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A NEW OPTICAL LANTERN.

The beautiful Peristyle which excited the admiration of millions during the summer has passed away in smoke; but, thanks to photography, its image exists and may be projected in a realistic way upon the screen, still an object of wonder and admiration to both those who have seen the original and those who have not.

One of the uses of the optical lantern is to perpetuate beautiful forms and scenes, thus cultivating the taste and increasing the knowledge of multitudes who could never have seen the object themselves. With greater perfection comes greater usefulness, so that improvements in photography, in conjunction with improvements in the optical lantern, yield results which

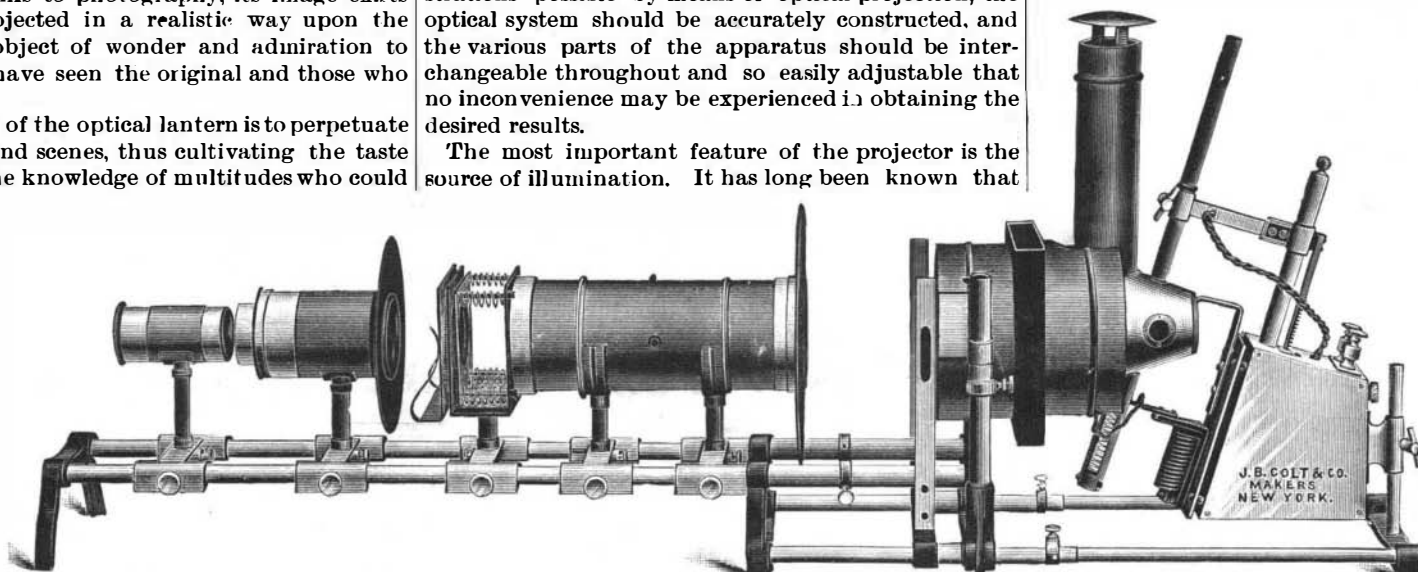
a few years ago were not regarded as among the possibilities.

To perform satisfactorily the great variety of demonstrations possible by means of optical projection, the optical system should be accurately constructed, and the various parts of the apparatus should be interchangeable throughout and so easily adjustable that no inconvenience may be experienced in obtaining the desired results.

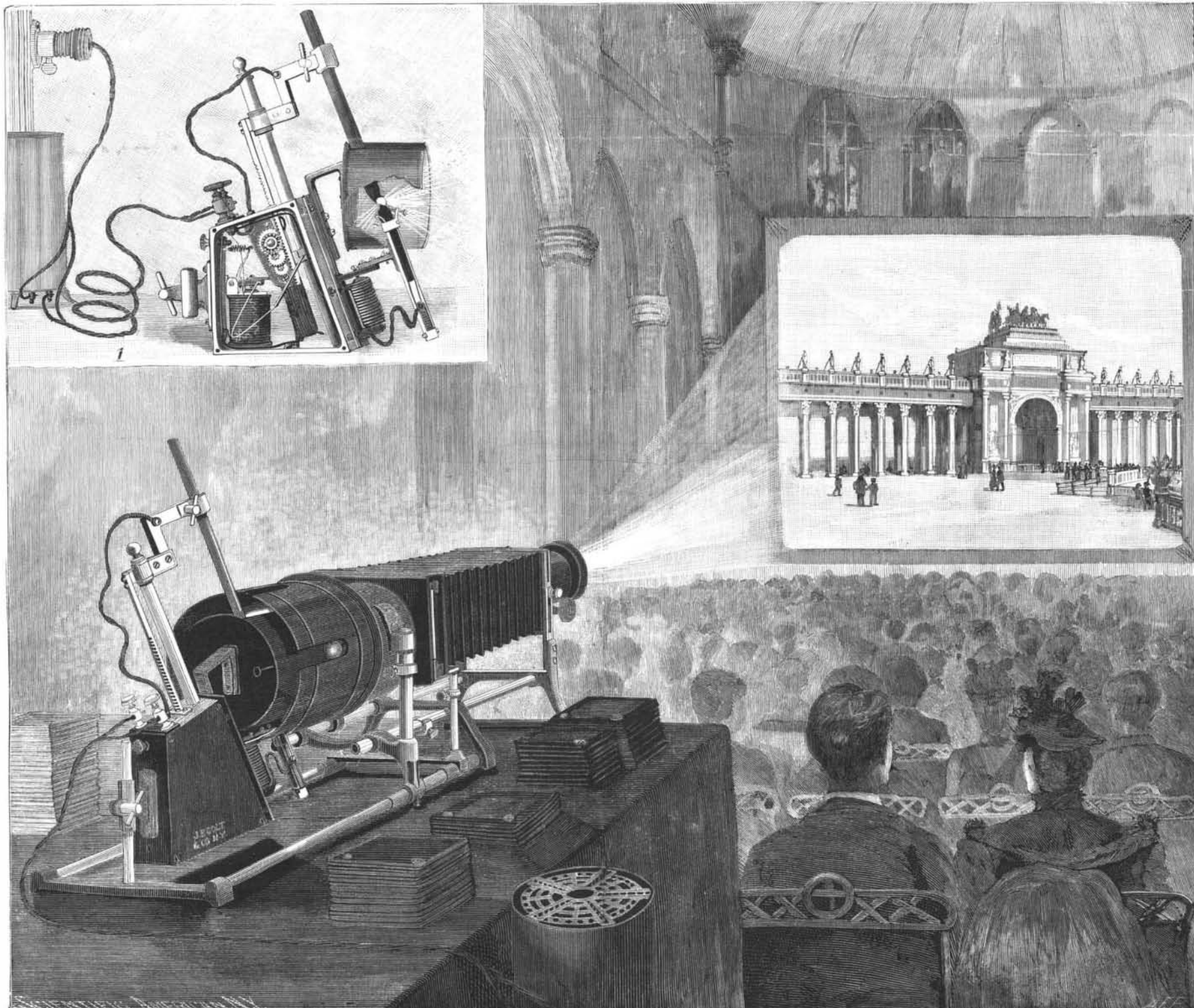
The most important feature of the projector is the source of illumination. It has long been known that

the electric arc light, owing to its intensity and whiteness, and to the fact that it is confined approximately to a "point," affords the most desirable form of radiant;

but, owing to irregularity in the consumption of the carbons and the difficulty of maintaining the arc in a permanent position, it has not been generally adopted for projection purposes. In the form of lamp here shown, which is manufactured for projection purposes. In the form of lamp here shown, which is manufactured by J. B. Colt & Co., of 16 Beekman Street, New York. (Continued on page 40.)



LANTERN WITH OPTICAL BENCH—SHOWING POLARISCOPE.



NEW OPTICAL LANTERN AND ELECTRIC LAMP.

A NEW OPTICAL LANTERN.

(Continued from first page.)

York, the undesirable features have been entirely eliminated. The lamp is perfectly automatic in the control of the carbons, which are disposed at such an angle as to present the crater of the positive carbon to the condensing lenses of the projector. This feature is very desirable, for, when carbons are vertical, even if the negative carbon is advanced toward the condenser out of line of the positive, the light will proceed from the negative carbon as well as the positive, thus making two sources of light instead of one—a condition fatal to definition on high class work. If, however, the carbons are placed at an angle, as shown in the cut, the luminous spot on the negative carbon is obscured from the condenser, and the crater on the positive carbon is presented in a most favorable way. By an admirable system of mechanism in the lamp referred to, the point of the lower carbon is accurately maintained in a given position, and the upper carbon is gradually and regularly fed toward it in the exact proportion to its consumption. This mechanism is so simply and nicely adjusted that the lamp may be run for hours without a flicker, always maintaining the radiant in the optical center of the projector.

The regulating device is contained in a metal case only 2 inches thick by $3\frac{1}{4}$ inches wide and $4\frac{1}{2}$ inches high, making it the most compact and easily adjusted lamp that has been brought to our notice.

The negative carbon is automatically moved upwardly as it burns away. The positive carbon is fed down by the weight of the carbon holder and by a small spring-actuated train of gearing, which is held in check while the arc is of normal length, or released when the length of the arc becomes too great, by a shunt magnet contained by the casing. The action of the shunt magnet is controlled by a spring acting on its armature; an increase in the tension of the spring increases the length of the arc, while a reduction of the tension diminishes the length of the arc.

The mechanism controlling the carbons is so constructed that the lamp may be used on from five to twenty amperes of current, by the mere inserting of carbons of suitable sizes. The lamp is perfectly insulated, so it may be freely handled.

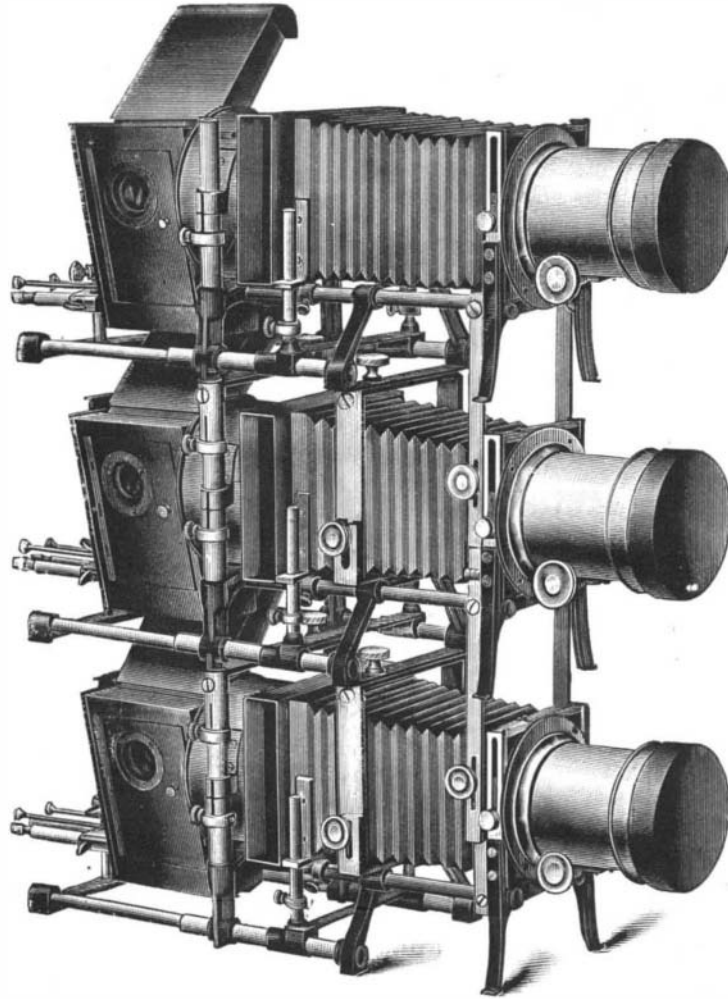
This lamp may be clamped on a vertical post, with a sliding base, admitting of universal adjustment; or it may be mounted otherwise, as may be desired. The utility of this lamp is by no means confined to optical projection, for, owing to its convenient size and the absolute steadiness of its light, it finds extensive use in photo-lithography and copying, micro-photography, for theatrical effects, and, in fact, all uses for which an intense artificial light is desired. The intensity of this light admits of the use of the optical projector in a room that is only partially darkened, which greatly increases its utility and widens its scope.

The same firm have recently taken out patents on a new form of optical lantern, which they have given the name of the "Criterion." This apparatus is constructed with a view to being universally adjustable and adaptable to optical projection in all its branches. It may be used singly, as shown in the large engraving, for the projection of ordinary views and diagrams, or two or three of them may be used side by side or mounted one above the other, as shown in Fig. 3, for producing the most elaborate dissolving effects, with either the oil, oxy-hydrogen, or electric light. The device for producing perfectly gradual dissolving effects with the electric light is original with this firm.

For scientific projections, the objective lenses, with their supports and slide box, may be entirely removed, giving place to the optical bench, as shown in the engraving of the improved polariscope. For the projection of experiments in acoustics, optics, microscopy, physics, chemistry or spectrum analysis, the various parts of the polariscope may be removed and other necessary appliances may be inserted in the sliding supports shown. The desirability of this interchangeable system may be seen at a glance. Among the apparatus that may be used on these sliding stands, in addition to that shown in the cut, are

the crystal stage, supports for prisms, and physical appliances—mirrors, tuning forks, focusing lenses, adjustable slits, diaphragms, chemical tanks, and alum cells—a system of parallelizing lenses, microscope attachment, in fact, every conceivable form of apparatus for use in any position.

The condenser support is adjustable vertically, and

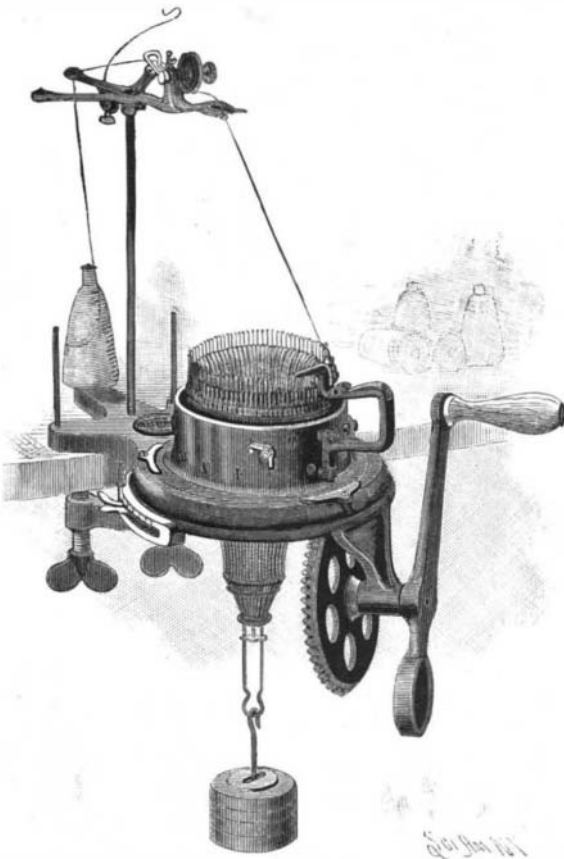


DISSOLVING VIEW LANTERN.

various combinations of condensers may be inserted or removed from the front of this support. It would seem that no form of construction could admit of more universal adaptability. Again, the optical bench, as shown and described, may be removed, giving place to J. B. Colt & Co.'s improved forms of vertical projection and opaque attachments. A lantern like that represented in the large engraving is in use at the office of the SCIENTIFIC AMERICAN.

FAMILY KNITTING MACHINES.

The simply constructed and remarkably efficient



THE NEW BRANSON KNITTER.



CHANGEABLE HEAD—BRANSON KNITTER.

hand knitting machine shown in the illustration was exhibited at the World's Columbian Exposition, and was awarded a premium. It is adapted for family and manufacturers' use, and in it are embodied the improvements resulting from twenty years successful experience in the manufacture and use of such machines, for it was in 1872 that James L. Branson, the president

of the Branson Machine Company, obtained the first patent on the Branson machine. The hosiery made on this machine is seamless, and the stitch is the same as that made by hand knitting. The work is commenced at the top of the stocking, which is ribbed as far as required as if knit by hand, and the narrowing for shaping the leg is effected by a stitch regulator.

The heel is made at the proper place by knitting backward and forward with the machine, being made double thickness if desired, but without a stitch being added by hand, after which the knitting of the foot is finished, except the joining of a few stitches at the toe, as indicated in one of the views, this being done by hand with a finishing needle. For the knitting of different sizes, and to enable one to use fine and coarse yarns, different sizes of interchangeable heads, as shown in one of the views, are made for the machine. With two sizes of the machine heads, and three needle cylinders containing different numbers and sizes and needles for coarse or fine yarns, all sizes and qualities of men's, women's and children's hose may be knit on the machine. The change from one head or needle cylinder to another is but a few minutes' work at any time. Among recent improvements in the machine is an attachment to hold down the work during the process of knitting, making possible the manufacture of finer and better goods and simplifying the operation of the machine, as it enables the same tension to be applied to the heel and toe as is applied to the circular portion of the hose. The operator retains hold of the crank during the whole operation of making the heel and toe, using the left hand to both raise and lower the needles. The heel is not held down nor is any weight attached to it, so that there is no strain on the yarn or pulling down on the heel by the operator. The machine is well built in all particulars. The office and manufactory of the Branson Machine Company is at No. 504 St. John Street, Philadelphia.

Experimental Immunity from Influenza.

Our knowledge as regards the source and spread of influenza has been advanced but little, in spite of the recent occurrence of several epidemics. Dr. Bruchettini, however, still maintains that the bacillus which he has before described is the causal agent of this disease, and he again refers to his experiments on animals, especially those on rabbits, which proved to be particularly susceptible. The pathogenic value of this microbe has been strongly contested by Drs. Pfeiffer and Bech; but by its nature what it may, it is not without interest to know that Dr. Bruchettini has succeeded in producing in the rabbit an immunity against its attacks. The results of his experiments may be briefly summed up as follows:



HOSIERY MADE ON BRANSON KNITTER.

Rabbits can be successfully inoculated without much difficulty, so that when subsequently treated with cultures of this bacillus (according to Dr. Bruchettini it is that of influenza) the animals remain perfectly unaffected. The material which gives the most complete immunity is obtained from cultures on blood serum filtered by Berkefeld's method. The blood serum obtained from animals rendered immune possesses the property of rendering other animals likewise immune from infection by the bacillus and from its toxic effects; and so great does this power seem to be that it was found sufficient to employ serum only in the proportion of 1 to 42,000 relatively to the body weight, and even in doses less than this. Finally, this serum was found to be capable of exercising curative properties, for when injected into animals already inoculated with the bacillus and suffering from its effects in the most severe form the temperature fell to normal and the animals recovered, while control

animals died in a few days.—*Lancet*.

DR. O. V. THAYER of San Francisco has successfully used the solar cautery—burning glass—in removing facial discolorations of the skin of large area, also in removing tattoo or India ink marks.