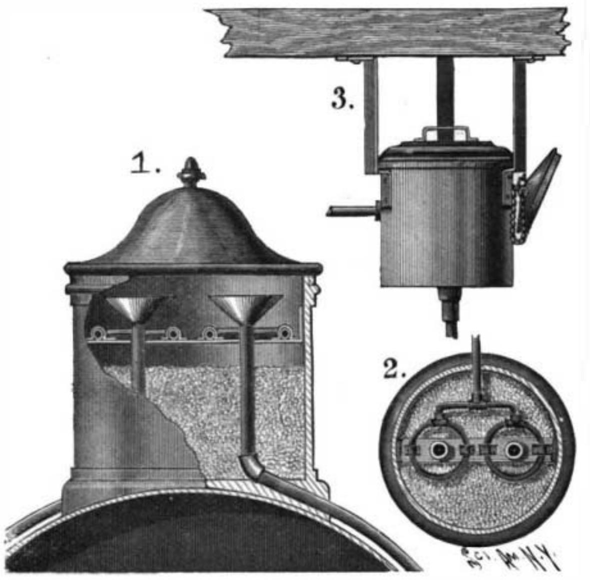
A PNEUMATICALLY OPERATED RAILWAY-SAND-BOX.

The sand-boxes of most railway-trains usually have their bottoms provided with slides, by means of which the sand may be discharged or cut off. Often it happens that a pebble prevents the slide's closing, for which reason the supply of sand will run out. In a device patented by James R. Donley and Halsey B. Philbrick, of Hartford, Conn., this objection is overcome by discharging the sand through the medium of an air-blast.

Fig. 1 is a view of a locomotive sand-box with parts broken away to show the construction. Fig. 2 is a horizontal section of the box shown in Fig. 1. Fig. 3 is a front elevation of the sand-box applied to a car-body. The box, shown in Fig. 1, is designed for use



A PNEUMATIC RAILWAY-SAND-BOX.

upon locomotive engines. From the interior of the box, two discharge-pipes lead, by means of which sand may be conveyed to the track when the air-blast is in operation. To insure the collection of a large quantity of sand by the discharge-pipes, the upper ends of the pipes are provided with funnels. The air-blast pipe, as indicated in Fig. 2, consists of a straight section communicating with two circular sections, each of which surrounds a discharge-pipe. The circular sections are provided with apertures in their under sides, for the escape of air.

When air is forced into the box, the sand will be driven up against the cover, and will be maintained in this position so long as the air is turned on. When the blast is cut off, the sand drops and enters the funnels of the discharge-pipes, and is conducted to the tracks.

The box shown in Fig. 3 is designed for use on railway-cars, and differs from the locomotive-box in having but one discharge-pipe, the air-pipe being in this instance provided with a single, perforated section surrounding the pipe.

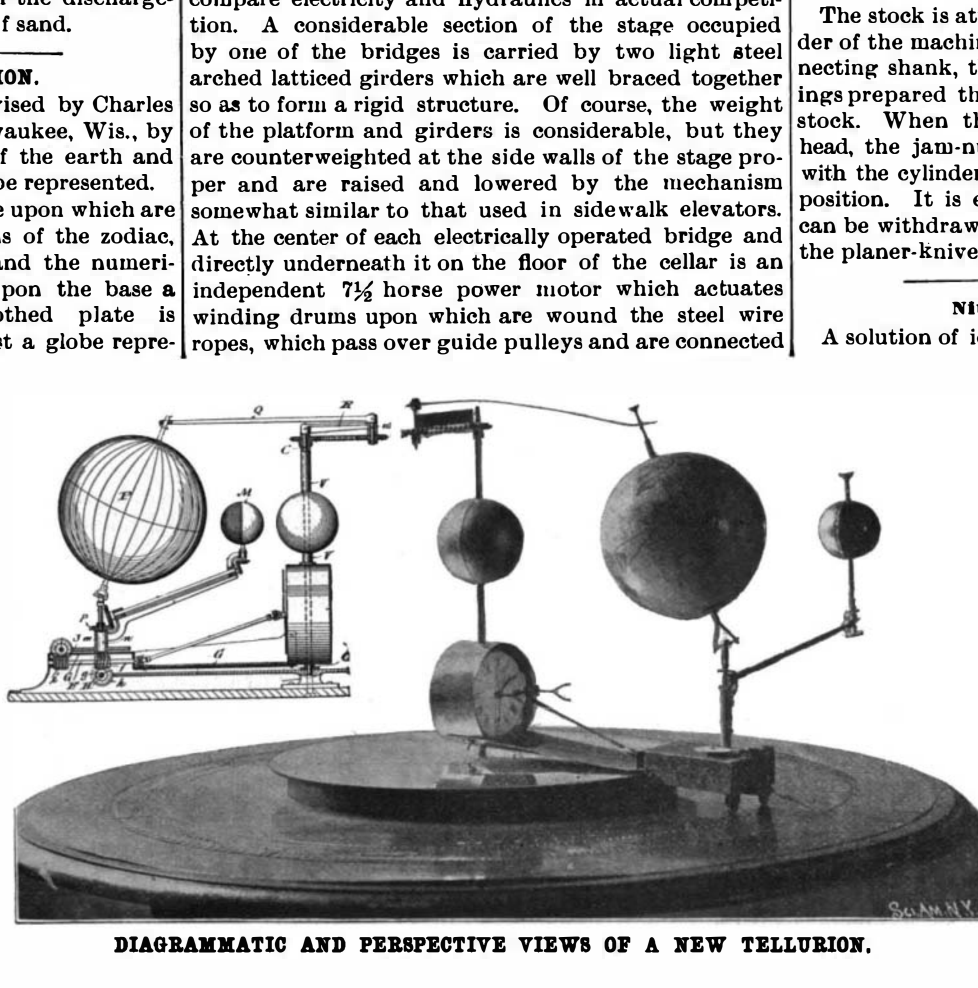
In order to prevent the entrance of sand into the funnel, while the sand-supply is being replenished, an auxiliary cap is provided, which, when not in use, is secured to the outside of the box (Fig. 3). In refilling the box the auxiliary cap is placed over the discharge-funnel, and thus prevents the escape of sand.

AN AUTOMATIC TELLURION.

An ingenious tellurion has been devised by Charles J. Boehm, of 409 Seventh Street, Milwaukee, Wis., by means of which all the phenomena of the earth and moon's revolution about the sun may be represented.

The tellurion is provided with a base upon which are inscribed in concentric circles the signs of the zodiac, the seasons, the months of the year, and the numerical order of days in each month. Upon the base a smaller, stationary, peripherally-toothed plate is mounted, which carries on a pivot-post a globe representing the sun, and a rotary clock constituting a motor for the various coöperating gear-mechanisms. The clock mechanism has universal joint connection with a rod, in turn connected by a universal joint with an arbor, *F*, beneath a plate, *G*. This plate, *G*, is attached to the clock, and is provided with a stationary pointer, traveling over the circle upon which the days of the month are inscribed. A worm, *f*, on the arbor meshes with a worm-pinion, *g*, on an arbor, *H*. A worm, *h*, on the arbor, *H*, meshes with the peripheral teeth of the plate already mentioned, the number of these teeth being twice 365, as there are two revolutions of the pinion, *g*, every twenty-four hours. Another worm, *i*, on the arbor, *F*, drives a worm-wheel, *J*, by means of connecting gear, and the wheel, *J*, rotates a disk upon which the days of the week are inscribed, the position of each day-space relative to a stationary pointer determining the ante or post meridian of that day. The hub, *m*, of the wheel, *J*, is loose on a hollow, vertical stud, *n*. At its upper end the stud carries a bevel-gear, *p*, which rotates the universally adjustable earth-globe, *P*, and the moon-globe, *M*. The earth-globe is maintained at a proper inclination to the plane of its orbit by means of the arm, *Q*, attached to the projecting axis of the earth-globe and by means of the stud, *w*, and arm, *R*. The arm, *Q*, and its stud, *w*, constitute a crank which is driven from the pivot post, *C*, by means of a sprocket-chain geared to a sleeve, *V*, loose on the pivot-post.

In operation, the clock will rotate once in a year, and the pointer on the plate, *G*, will mark the days of each month, the months themselves, the seasons, and signs of the zodiac. At the same time the moon and earth globes will revolve around the sun-globe and rotate on their own axes, the moon's revolution and rotation being accomplished in a lunar month. The clock and coöperating gears can be set forward or back to correct time; or the clock can be dispensed with and the entire apparatus operated by hand.



DIAGRAMMATIC AND PERSPECTIVE VIEWS OF A NEW TELLURION.

An Electrically Operated Stage.

Modern science has entered almost every walk of life, and one of the rarest exceptions which we could name is the stage. With one or two reservations, we can say that in the United States the modern stage does not exist, and with two or three examples in England the same is the case. Germany is the great center of modern stage equipments. The splendid stage at Vienna is marvelous and makes the archaic stages which we use in this country appear actually disgraceful. We have used electricity for almost every purpose, but we have yet to learn of its use in the United States for anything but obtaining "effects," and it has remained for us to learn the lesson from the Drury Lane Theater, London, where a new electrical installation has just been constructed by Mr. Edwin O. Sachs, the well-known theatrical architect and expert, whose important monographs upon theaters and opera houses and stage mechanism are the most valuable contributions which have ever been made to the literature of the subject. With the exception of one great theater, the Auditorium, at Chicago, we do not know of any theater in the United States where manual power is not used in the raising or lowering of the bridges or in shifting the scenes. It may be said that a "bridge" in stage parlance is a section of the theater stage directly in front of the proscenium which can be raised or lowered at will. These sections are usually long and narrow and they can be raised or lowered so as to produce mountains or a deep cave, when masked with the appropriate scenery and properties. In the present instance the stage is divided into six bridges which are each 40 feet long and 6 feet 9 inches wide, with an 8 inch flap in between. The electrically operated bridges may be moved vertically to a height of 12 feet above the stage level or 8 feet below it. The two rear sections can only move vertically, but the others can also be moved in a sloping direction to produce certain effects. The third and fourth bridges from the front are still operated hydraulically, so that it will be possible to compare electricity and hydraulics in actual competition. A considerable section of the stage occupied by one of the bridges is carried by two light steel arched latticed girders which are well braced together so as to form a rigid structure. Of course, the weight of the platform and girders is considerable, but they are counterweighted at the side walls of the stage proper and are raised and lowered by the mechanism somewhat similar to that used in sidewalk elevators. At the center of each electrically operated bridge and directly underneath it on the floor of the cellar is an independent 7½ horse power motor which actuates winding drums upon which are wound the steel wire ropes, which pass over guide pulleys and are connected to the legs at the four corners. The speed obtained by working these cables is 16 feet per minute. In the event of a breakage of one of the ropes, safety catches have been provided and gear has been installed so as to make the bridges stationary at certain points. One man at the switchboard could manipulate all of the bridges at once if necessary.

We hope, now that a practical example of the use of electricity in the manipulation of the stage has been effected, that attention will next be devoted to the raising and lowering of the drop scenes and borders. It does not seem possible that, at the close of the nineteenth century, the heavy drop scenes, border lights, and other considerable weights should have to be raised and lowered by manual power, and anyone who may be invited to visit the stage of the Opera House in New York can see men climb to the top of the second fly gallery and catch hold of a group of ropes which control a drop scene, swing off from the gallery and descend, their weight gradually raising the enormous drop scene. Even the great curtains are manipulated by manual power. Of course, in general, the crude appliances are less liable to break down at the critical moment than when complicated machinery is used; at the same time, if machinery is properly installed and inspected, there should be no difficulty on this score.

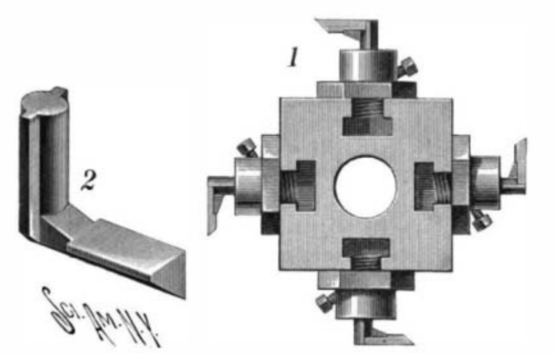
AN IMPROVEMENT IN CUTTER-STOCKS.

A patent was recently granted to Amos W. Terrell, of Patchogue, Long Island, N. Y., for a simple bit-stock which can be conveniently secured to the heads of a machine.

Fig. 1 shows the invention practically applied, and Fig. 2 is a perspective view of a bit used in connection with the stock.

The body of the bit-stock is formed with a foot and with a head, connected by a shank. The shank and the adjacent portion of the head are threaded to receive a jam-nut. A circular bore formed with two longitudinal grooves extends through the body from end to end. In the head a longitudinal slot is made, and opposite the slot the head is provided with a set screw, by means of which the bit is held in place.

Referring to Fig. 2, it will be observed that the bit comprises a blade and a shank extending at right angles to each other. The shank of the bit corresponds in cross-section with the bore, and, after having been



TERRELL'S IMPROVEMENT IN CUTTER-STOCKS.

inserted in the stock, is securely held by the set screw, with the blade extending through the head-slot.

The stock is attached to the cutter-head of the cylinder of the machine by means of the foot and the connecting shank, the cutter-head having suitable openings prepared therein to receive these portions of the stock. When the stock is in position in the cutter-head, the jam-nut is screwed down until it engages with the cylinder, thereby holding the stock firmly in position. It is evident that as the bit wears away, it can be withdrawn from the stock to meet the sweep of the planer-knives of the machine.

Nitrate of Silver Stains.

A solution of iodine in ammonia water, the so-called colorless tincture, will remove nitrate of silver stains from the hands, clothing, etc., but owing to the danger of the formation of nitrogen iodide, which is a very powerful explosive, it is not recommended.

A solution of iodine in iodide of potassium dissolved in water is nearly as quick, and quite as effective. Dissolve fifteen parts of iodide of potassium in fifty parts of water, and to the solution add ten parts of iodine. When the latter is dissolved add sufficient water to make five hundred parts. Keep in a well-stopped bottle. Treat the spots with this, and after a few minutes with a ten per cent solution of caustic soda, which will remove the silver iodide formed by the first treatment.—National Druggist.