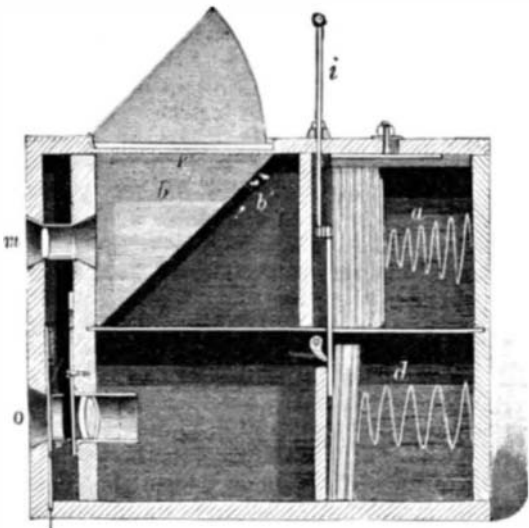


**IMPROVED HAND CAMERA.**

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 for making 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.

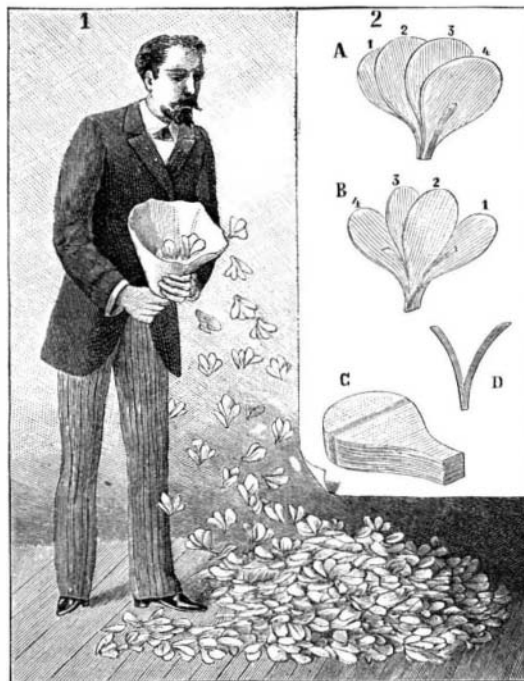
In the old process of cutting the threads on the screw, which was brought to a state of perfection by this company, it was necessary

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-forming 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



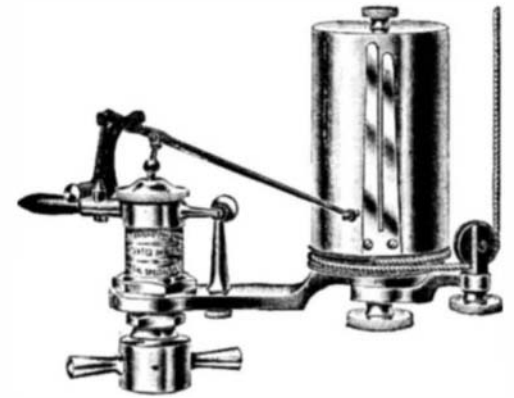
**THE CONE OF FLOWERS.**

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.

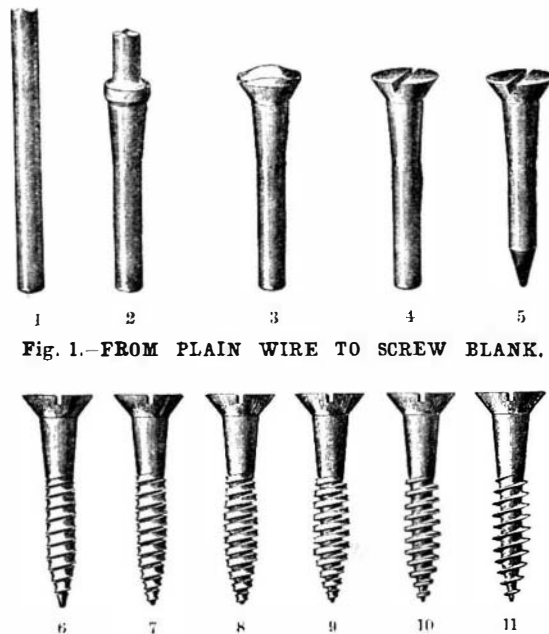
The guiding mechanism consists of a small cam fastened to the pencil arm, the face of the cam being held by a spring against a roller. The roller has a fixed bearing on the upright, and the cam which rocks upon the roller is so shaped as to cause the pencil point to move in a straight line. The guiding 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.

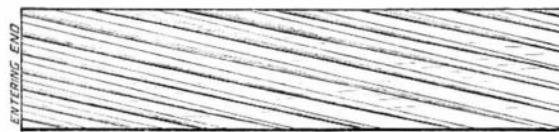
The prestidigitator takes a newspaper and forms it into a cone before one's eyes. It is impossible to suppose the existence here of a double bottom, and yet the cone, gently shaken, becomes filled with flowers that have come from no one knows where. The number of them even becomes so great that they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



**THOMAS J. SLOAN—1846.**



**CHARLES D. ROGERS—1876.**



**CHARLES D. ROGERS—1892.**

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

**MAKING WOOD SCREWS.**

tals 1 and 2 and 3 and 4 gummed together by the extremities of their anterior sides, while Fig. B shows us the petals 2 and 3 united in the same manner on the opposite side. A small, very light and thin steel spring, D, formed of two strips soldered together at the bottom, and pointing in opposite directions, is fixed to the two exterior petals, 1 and 4, of the flower and is concealed by a band of paper of the same color gummed above. It is this spring that, when it is capable of expanding freely, opens the flower and gives it its voluminous aspect.

Quite a large number of these flowers (a hundred or more), united and held together by means of a thread or a rubber band (Fig. 2, C) makes a package small enough to allow the operator to conceal it in the palm of his hand, only the back of which he allows the spectators to see while he is forming the paper cone.—*La Nature*.

#### THE WORLD'S COLUMBIAN EXPOSITION.

As the time approaches for the dedicatory ceremonies next month of the World's Fair, the full programme of which was printed in last week's SCIENTIFIC AMERICAN, increasing public interest in the great enterprise is being manifested in many directions. The financial problems affecting the exposition have now been definitely settled, and it is assured that ample means have been provided to make the fair the great success which was promised when it was decided to hold it in Chicago. The long struggle to obtain an appropriation of five million dollars from Congress at the last session had, it would seem, a most happy ending, as Congress substituted for the proposed loan of \$5,000,000 an appropriation of \$2,500,000 in souvenir half dollars. The demand for these coins justifies the expectation that the sale of them will realize at least \$4,000,000, and none of it will have to be paid back. Large sums will be obtained by the sale of privileges. At the Centennial many fortunes were made by those who dispensed refreshments and provided various auxiliary entertainments. The Chicago directory have knocked every concession down to the highest bidder, and have in each case exacted heavy bonds. It is even reported that the man who secured the exclusive right to sell peanuts, for example, paid the amazing sum of \$120,000. All these sources of revenue have been looked after with a good deal of business shrewdness.

The vast grounds and buildings have for the past month presented an especially animated spectacle, as the work has been pushed with remarkable vigor in all departments to have everything in as complete a state of forwardness as possible for the dedicatory ceremonies, the force of mechanics and laborers having been increased to 10,000. The building of roads and paths has been rapidly approaching completion, walks and flower beds being laid out on the terraces along the grand basin, and the completion of the Manufactures Building, in which particular interest is centered, is in sight. There is no doubt of its being in readiness for the ceremonies. The steelwork of the roof is completed, and the carpenters and staffmakers are as close upon the ironworkers as possible. The artists who will decorate the interior of the domes over the entrances are now busy at their portion of the task. Work on the main building of Machinery Hall is being pushed. The placing of the ornamental staffwork has also begun, and the foundations for the boilers and engines in the power house are being placed.

The exterior of the Administration Building is practically completed, with the exception of the coloring and placing of free groups of statuary. Artist Dodge is at work on the statues for the decoration of the outer dome. The figures in this work will be thirty feet high. On each side of the mammoth memorial fountain in front of the Administration Building will be a huge electrical fountain, throwing a stream 150 feet high, brilliantly illuminated by variously colored electric lights.

Active work on the Transportation Building's annex will begin shortly. The roof of this annex constitutes a terminal for the elevated railroad. Building work has been begun on two annexes for the Fine Arts Building. Contracts are let for the stock pavilion and excavations for the foundations are begun. Work will soon begin on the Photographic Building. The big plate glass tanks in the aquaria of the Fisheries Building are nearly completed, and it is expected that some of the fish will be placed in them this month.

The dedication exercises are to be held in the Manufactures Building, where accommodations for seating 80,000 people will be provided. The programme provides for the presence on this occasion of President Harrison, Vice-President Morton, the members of the Cabinet, the judges of the United States Supreme Court, the governors of the forty-eight States and Territories, the ministers of foreign nations resident at Washington, the Chicago board of forty-five directors, the one hundred and six national commissioners, and scores of Congressmen and Senators.

The state of forwardness of some of the great buildings of the fair is accurately shown in the pictures

given, which are from recent photographs. Around the Woman's and Horticultural Buildings large steam rollers have been at work packing down the permanent crushed stone roadways and paths, and the landscape work around these two buildings is nearly finished. A large rookery is to be placed in the central dome of the Horticultural Building. The design for the Woman's Building was made by Miss Sophia G. Hayden, of Boston, who won a \$1,000 prize offered for the best plan. The structure measures 200 by 400 feet, and cost \$200,000. The architecture is classic, with end and center pavilions, connected by an arcade. The center pavilion contains the main entrance to the building, from which the visitor enters the main gallery, 60 by 240 feet, to the left of which is a room 80 by 200 feet, in which there will be a retrospective exhibit, while a similar space at the other end of the building will be devoted to reforms and charities. Portions of the building are also allotted for a model kindergarten, a model hospital, a library and record room, a bureau of information, club rooms, committee rooms, parlors, etc. The main portion of the building is three stories high.

The Palace of Fine Arts occupies a space of 320 by 500 feet, and to the rear, on each side, will be an annex, reached by a covered passage, each of these additional buildings covering a ground space of 120 by 200 feet.

The Electricity Building covers a space of 700 by 350 feet, or more than five and one-half acres. It was designed by Messrs. Van Brunt & Howe, of Kansas City. Like most of the other buildings, the style of architecture is Italian Renaissance. It is 60 feet high and ornamented with designs suggestive of the department. It is one of the handsomest of the grand central group, and will cost \$650,000. There will be four entrances to the building, the main one on the south. Its staff covering will cause it to resemble granite in color. A statue of Franklin will rise conspicuously before the south entrance.

The Horticultural Building, facing the lagoon on the land side, is 1,000 feet long and with an extreme width of 286 feet. It was designed by W. L. B. Jenney, of Chicago, and in front will be a flower terrace for outside exhibits, including tanks for nymphaeas and the Victoria regia, while the front of the terrace will have a low parapet between large vases bordering the water, with a boat landing at the center. The building will have a central pavilion and two connected end pavilions, forming two interior courts each 88 by 270 feet, the courts being beautifully decorated in color and planted with ornamental shrubs and flowers. The center pavilion will be roofed by a crystal dome, 187 feet in diameter and 113 feet high, under which will be exhibited tall palms, bamboos, and tree ferns. The exhibits will include all the varieties of flowers, plants, vines, seeds, horticultural implements, etc., those requiring sunshine and light being placed where the roof is entirely of glass, while provision will be made for furnishing heat where required. The exterior of the building will be in stucco. The appropriation for this building is \$400,000.

The Fish and Fisheries Building was designed by Mr. Henry Ives Cobb, of Chicago. It has an extreme length of 1,100 feet, and its width is 200 feet. The building is subdivided into three parts, to conform to the shape of the site. In the central portion will be the general fisheries exhibit. In one of the polygonal buildings will be the angling exhibit, and in the other the aquaria. The exterior of the building is Spanish-Romanesque, and will contrast agreeably in appearance with the classic style of all the other buildings.

#### World's Fair Notes.

In the interest of foreign exhibitors the government Treasury Department has agreed to have some one appointed at every port of entry to look after exhibits sent to Chicago. It will be the duty of these agents to forward without delay or appraisal exhibits regularly consigned to transportation companies. This concession was never previously secured for an exposition in this country. The plan will greatly facilitate the shipment of exhibits, for the agent will be charged with the further duty of looking out for all goods not regularly consigned. In all cases where exhibits are not properly consigned, and on which freight charges have not been prepaid, the agent will care for them without cost to the exhibitor or the exposition company until arrangements can be made for forwarding them to Chicago. The Treasury regulations provide there will be no customs duty or charges exacted from exhibitors, but it has always been customary for charges to be made by custom house brokers for blanks and clerical work at the port of entry. This charge the railroads in whose care exhibits have been consigned will assume, and the exhibitor will thus be saved a cost ranging from \$3 to \$10 on every shipment.

A separate building for the shoe and leather industry exhibit is now an assured fact, as the required \$100,000 has all been raised. Leather dealers and manufacturers in all parts of the country have contributed to the fund.

An international congress of charities, correction and philanthropy will be held at the World's Fair, to consider questions relating to the care of criminals, paupers, and unfortunates. The congress will begin June 12, and last one week.

The New York State Board of Charities is preparing an industrial exhibit of the products of the charitable, corrective, reformatory, and eleemosynary institutions under its supervision. The exhibit will contain photographs, models, illustrations, of the various methods of instruction, statistics, and a comparison showing the progress of work for the past twenty-five years.

The German exhibit will contain an architectural display including drawings illustrating 200 or more of the most notable buildings in the empire.

The Baltimore and Ohio Railway Company will make a historical exhibit which will be of absorbing interest to all railroad men. Major J. W. Pangborn has charge of its preparation. The Baltimore and Ohio claims to be the oldest railroad in the world, its two or three predecessors having been mere tramways for transporting coal, stone or ore. The actual construction of the road began on July 4, 1828, and its first section was in operation six months before the Liverpool and Manchester road, the first railroad, in the present sense of the word, in Europe. The Baltimore and Ohio claims also to be the only one of the pioneer roads which has retained its original name and has remained under a continuous succession of management.

The Austrian wood-carving industry will be represented by thirty-four expert wood carvers from Vienna, who will exhibit their work in its various branches.

Plans for the passenger station at Jackson Park call for a main building, 150 × 300, with an annexed train shed, 100 × 672. Provision is made for loading and unloading thirty-six trains at one time.

A gold brick worth \$230,000 will be exhibited by Montana.

#### The Mont Blanc Observatory.

It may be remembered that M. Janssen, the director of the Meudon Observatory and member of the French Institute, who last year made the ascent of Mont Blanc, in order to examine the practicability of the scheme for establishing an observatory there, finding that at 40 feet below the surface of the snow there was no solid bed of rock for the foundations of a building, conceived the idea of constructing one which could be kept in its place by the snow itself. He accordingly formed an association, to which Prince Roland Bonaparte, M. Leon Say, M. Raphael Bischoffsheim, Count de Greffulhe and Baron de Rothschild were liberal subscribers, and the funds thus obtained were spent in the construction of an observatory which, after having been put up in the grounds of the Meudon establishment, has been taken to pieces again and sent off to Chamounix, from which place it will be taken up to the summit of the mountain and put together under the supervision of M. Capus, the well known explorer, who accompanied M. Bonvalot on his journey through Central Asia and over the Pamir into India. The new observatory is of timber and is about 25 feet in height, being divided into two compartments or stories, surmounted by a square platform, with an iron balustrade and a wooden scaffolding for the reception of the various meteorological instruments. There are several rooms in each compartment or story, for the use, upon the one side, of the director and his staff, and, upon the other, of tourists and their guides. These rooms will be provided with barrack furniture and with small stoves for heating and cooking purposes, the fuel used at first being anthracite. The two stories communicate with each other by means of a spiral staircase, while there is a straight ladder with a trap door, giving access to the room for the guides. Ventilation is provided for by means of tubes, while the windows of the upper story, with double framework and double panes of glass, afford views in various directions, among others toward Chamounix, with which it is intended to communicate by means of semaphoric signals when the atmosphere is sufficiently clear. All the timber has a thick coat of fireproof paint, and each piece of wood is numbered so as to facilitate the observatory's being easily put together—a work which, it is hoped, will be completed by the end of September. It remains, of course, to be seen whether the building will, as M. Janssen anticipates, remain in its place by the simple process of letting the planks which are to form the outer walls down some distance into the hardened snow.

REFERRING to our recent article on the American black wolf, Mr. F. H. Peorman writes that "the black wolf is not by any means extinct; that they exist in large numbers in Alaska, and that other animals extinct, or nearly so, in the States and other Territories are in good preservation in Alaska." Among these he mentions the black fox, the gray or silver-tipped fox, the red fox, and the bald-faced bear, so called because his face is the only bare portion. He states that a black wolf was killed about a year ago near Douglas City.