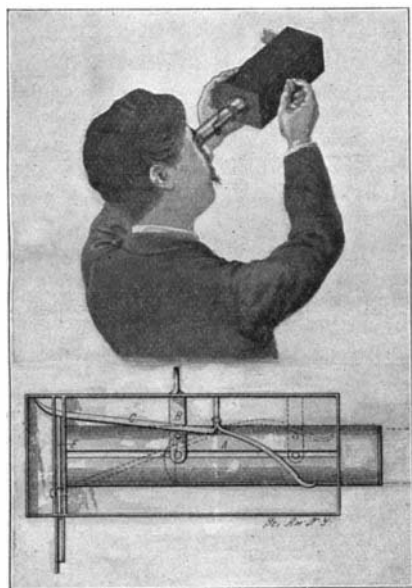


pressure in the reservoir is attained by means of a hand pump at the side, as shown in section in our engraving. The pump connects with the bottom of the reservoir, and forces the air through the paint to an air space at the top. A vertical tube mounted outside of the reservoir connects at the top and at the bottom with the interior of the same. This tube is provided with two valves, and secured to a nipple between these valves is a flexible tube, which at its lower end connects with a fixed tube in the brush handle. A valve located at the base of the handle is provided with a thumb piece, which by means of a leaf spring is normally held in such position as to close the fixed tube. The lower end of the handle is formed with a threaded stem, onto which the brush proper is screwed. The stem is also provided with an internal thread adapted to receive a short tube to which is secured what is called the "distributor." The distributor consists of fan-shaped canvas web made double, and between the folds of which cords are placed. The webs are sewed together between the cords in such manner as to form channels through which the paint can freely flow to the bristles. The distributor is necessary only for use in connection with flat brushes. When brushes of the type known among painters as "dagger strippers" are used, the distributor may be dispensed with and the paint fed to the bristles through a small nipple threaded onto the stem of the handle. In use the painter can accurately control the flow of paint through the brush by depressing the thumb piece on the thumb handle. After the painting is done the lower valve of the reservoir is closed and the upper one opened to admit a flow of compressed air through the tube and brush, discharging all paint therefrom.

A NOVEL PICTURE EXHIBITOR.

We illustrate herewith a toy picture exhibitor for which a patent has recently been procured by Mr.



A NOVEL PICTURE EXHIBITOR.

Ulysses L. Berger, of 1332 11th Street, N. W., Washington, D. C. The principal feature of the apparatus lies in the provision of simple means for producing the effect of a moving panorama. A brief description of the construction of this apparatus will enable one to readily understand the method of producing this effect. The picture exhibitor comprises a box provided with two partitions at one end, which are separated by a narrow space in which the transparency to be exhibited may be received. A tube extends from the inner partition lengthwise of the box, and projects through the opposite end. A shorter extension tube is adapted to slide within the main tube. An arm *B*, which projects through a slot in one side of the box, serves as a means for sliding the lens in the tube *A*, being connected to this lens by a pin extending through a slot in the tube. Lying above tube *A*, and hinged to a bracket at one side of the box, is a lever *C*, which is adapted to be operated by engagement with a pin *D* on the arm *B*. The longer end of this lever projects through slots in the partitions referred to above, and rests against the picture when it is introduced into the box. Projecting from the side of the box at the point where the picture is introduced is a sliding support or guide, which affords a ready means for inserting the picture in position. Light is admitted to the transparency through coincident openings in the center of the partitions and the end wall of the box. In use the picture is first inserted and the extension tube drawn out, then the apparatus is held to the eye as shown in our illustration. On sliding the lens back and forth in the tube the figures in the transparency will be correspondingly enlarged or diminished in size, giving the effect of an advancing or receding panorama. When the lens is moved further back beyond the pivot of lever *C*, the pin *D* will engage the shorter arm of the lever,

swinging it about to the position shown in dotted lines. This causes the longer arm to move the transparency *E* across the field of vision and out onto the sliding support at the side of the box. Thus the effect of a sidewise movement is added to the effects above mentioned.

VACUUM PUMP FOR BULBS OF ELECTRIC LAMPS.

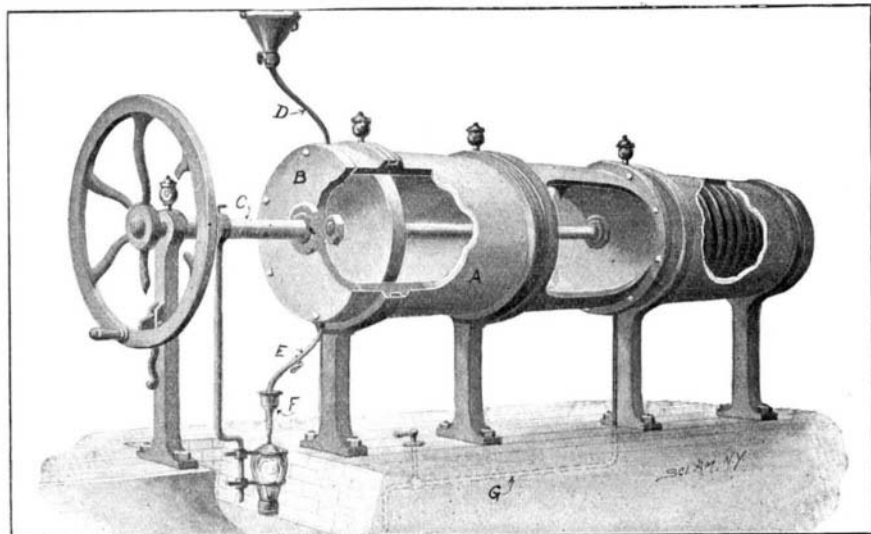
A new form of vacuum pump for exhausting the air from the bulbs of incandescent electric lamps has been provided by the recent invention of Mr. Rudolph A. Steeb, of Roselle, N. J. The pump is provided with two cylinders, one of which is fixed and the other mounted to rotate. The revoluble section is shown at *A* in our illustration. A piston rod runs through both cylinders, and is provided with two pistons, one in each cylinder; the pistons are normally held in forward position by means of a spiral spring in the fixed cylinder. The cylinder head *B* of the revoluble section is secured to a shaft *C*, which is provided at its outer end with a hand wheel, by which the operator can turn the cylinder *A*. Connecting with the cylinder *A* at its forward end is a tube *D*, provided at its upper end with a funnel. A similar pipe *E* leads from the cylinder in the opposite direction, terminating in a coupling *F*. The coupling connects with the tube extending integrally from the bulb in which the vacuum is to be produced; the bulb is supported in holders adjustably secured to a rod mounted on the shaft *C*. In operation the hand wheel is turned to bring the parts in the position illustrated, then mercury is poured into the funnel, and passing into the cylinder through the pipe *D*, it thence forces its way through pipe *E* into the electric lamp bulb. The air in the bulb slowly bubbles out during this operation, and after the bulb is completely filled, a valve on the pipe *D* is closed. Then the hand wheel is given a half turn, reversing the positions of the funnel and the bulb, that is, bringing the bulb to the top. The motive agent is now admitted to the fixed cylinder through pipe *G*, which forces back the pistons, producing a vacuum in the cylinder *A*, and drawing the mercury out of the bulb. The valve on pipe *E* is now closed, and the bulb sealed by melting and closing the tube extension thereon. A new bulb may then be placed into position, and the hand wheel is again operated to bring the bulb to its lowest position. The three-way valve on pipe *G* is then turned to permit the escape of the motive fluid. This permits the pistons to move forward under action of the spiral spring, forcing the mercury into the new bulb, after which the operation is repeated as described above. A spring catch which engages the hand wheel serves to firmly hold the parts in their two positions.

FREIGHT CAR WITH REMOVABLE ROOF.

The ordinary covered freight car—a huge closed box with a narrow door in the center of each side through which every piece of freighted merchandise must be twice handled—can hardly be said to have kept pace with modern requirements. In many cases articles which need protection from the weather have to be loaded onto flat or open cars, because they are too large to pass through the car doors or are too cumbersome to be carried therein; for, obviously, a crane or the like cannot be readily used in loading a covered car, and consequently the work must all be done manually. Another objectionable feature of the ordinary box car lies in the difficulty of completely filling the upper part of the car, and in subsequently unloading the car without dropping and injuring the merchandise. Aside from these, other difficulties will readily suggest themselves to all those acquainted with freight handling.

With this brief summary of present conditions in mind, we will more readily appreciate the advantages offered by the car with removable roof which is illustrated herewith. The car roof comprises a number of sections or doors, which meet at the center line of the car, and which at their outer edges are bolted to hinged brackets, mounted to slide on vertical guide rods at the side of the car. By this

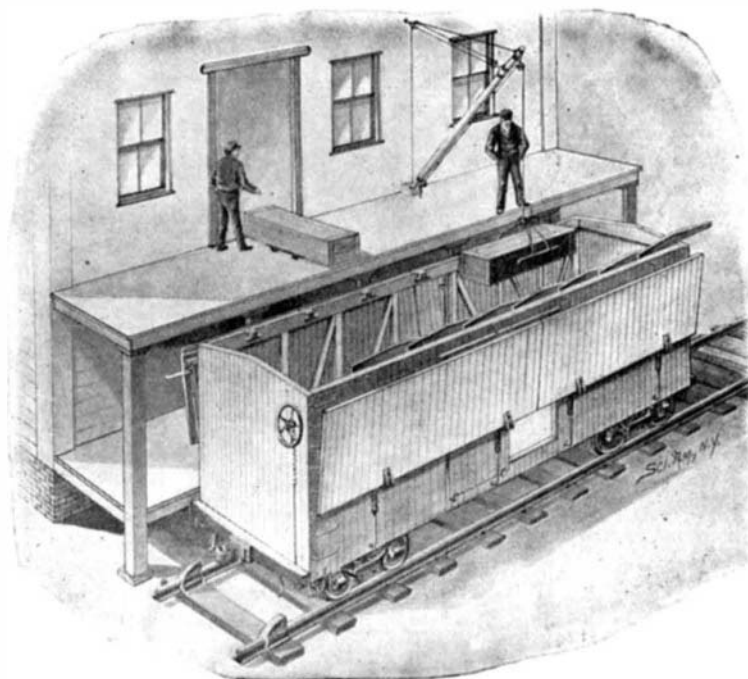
arrangement, when the doors are swung open, the brackets slide down the guide rods, drawing the doors with them, and a cam on the hinge causes the doors to assume a position close to the side of the car. Spiral springs on the guide rods prevent jarring of the hinges when the roof sections are being lowered. The roof-supporting beams are hinged to one side of the car and can be swung parallel with that side so as not to interfere with the loading or unloading of the car, but normally the beams lie transversely across the car and their free ends are hooked into sockets on the opposite side. This construction relieves the side strain against the walls of the car.



PRODUCING THE VACUUM IN ELECTRIC LAMP BULBS.

In order to prevent rain and moisture from entering the car at the joints of the roof sections, the sections are provided with weather-strips and as an extra precaution the cross-beams on which they rest are channeled so as to catch the water and conduct it out of the car. The center longitudinal joints of the roof sections are protected by runways secured to the sections at one side and fitting over weather-strips on the meeting sections. A simple locking-device holds the roof sections firmly together. The device may be unlocked by the manipulation of a lever at the end of the car. A patent for this improved type of freight car has recently been obtained by Mr. H. Addison Johnston, of Ingersoll, Canada.

Dr. George Cohen, an Allegheny inventor, has recently announced the perfection of an invention on which he has been working for some time past, and which promises to overcome the defects of the railroad block system by means of electricity. A company was formed some time ago to develop his invention, and it has been agreed to increase the capital stock to three million dollars and put the device on the market after it has been thoroughly covered with patents. Dr. Cohen is about to sail for Europe with the object of securing these patents, and on his return the details of the invention will be made public. He has announced, however, that his perfected invention will protect a train from almost any character of accident. A broken rail, for instance, will be the means of throwing the system into operation, and a train moving along in the vicinity of the danger will be stopped automatically. This invention was demonstrated some time ago in the presence of a number of railroad men, and at that time it was pronounced to be a remarkable device, but since then the doctor has spent a great deal of time in further improving it.



FREIGHT CAR WITH REMOVABLE ROOF.