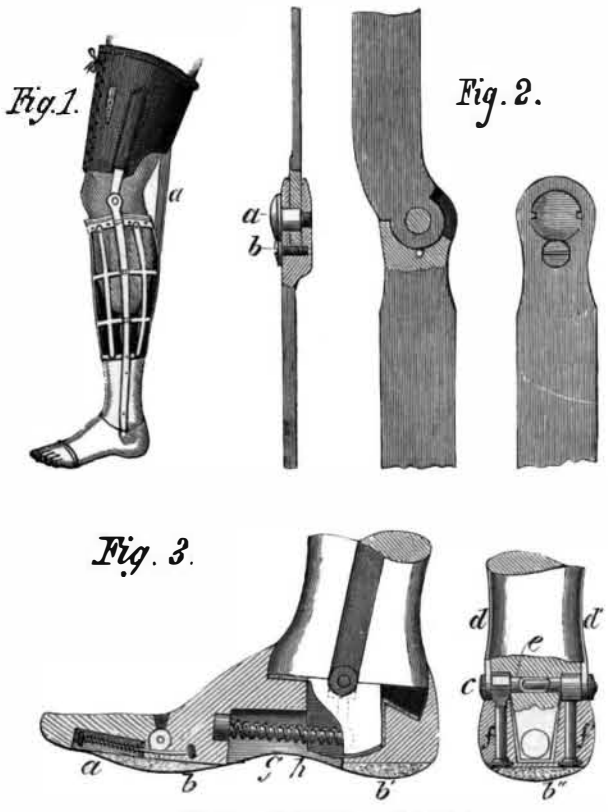
### IMPROVED ARTIFICIAL LIMBS.

Rapid travel in the streets and suburbs of our cities, whether by cable cars, electric trolley or steam, is becoming more and more a necessary condition of modern American life, even though it be accompanied by an increased number of accidents. Although our war has long passed, cases of amputation are constantly being attended to in our hospitals. The electric motor and steam engine continue to make as many cripples as did the missiles of war, so that we have an army of mutilated men and boys in whose interests the highest mechanical skill has been invoked in the production of an artificial limb that shall imitate with precision the movement of the natural member. Very few of our readers probably are familiar with the internal construction and method of attachment of these appliances, which add so greatly to the comfort, moral and physical, of those who have been unfortunate enough to require their service. We give in the accompanying illustration details of construction of a steel skeleton leg manufactured by D. W. Kolbe & Son, of 1339 Arch Street, Philadelphia, Pa.

The principal conditions called for in the production of a false leg are strength, lightness and absolute reliability and freedom of movement at the joints, while at the same time the member must minister to the comfort of the wearer and must present a natural appearance while at rest as well as in motion.

The leather socket, as shown in Fig. 1, is made to perfectly fit the stump, and is firmly attached to a steel band shown at a. This socket, while comparatively rigid, has sufficient elasticity to give more comfort to the stump than is possible to obtain in the old style of artificial leg, where the stump is necessarily placed in a rigid wooden box. The open work of steel gives perfect ventilation to the stump, and its framework is cut from a solid piece of high grade metal and is without rivets, thus making it light and very strong. The knee joints shown in Fig. 2 have cast steel bearings and a take-up joint, so that any looseness is obviated by merely tightening the screw, a, which is clamped by the small screw, b. The foot itself, shown in Fig. 3, is novel and unique, and in its construction so little metal is used that its lightness is remarkable. The wood used is fine grained willow. The toe joint is entirely of wood and yet very strong, a result attained by making the rod of the under draw spring, a, of rawhide; this, together with the pure rubber cushion, b, gives ample strength to this joint and at the same time avoids the use of any metal to increase the weight, at a point where weight is most uncomfortable to the wearer. The ankle joint is made with a taper steel pin, c, which takes the steel straps, d, d', extending from the steel framework, closely fitted to square bearings, so that the pin is rigidly held in place to the upper part; the bearing, e, is of phosphor bronze, fitted to octagon holes in the bolts, f, f, which hold it rigidly to the foot. This ankle motion is controlled by the spring, g, which is held in place by a hickory pin, h. The pure rubber cushions, b, b', under the heel and ball of the foot, are the most recent improvement, relieving the jar from the stump and giving the natural elasticity to the wearer.




The entire weight of the leg complete is only five and a quarter pounds, and the action of the whole is so natural that in use it cannot be easily detected from the natural limb. This artificial leg is highly recommended by those wearing it, and particularly by those who previously wore the old style of wooden leg; among the latter is Dr. Mordecai Price, of Philadelphia, who has worn one of Kolbe's steel legs for the past fifteen years.

### THE MICROGRAPH.

The micrograph is an interesting little instrument for showing a succession of photographic pictures, such as portraits, landscapes, statuary, paintings, and all kinds of notable objects. It consists of a case which carries a microscopic lens and also a transparent wheel or disk, on which the pictures are photographed; and the pictures are viewed by simply revolving the disk with the finger so as to bring the pictures successively under the lens, by which they are magnified or enlarged. The mode of using the instrument is shown in Fig. 1.

Fig. 1.

The full sized instrument is given in Fig. 2, from the side of which one edge of the picture disk is seen to project. Fig. 3 shows the picture disk itself. The case can be readily opened and new photo. disks put in, bringing thus other series of pictures. In this way the photographic representations of hundreds of remarkable scenes and objects may be preserved in a very small space, yet always ready for interesting study and examination. The micrograph is destined to become a very popular and useful instrument. Mr. F. W. Gardam, of 58 Ann Street, New York City, is the inventor and sole manufacturer. Patented in the United States and foreign countries.


Fig. 2.

Fig. 3.

### Edward Swift's Comet.

The discovery of a faint comet by Edward, son of Dr. Lewis Swift, of the Lowe Observatory, Mt. Echo, Cal., brings once more to the attention of astronomers the lost comet of Di Vico. The earliest orbits of the Swift comet suggested that it was probably a periodical one, and some points of resemblance in its elements make it quite possible that it may indeed be that interesting object.

Di Vico's comet is the longest and least well known of the short period comets. It was discovered by Di Vico at Rome on August 22, 1844, and near the end of the month it became visible to the naked eye. It soon became evident that the observations could not agree with a parabolic orbit, and elliptic elements were computed by Brunnow and others, the period of the comet being established as 1,993 days. The next return was computed for 1850, but it was found that during its time of possible visibility its place would lie so close to the sun as to be overpowered by his light. The next return was fixed for 1855, but the object was not seen at that time or at any time since. It has therefore been known as Di Vico's lost comet. Le Verrier has shown that the comet was identical with that of 1678.

The orbit which was computed by Brunnow has not been forgotten by astronomers, and they have by no means given up the hope of finding it at some time. Finlay's comet in 1886 was supposed to be the lost one, but a close consideration of its orbit shows that it is not the same.

When the possibility of the identity of Swift's comet with Di Vico was known, the computers in this country as well as in Europe became at once exceedingly anxious to secure further data. In this the Europeans have had the advantage, for in this country not more than six observations are known altogether. This record is not a creditable one to American astronomy. It is true that this object is a faint one; at the same time it has been seen in a six-inch telescope at Lick and in a nine-inch, by Father Searle, at Washington. It is surprising that with all the large telescopes of the country the whole month of December should have to show only three or four American observations altogether. From this scanty data, Father Searle has computed a second and later orbit, but he is unable to prove positively the identity.

In Europe, however, Schulhof seems quite positive that the two objects are the same. He expresses his reasons in a late issue of the Astronomische Nachrichten, reasons which it is not necessary to repeat here. If the identity can be proved, there are several interesting matters connected therewith, and the discovery is of great importance. In the first place, the rediscovery of a comet lost for some fifty years is remarkable, and further it seems curious that the comet could have returned again and again to perihelion and yet not have been seen. In this latter respect, the information secured within the last few years is quite to the point, and Schulhof suggests that an outburst might have made it visible for a few days in 1844 at a brilliancy very much greater than its normal brightness. Several comets have been observed in such outbursts, more particularly the Pons-Brooks comet of 1888, the Brooks comet of 1889, and especially the Holmes comet of 1892.

Such is the story of the comet Edward Swift. It is the return of some comet, most probably that of Di Vico. It is most important to secure as many observations as possible; the more so, since in 1885 it must have passed very close to Jupiter and will be still more closely approached in 1897.—Boston Commonwealth.

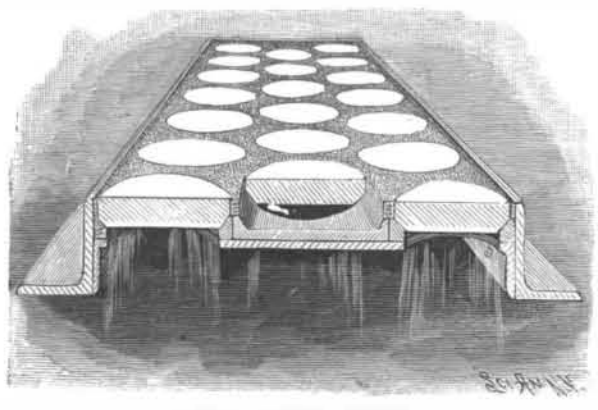
### Mexican Onyx.

Mexican onyx has suffered a gradual decline in value for many years past. It is generally becoming known that Mexican onyx is not true onyx, but a species of marble. It is really an aragonite and is composed of calcium, oxide of iron and magnesium. The presence of these last two elements gives it its beautiful color. It is said the use of African marble and other cheap stones is replacing it.

Mexican onyx is easily worked and has been used not only for building purposes, but for ornamental household articles such as lamps, table tops, mantels, etc. It was used by the ancient Mexicans for masks, idols, and similar small objects. The price of all such articles has of late considerably decreased. Mexican onyx now sells in the rough at from $6.00 to $20.00 a cubic foot. Very large pieces bring more than this proportional price. When it is sawed into slabs, $2.00 per cubic foot is added to the price. The polishing, furthermore, greatly increases the value of the stone. In many cases there is a loss of 40 per cent of material in preparing it for wainscoting, so that the finished product is worth about $6.00 a foot. The material is too valuable to be used in places where it would be exposed to the weather.

### AN IMPROVED VAULT LIGHT.

According to the improvement shown in the illustration, the framing or body of the vault light is composed of channel and angle irons, braced at special points by T, I, or angle irons, and the construction is such that the lights may be arranged in any desired order, each light being firmly held in position by one of the channel irons, and the spaces between the lights being easily filled with cement or other suitable material. A patent has been granted for this invention



CLOPP'S VAULT LIGHT.

to Mr. George B. Clopp, of No. 3028 Market Street, Philadelphia. The parallel flanges of the channel irons are tied together by bolts to form a rigid structure, and the connected irons are surrounded at the sides and ends by a frame of angle irons, whose vertical members are bolted to the marginal portions of the connected channel irons. The entire frame is braced and strengthened by another set of angle irons, and the frame and body are strengthened by T irons, which support the bottom portions of the channel irons, and are connected with the outer angle irons by brackets. This light is quickly and economically made, as all of its parts are stock material, so that it may be readily connected and built up for any situation where a vault light is desired.