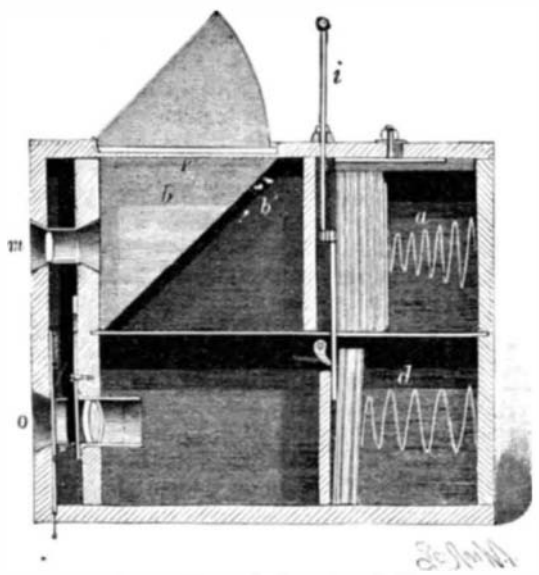
IMPROVED HAND CAMERA.

The German edition of "Experimental Science" contains the following description of a magazine hand camera, invented by Dr. Krugener, which differs in some respects from the one described recently in the SCIENTIFIC AMERICAN. It has a large finder, which includes the same area as the plate upon which the impression is taken. The finder lens is above the view



IMPROVED HAND CAMERA.

lens, and the plates are transferred before the impression is taken instead of afterward, as in the camera above referred to.

A mahogany case of convenient form is divided into four compartments by horizontal and vertical partitions. Division *b* contains a mirror, *b'*, placed at an angle of 45°, which throws the image formed by the lens, *m*, upon the ground glass, *p*, so that during the taking of the impression the position of the object may be observed. Division *a* contains from 12 to 24 sensitive plates, firmly pressed by a spiral spring, by which they are moved forward, when one of the plates in division *d* is shifted by means of the transferring rod, *i*, so that it may receive the light from the object glass, O. The next plate moves in front of the one already exposed. Every plate is fixed in a small shield, so that the forward plate protects all those behind it from the injurious influence of the light. The object glass is closed independently of the shutter. The instantaneous shutter is placed in a compartment in front of the objective, and is therefore out of sight and protected from injury. It has been suggested as a further modification of this camera that the finder lens may be a duplicate of the view lens, so that by arranging the box to permit of the exposure of two plates simultaneously, the instrument may be converted into an efficient stereoscopic camera. In this case it would, of course, be necessary to shift two plates for each double exposure.

ROGERS' COLD FORGING PROCESS FOR WOOD SCREWS.

A patent was lately granted to Charles D. Rogers, of Providence, R. I., for a cold forging process formaking wood screws. By the Rogers method the finished screw head, including the slot, is forged upon the end of the wire from which screws are produced, a piece of wire of the size required to form a screw being cut off and pointed by compression between dies, the thread being forged thereon by rolling the piece between the dies. The ribs of the dies at the commencement of their operation penetrate the metal to the required depth and then force the metal by lateral compression to expand radially and give the required form to the thread.

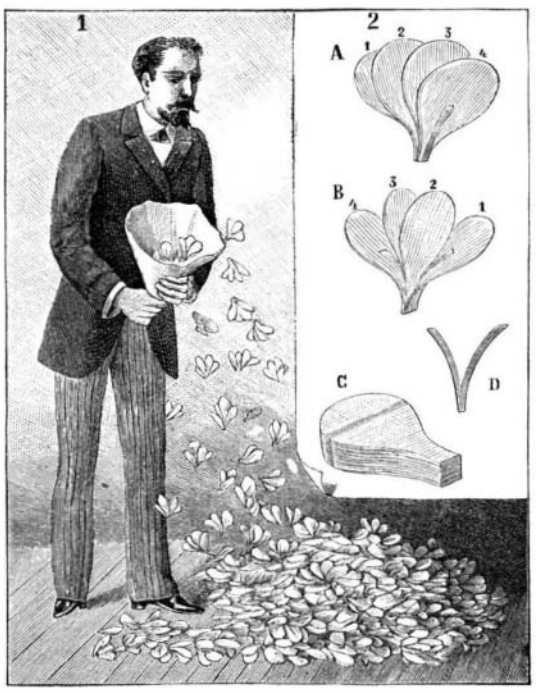
During a recent visit to the works of the American Screw Company, at Providence, R. I., we were shown this process, the 11 small cuts illustrating every stage from the wire in the coil to the finished screw. The operation necessary to complete the screw from the finished screw blank No. 5, Fig. 1, to the finished screw No. 11, Fig. 2, being made by one movement of the working surfaces (Fig. 3) of the dies for forming the thread on the screws.

In the old process of cutting the threads on the screw, which was brought to a state of perfection by this company, it was necessary to run the cutters over the surface of the screw a number of times to complete the thread; as the new process completes the thread in one movement, it will be seen that in speed alone the new process is a long step in advance. When the additional advantages of the superiority of the new screws over the old are considered, it will be seen that Mr. Rogers' invention forms a great improvement in this manufacture.

Starting with Fig. 1, No. 1, the plain wire is fed automatically from the coil of wire by the machine, and Nos. 2, 3, 4 and 5 show the effect of the successive blows given the same piece of metal in the heading machine. From a manufacturer's standpoint this is very important. There is no waste. The head of the screw is much stronger than when made in the old manner, and the shank is tapered from the head to where the thread begins.

Nos. 6 to 11, Fig. 2, show the work of the thread-forging dies and clearly illustrate how all of the metal is left in the screw, none being wasted, and show also how the thread of the screw is raised until it is larger than the shank where the thread begins, being as large as the shank at its largest point, where the head commences. This gives the screw a much firmer hold in the wood, and enables the head to fit snugly. The screws are stronger than those made by the old process, the forging making the material denser, while by the process of cutting away the metal to make slots in the heads and threads the screws are weakened in proportion to the depth of the threads and width of the slot. By this process also the wire used may be several sizes smaller than the finished screw.

The progress made in the manufacture of wood screws from 1846 to the present time is shown in Fig. 4. Tests have been made which show that screws made by this new process with a rolled forged surface have greater strength to resist the torsional strain of a screw driver than cut screws of the same size, made from

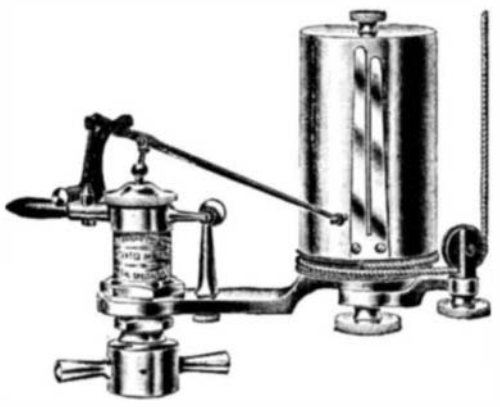


THE CONE OF FLOWERS.

wire of the same material and of larger diameter. The danger of splitting the wood where these forged screws are used is much less, as the diameter of the threaded part is greater than that of the unthreaded part.

At a recent legal trial in London where the validity of Rogers' invention was questioned, Judge Romer in his decision said, "I see no ground in the evidence before me for believing that the defendant has not *bona-fide* and independently constructed a machine of his own which he has reason to consider original."

The American Screw Company are equipping their various factories, three in Providence, R. I., and one in Hamilton, Ontario, with these new forging machines as rapidly as possible, and are advised by cable that the trials of their machinery at Paris have been highly satisfactory to the parties who propose to work



HINE & ROBERTSON'S STRAIGHT LINE INDICATOR.

the foreign patents, while the British Screw Company, Limited, has been operating its plant at Leeds, England, for several weeks with very satisfactory results.

STRAIGHT LINE INDICATOR.

A new indicator, in which a pencil, by means of a very simple mechanism, is made to move in a straight line, is shown in the illustration. It is made by Messrs. Hine & Robertson, of No. 39 Cortlandt Street, New York City. This movement is effected by means of a parallel motion, and an auxiliary spring that holds the parts in such relation to each other that the wear comes continually upon one side of the surfaces, thereby preventing any appearance of back lash. The superiority of this indicator is due to these two features, for this construction permits of lightness in the moving parts and accuracy in the guiding mechanism.

The guiding mechanism consists of a small cam fastened to the pencil arm, the face of the cam being held by a spring against a roller. The roller has a fixed bearing on the upright, and the cam which rocks upon the roller is so shaped as to cause the pencil point to move in a straight line. The guiding mechanism is placed near the fulcrum of the tracing lever to prevent high surface velocity of the cam. This construction enables the machine to trace a line parallel with the axis of the drum. The drum is made very light, and is provided with a bearing at each end. Special attention is given to the fitting of the piston and in other details of the mechanism. Engineers who have used this indicator speak highly of it.

THE CONE OF FLOWERS.

In prestidigitation flowers have in all times played an important part, and they are usually employed in preference to other objects, since they give the experiments a pleasing aspect. But, in most cases, natural flowers, especially when it is necessary to conceal their presence, are replaced by paper or feather ones, the bulk of which is more easily reduced. Such is the case in the experiment which we are about to present, and which, it must be confessed, requires to be seen from some little distance in order that the spectators may, without too great an effort of the imagination, be led into the delusion that they are looking at genuine flowers. However, even seen close by, our trick surprises one to the same degree as all those that consist in causing the appearance of more or less bulky objects where nothing was perceived a few moments previous.

The prestidigitator takes a newspaper and forms it into a cone before one's eyes. It is impossible to suppose the existence here of a double bottom, and yet the cone, gently shaken, becomes filled with flowers that have come from no one knows where. The number of them even becomes so great that they soon more than fill the cone and drop on and cover the floor.

The two sides of the flowers employed are represented in Fig. 2, where they are lettered A and B. Each flower consists of four petals of various colors, cut with a punch out of very thin tissue paper. Upon examining Fig. A, we see opposite us the pe-

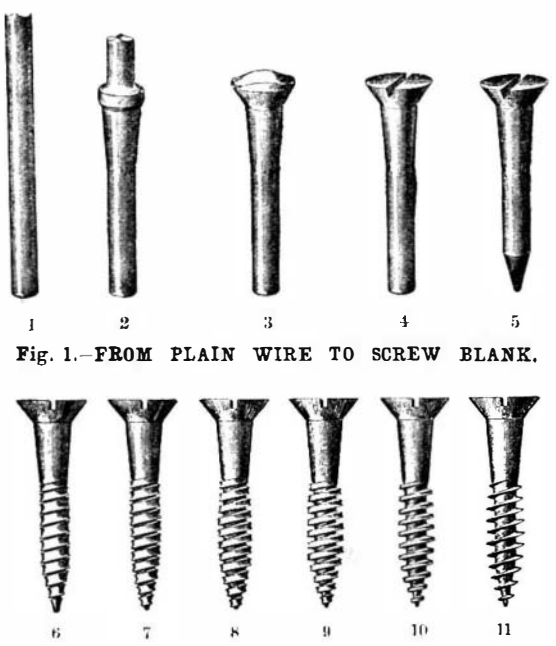


Fig. 1.—FROM PLAIN WIRE TO SCREW BLANK.

Fig. 2. FROM THE BLANK TO FINISHED SCREW.

Fig. 3.—SCREW FORMING SURFACE OF DIE.

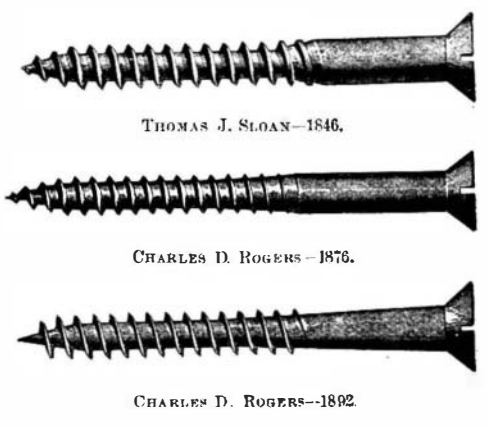


Fig. 4.—PROGRESS IN WOOD SCREWS—1846 TO 1892.

MAKING WOOD SCREWS.

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