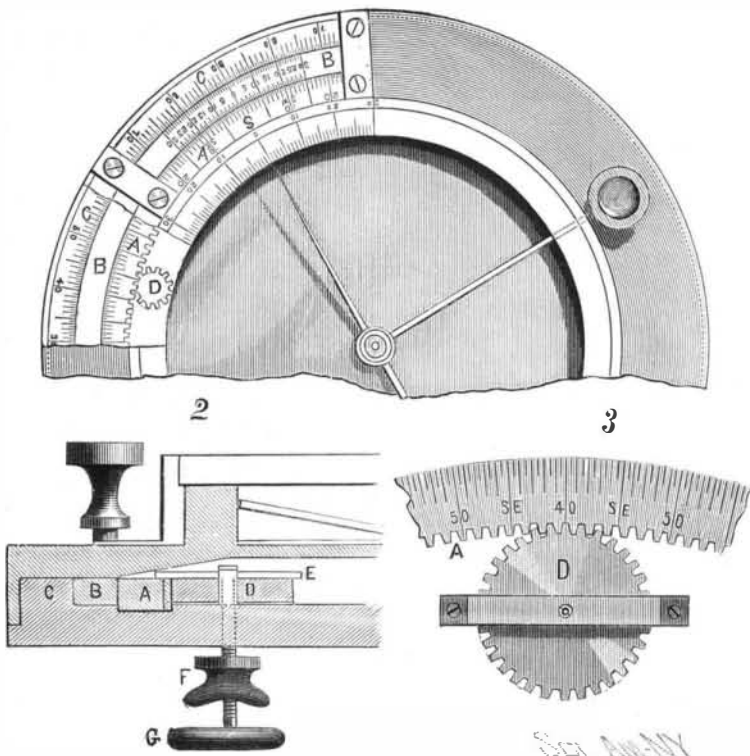
ing post, and allows the signal on that post to drop out of sight. Above the outer parts of the levers are placed springs, which prevent those parts from being raised too high, and also prevent too great a jar when the outer parts are struck by the wheels. This invention has been patented by Mr. Emil Baumbach, of 241 Broadway, New York city.

## Perfumes of the Orange.

From the orange, *Citrus aurantium* and *C. bigaradia*, are obtained five distinct and valuable perfumes: 1. The true orange flower essence, obtained by digesting the flowers with lard. 2. *Oil neroli petale*, or *oil neroli bigarade*, by distilling the flowers of the sweet and bitter orange respectively. 3. *Oil neroli petit grain*, obtained by distilling the leaves and unripe fruit. 4. *Oil orange of Portugal*, obtained by rolling the fruit in a metal cup covered with spikes on its inner surface (known as *ecuelle*), which wounds the rind, and causes the essence to flow from the oil glands. 5. Commercial *oil of orange*, obtained by expressing or distilling orange peel.

## Paper Slippers.

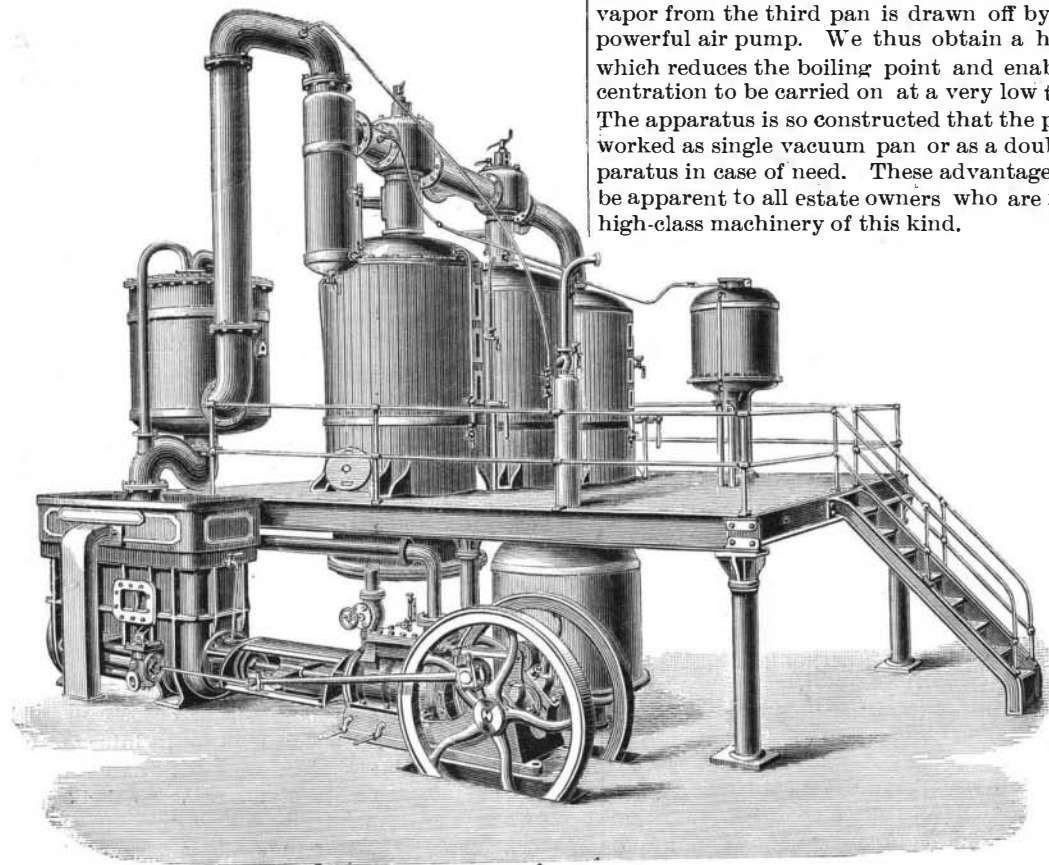
Paper slippers are the latest form in which paper is introduced in new inventions. An Englishman has patented a system of manufacturing slippers, sandals, and other coverings for the feet out of paper. Paper pulp, or papier mache, is employed for the upper, which is moulded to the desired form and size, and a sole is provided made of paper or pasteboard, leather board, or other suitable paper material, which is united to the upper by means of cement, glue, or other adhesive material. The upper is creased, embossed, or perforated at the instep and sides, which renders them somewhat pliable, and prevents their cracking while in use.



NIXON'S COURSE READING ATTACHMENT FOR TRANSITS.

from the preceding course. Especially are these calculations liable to error when the addition or subtraction of the deflection angle will put the course of the new line into another quadrant from the one in which the preceding course was located. Every engineer of any experience knows the great loss of valuable time and the annoyance often caused by errors of transit men in calculating courses.

The inventor of this improvement, Mr. T. L. Nixon, of Tacoma, Washington Territory, has had extensive experience in transit work, and after some study contrived this simple but valuable improvement. Any one can understand the working of the instrument by a glance at the illustrations. The course ring, A, can be revolved upon the lower plate, or can be clamped to it at any desired point. This ring is divided into the different quadrants, and graduated so as to read by the vernier exactly the same as the vernier reads upon the outer circle, which circle is graduated from 0 up to 180°, just the same as the old style of instrument. Therefore, instead of deflecting an angle upon the outer graduated circle each time and making the calculation of the course, with this instrument the zero of the vernier is set at the course of the back sight, and then when the upper plate is unclamped and the telescope directed to the forward tack and the upper plate again clamped, by a look at the vernier and course ring the



TRIPLE EFFECT APPARATUS.