

THE MUTOSCOPE AND MACHINERY IN MOTION.

It does not often happen that a device, which was originally designed as a mere toy, becomes an instrument of practical utility in the great world of commerce. Occasionally it does, as in the case of the bicycle, which, in the form of its natural ancestor, the "hobby-horse," was a toy of the most rudimentary description, but in its modern development is a machine of the highest general utility.

It is the purpose of the present article to describe an instrument which is undergoing a similar change by enlarging its field of usefulness from that of a mere instrument of entertainment to one of commercial utility. Our readers are familiar with the mutoscope, which has been aptly described as "the little brother of the biograph." It is a simple and ingenious contrivance for the exhibition in a cabinet of the same moving pictures that the larger machine throws life-size upon a screen. It is not necessary to give here any detailed account of this well-known machine, and those who wish to learn fully about the construction and operation of the biograph and an earlier form of the mutoscope are referred to the SCIENTIFIC AMERICAN of April 17, 1897, which contains a fully illustrated article on the subject.

Now, the art of moving photography, as we have said, has hitherto been solely devoted to the purposes of entertainment. In the case of the biograph, the subject is thrown upon a large screen hung on the stage of the theater, and in the mutoscope the photographs are set up in circular book form, within a suitable box or case, and successively tripped before the eye by means of a hand-crank or electric motor. In each case the subjects chosen for exhibition have usually been selected for their scenic or spectacular effect, and with certainly no thought to their commercial utility.

It was inevitable, however, that the great possibilities of this little machine in a commercial or industrial way should early suggest themselves. If it is possible to reproduce a train in motion, to catch the discharge of a rifled gun at Sandy Hook, or the rush of the whirlpool rapids at Niagara, why should not the mutoscope be harnessed to the service of industry, and made to show machinery in motion and recall to prospective purchasers the operation of complicated devices? There is an old saying that "seeing is believing," and while a good line drawing, or a judiciously taken photograph, will do much to bring a subject before the mind, the actual movement is lacking and may very easily be misunderstood. At present there is an endless number of commodities that cannot be sold from samples; such, for instance, as locomotives, cars, derricks, pile-drivers, and all heavy machinery, revolving doors, fire-escapes and extinguishers, blasting powder and an ever-increasing list of etceteras. Some of these devices are portable; but it is not enough to show them to the prospective customer—he must see how they work. This, however, is often impossible, for the man with a fire extinguisher or escape cannot start a blaze to order, nor can a blast of giant powder be set off at the nearest street corner to demonstrate its disruptive value. Moreover, there are many large operations, such as systems of transportation of the raw materials from mines to mills and factories, of which no mere verbal or written description conveys an adequate idea, and for which some system of continuous illustration is necessary to render it intel-

ligible. With a view to enabling the inventor, the promoter, or the salesman, to show, as well as explain, the operation of devices which are too elaborate or too cumbersome to admit of a model or a portable sample being carried round, the makers of the biograph and

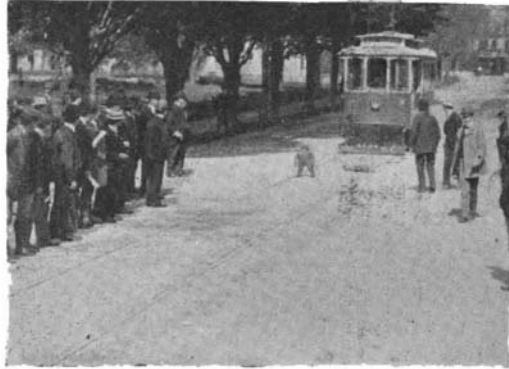
the circular book of photographs removed, and another represents the mutoscope in operation, and also closed with the mirror and turning-crank removed. The photographs of objects in motion are taken upon a moving film at the rate of forty per second. These are reproduced upon cards which are mounted radially in consecutive order around a hollow cylinder, and stand out like the leaves of a book (see illustration). The cylindrical book is placed upon a small shaft arranged centrally and transversely within the cabinet. On the same shaft is mounted a worm wheel, which is engaged by a worm on a shaft that is carried near the right-hand wall of the mutoscope. When the cylinder is slowly revolved, the picture-cards being held back by a stop, (carried in the position shown), and allowed to sweep past the eye one by one, as one thumbs the leaves of a book, an apparently moving picture is the result, and the exact motions of the device are reproduced. One great advantage is the ability of the operator to vary the speed; for he may make the operation quick or slow as he desires, either maintaining the normal speed at which the original demonstration took place, or stopping the spectacle at any point in the series, so as to inspect each picture step by step at his leisure. The case containing the mutoscope is hinged at its forward end to a base plate, and by means of a vertical rack extending from the front end of the box the machine may be inclined to suit the convenience of the user.

As an instrument for the exploitation of newly patented inventions, this machine should have a wide field of usefulness. We present a series of three pictures of a new style of car-fender. Life size dummies of children were placed in front of a moving car and the biograph camera took a roll of pictures (from which these three were selected) as the fender successfully picked up the objects. Another group of pictures shows a woman in the act of unrolling a reel of hose and throwing a stream of water into a blazing cottage. There are

on view at the office of the Mutoscope Company series of pictures showing the operation of heavy machinery, cars, etc. One of the best of these represents a well-known hoisting and conveying machine in operation. It can be understood that in commending this machine to the favorable consideration of the manager of a railroad, or a steamship company, the vendor would be at an immense advantage if he could place his mutoscope cabinet on the desk and let the official take the crank in his own hand and vary the "ocular demonstration" to suit his own idiosyncrasies.

We are indebted for our photographs and information to the courtesy of the American Mutoscope and Biograph Company, of 841 Broadway, New York, whose studio and factory afford impressive evidence of the growth and future promise of the essentially modern art of moving photography.

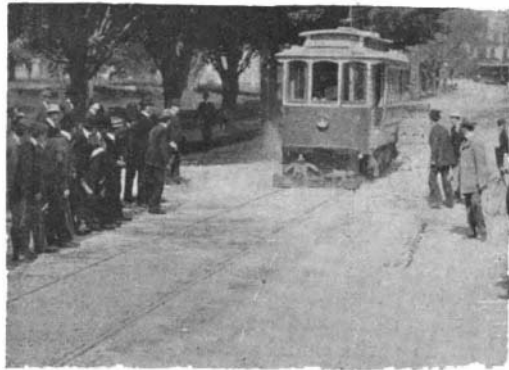
Experiments have been carried out in England to ascertain the amount of corrosion that takes place upon the plates of a ship under varying conditions regarding water, weather, etc. Iron and steel plates were immersed in sea water, river water, and also exposed to the weather, but very little difference was found to occur in the relative corrosion of the two metals. When an addition of 3 per cent of nickel was introduced into the steel the rate of oxidation diminished by about 23 per cent, and when the steel was mixed with 26 per cent of nickel the loss by oxidation was equal to about 33 per cent of that of wrought iron.



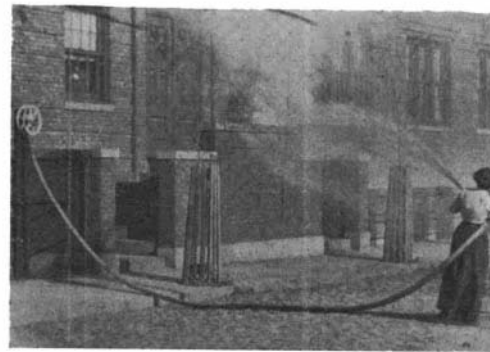
CAR APPROACHING DUMMIES.



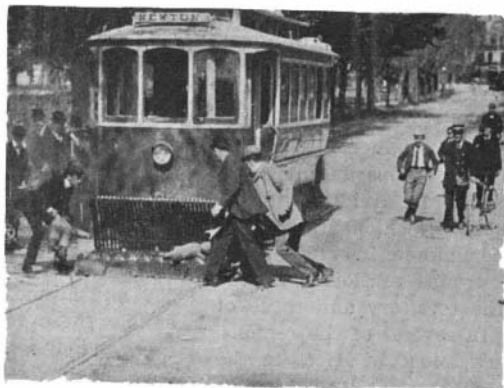
UNREELING THE HOSE.



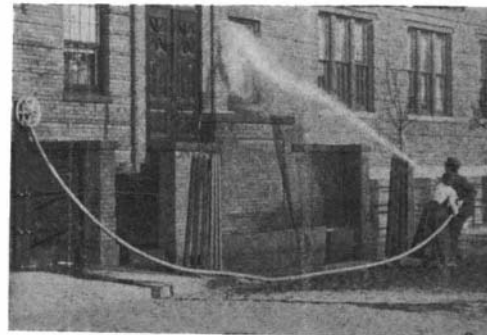
DUMMIES PICKED UP.



WATER TURNED ON.



REMOVING DUMMIES FROM THE FENDER.



FIRE OUT IN 30 SECONDS.

Selection of Views from two 180-foot strips of Mutoscope films.

mutoscope have produced the compact instrument shown in the accompanying illustrations, to which they have given the self-explanatory name of "Commercial Mutoscope." It will be recognized as an improved slot-machine mutoscope, with the stand and slot-mechanism removed, and its bulk and weight so reduced that it is as conveniently portable as a photographer's camera, or an ordinary sample case.

Of our illustrations, one shows the cabinet open, with



THE COMMERCIAL MUTOSCOPE.