

NEW TRUNNION AND TRIMMER.

This improved trunnion is designed for oscillating engines, drying calenders, car axles, fly wheel shafts, crank pins, etc., and is of great utility wherever there is a bearing subjected to great friction and wear.

It is a well known fact that while car axles frequently heat and cut, it seldom happens that the journals of a locomotive driver shaft become heated, although they are subjected to greater pressure; and a driving shaft under a locomotive, it is stated, will run for fifteen or twenty years, whereas a car axle will run for about two years only. To lessen friction and increase the durability of car axle and other bearings, Mr. Thomas Hill, of Newark, Alameda county, California, has perfected and patented the improved trunnion and trimmer shown in the accompanying engravings. Fig. 1 shows the driver as applied to a steam trunnion or tubular shaft. Fig. 2 shows the application of the device to car axles.

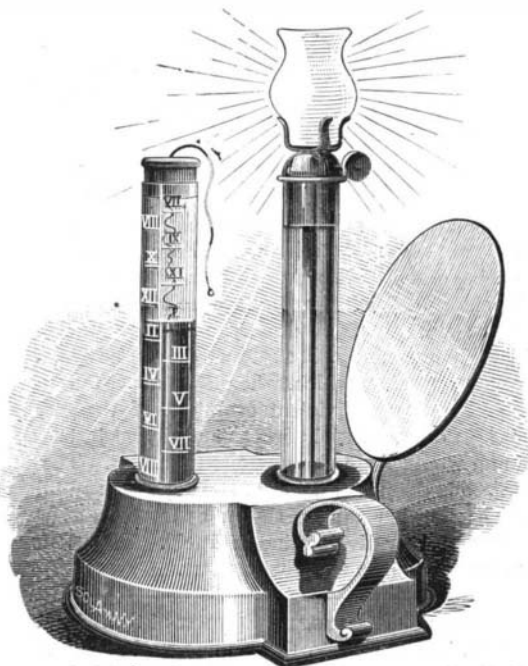
The trunnion is made of two parts. The inner part, through which the steam passes, is made with four or more projections, B, with corresponding spaces or depressions, C, between them, so that a transverse section represents a cross. These projections, B, are turned off in a lathe, and a sleeve, A, is fitted to slide on over them. This sleeve is made fast to the arms with a set screw or pin, one inch from the end, and is turned smooth on the outside to form a journal. A hole is made through this trunnion for the passage of steam, which is brought to it through the pipe, A. This pipe enters the hole in the trunnion, and is packed so as to be steam tight. Whenever the sleeve, A, becomes worn, it can be removed, and a new one substituted with but little delay; the cylinders, with the ordinary trunnions, would have to come out. The spaces formed by the depressions, C, in the inner part, allow a free circulation of air about the trunnion, either naturally or by blast, so that the journal is kept cool and will work better. A trunnion thus constructed can be introduced advantageously for oscillating engines, drying calenders, or in any place where it is necessary to have a joint through a movable bearing or journal.

The trunnion and trimmer may be applied to car axles or shafting with great advantage whether they are old or new; when applied to shafting it may answer both as a coupling and a journal; it is also especially adapted to thrust bearings. As the wear comes wholly upon the sleeve the expense of renewing a shaft or axle is avoided, and the sleeves can at any time be replaced, at a slight expense, in a few minutes, when the old one becomes worn out. When applied to a car axle or shaft the chambers, C, by acting as receptacles for oil, assist in lubrication, as the oil is received and discharged at every revolution through the holes.

For further particulars address the inventor, at Newark, Cal., as above, or at 64 First street, San Francisco, Cal.

NEW TIME-INDICATING NIGHT LAMP.

The accompanying engraving represents an ingenious and very simple time-indicating lamp, recently patented by Mr. Henry Behn, Sr., of this city.



TIME-INDICATING NIGHT LAMP.

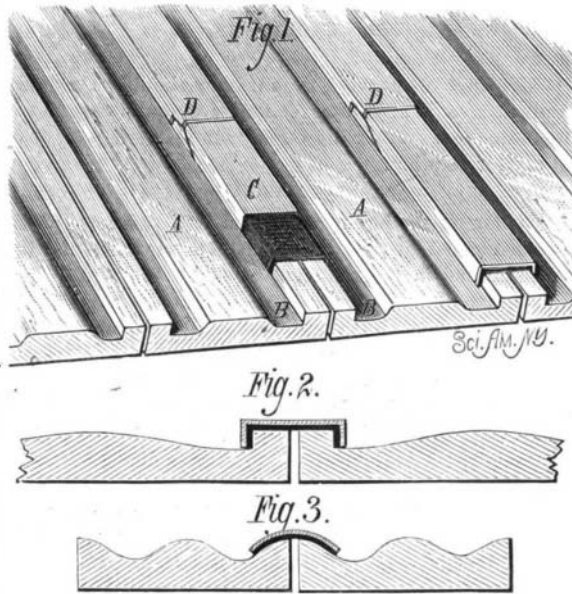
The invention consists in a reservoir containing oil, and two vertical glass tubes rising therefrom. The lamp burner is placed on the top of one of these tubes, and the other contains a float, and has the hours marked on it. Near the foot of the tube which supports the burner there is a re-

flector, which receives light from the burner and throws it upon the graduated tube.

As a certain quantity of oil will be burned each hour, the sinking of the oil will indicate approximately the time. The inventor, in some cases, dispenses with the float and uses colored oil.

AN IMPROVED ROOFING.

The accompanying engraving shows in perspective and in section a new roofing recently patented by Mr. Nathan H.



BROWN'S ROOFING.

Brown, of Detroit, Mich. This invention consists in the peculiar form of roofing boards and metallic batten strips

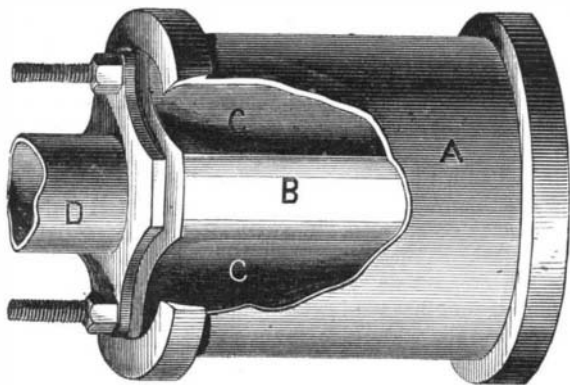


Fig. 1.

HILL'S TRUNNION AND TRIMMER.

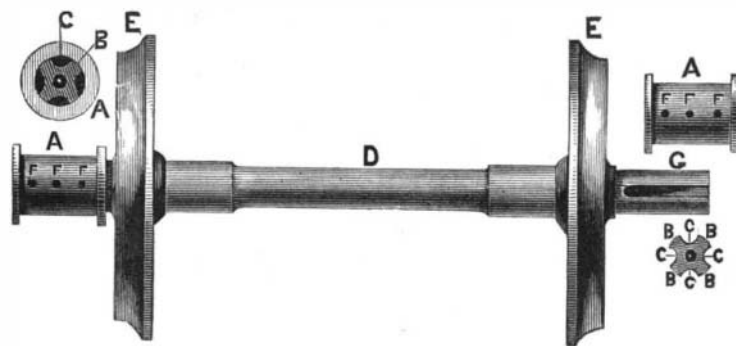


Fig. 2.

which cover the joints between the roofing boards, and in a novel method of connecting the ends of the metallic batten strips.

The boards, A, have, near their adjacent edges, grooves, B, for receiving the edges of the metallic batten strips, C, the form of which may be seen in Fig. 2. Between the metal batten and the boards there is a strip of tarred paper or roofing felt which renders the joint water and air tight. The batten strip is made in sections, one end of each having its flanges beveled, while the other end is cut and turned down, forming locks for receiving the beveled flanges of the succeeding strip, as shown at D in Fig. 1. A modified form of board and batten is shown in Fig. 3. The boards should have a coat of paint before applying the battens, and it should afterward be covered with two coats of fire and water proof paint. The nails which secure the boards are covered by the battens.

The inventor states that the roofing boards may be readily made by means of an ordinary moulding or planing machine, and says that the roof made on this plan will not be more expensive than a shingle roof, while it has many points in its favor.

For further particulars address the inventor as above.

Persistence of Images on the Retina.

It will be remembered that about the beginning of last year Dr. Boll threw some new light on the structure of the retina by the discovery of a substance of purple color in the last retinal layer, in which a portion of the "rods" is engaged. It had escaped notice before, because of its very rapid disappearance on the action of light. Dr. Boll felt himself warranted in saying that the formation of images on the retina was a veritable photography. Subsequently Dr. Kühne discovered the organ by which this purple is incessantly reproduced, namely, the mosaic layer, or hexagonal epithelium of the choroid, which, therefore, it has been proposed to call the retinal epithelium. M. Giraud Teulon, in a recent report, calls attention to some modifications in theory required by the unlooked for physiological function referred to. Thus as regards the persistence of positive images (that is, the continuance of the sensation after the impression that produced it), the simple fact of chemical decoloration of the retinal purple by the light, involving a certain time for its reconstitution, by the secreting action of

the mosaic layer, gives a sufficient account of the phenomenon. Then, as to accidental negative images and their successive phases of coloration, the photo-chemical theory replaces Young's perfectly arbitrary explanation, based on three supposed different kinds of fibers, by a simpler one, which is this: A given monochromatic light chemically alters, in a constant and uniform way, the retinal purple which it encounters. Now, the rod, or primitive nerve element, has its base immersed in the bath formed of this substance.

We have only, then, to suppose in this element the power of feeling in a different way, the intimate contact of different media, exactly as the papilla of the nerves of special sensibility (like those of smell and taste, for example) appreciate or carry to the sensorium stimulations as varied as is the nature of the liquids or effluvia which come to them. When the primary cause, the luminous object, is withdrawn, the nerve fiber, according to the progress of the reconstitution of the purple, announces by successive testimonies the gradual renewal of the normal bath.—London Times.

The Secrets of a Bushel Measure.

The *Pharmaceutical Journal* gives some curious information respecting the variable results obtainable in the measurement of dry goods. The Weights and Measures Act of England, passed last session, expressly prohibits "heaped measures," and requires that the measure shall be filled as nearly level as the size and shape of the articles will permit. This led to some experiments as to the results following different modes of "striking" a measure, that is, of bringing the level of the contents of the measure into the same horizontal plane as the brim.

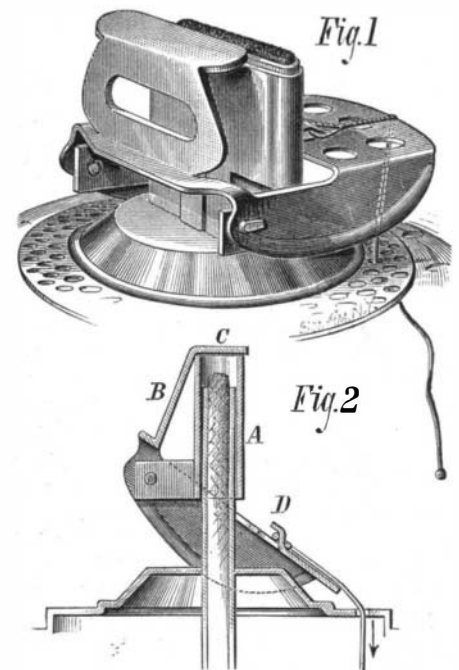
A sample of corn was taken, and the true weight of a standard bushel of it was ascertained to be 57 lbs. 2 ozs. But when the ordinary flat strike is used the corn left in the measure weighs 57 lbs. 3 ozs., while, if the ordinary round strike or roller be employed, the quantity of corn is increased to 57 lbs. 9 ozs. If the measure be shaken when struck with a round ruler the weight rises to 62 lbs. 15 ozs. The diameter of a vessel, in proportion to its depth, appears to

make little difference in measuring grain, unless the diameter is less than one third of the depth. The Board of Trade standard dry measures—the bushel, half bushel and peck—have their diameters nearly double their depth, while those for liquids have their diameters nearly equal to their depths. But it is found that, particularly in the sale of such articles as

coke, potatoes, etc., the proportions adopted in the standards for dry goods are those most likely to give just results.

A NEW LAMP EXTINGUISHER.

The accompanying engraving represents a novel and simple lamp extinguisher recently patented by Mr. Albert Hall of this city. It may be made and sold separately from the burner, and may be readily applied by the purchaser to lamps already in use. To the slide tube, A, which fits over



HALL'S LAMP EXTINGUISHER.

the wick tube of the burner, is pivoted a lever frame, B, which carries the cap or cut off, C. The lever frame, B, has cams formed on it which bear upon the bottom plate of the burner. A cord is attached to the lever frame, at D, and extends downward through one of the perforations of

the bottom plate of the burner. When this cord is pulled the sliding tube, A, is raised, and the cap, C, swings over it, instantly extinguishing the flame.

The device is readily removed from the lamp burner for cleaning, and is easily replaced, being complete in itself and not attached to the burner.

For hanging and other lamps placed too high to be easily reached, this invention is valuable, as it only requires a pull of the cord to extinguish the light. Further particulars may be obtained by addressing the inventor, P. O. Box 2326, New York city.

A Marble Boring Sponge.

In 1871, a vessel laden with a cargo of Carrara marble was wrecked off the south coast of Long Island. This year some of the marble having been raised was found to be perfectly honeycombed by some marine boring animal. A fragment of the marble was exhibited at a recent meeting of the New York Academy of Sciences, and the opinion expressed by one of the members that the work of destruction was probably due to a species of *Pholas*. Dr. Newberry, however, was inclined to believe that it was due rather to the ravages of a species of sponge of the genus *Otione*, and this view has been recently indorsed in a note on the subject published by Professor A. E. Verrill, who has had an opportunity of examining some specimens sent to the Peabody Museum of Yale College. Professor Verrill states that the exposed portions of the slabs examined by him are thoroughly penetrated to the depth of one or two inches by the crooked and irregular borings or galleries of the sponge, *Otione sulphurea*, so as to reduce them to a complete honeycomb, readily crumbling in the fingers. The marble is perfectly sound and unaltered beyond the borings. He says that the rapid destruction of the shells of oysters, etc., by the borings of this sponge has long been familiar to him, but he has never before seen examples of its effects on marble or limestone; for calcareous rocks do not occur along those portions of our coast inhabited by the animal. He suggests that its ability to rapidly destroy such rocks might have a practical bearing in case of submarine structures of limestone or other similar materials.

PARIS EXHIBITION.—FACADE OF AUSTRIA AND HUNGARY.

The facade of Austria and Hungary is simple in appearance, but it lacks neither grandeur nor elegance. Its architect had in view not only the Austrian and Hungarian architecture, but also the vestibule of a palace of fine arts. In reality these two pavilions are devoted to art; the one on the south includes the bureau of the Austrian Commission, the one on the north the bureau of the Hungarian Commission. These buildings are of cut stone, and each has above and below three windows. They are very plain on the first and second floors, and appear to have no roofs, but are crowned with a balustrade of stone.

The colonnade that unites the two pavilions forms a portico of nine arches, the abutments of which are each supported by an entablature, supported by two columns of white stone.

The ornamentation of this building consists of festoons and allegorical figures painted in black upon a white ground; the attic that crowns the frieze is equally ornamental.

Above the portico there are statues of art, science, history, etc. At one end of the colonnade floats the flag of Austria; at the opposite extremity the staff bears the flag of Hungary.

Within the Austro-Hungarian vestibule were displayed several statues, among which are Michael Angelo, Beethoven, and Albert Dürer, and beyond there were plans of existing monuments and important buildings in Austria and Hungary.

THE COMMON JACANA.

This bird is a native of Southern America, and there are other species scattered over Africa, Asia, and Australia. Mr. Gould tells us that the Australian species is a good



JACANA.

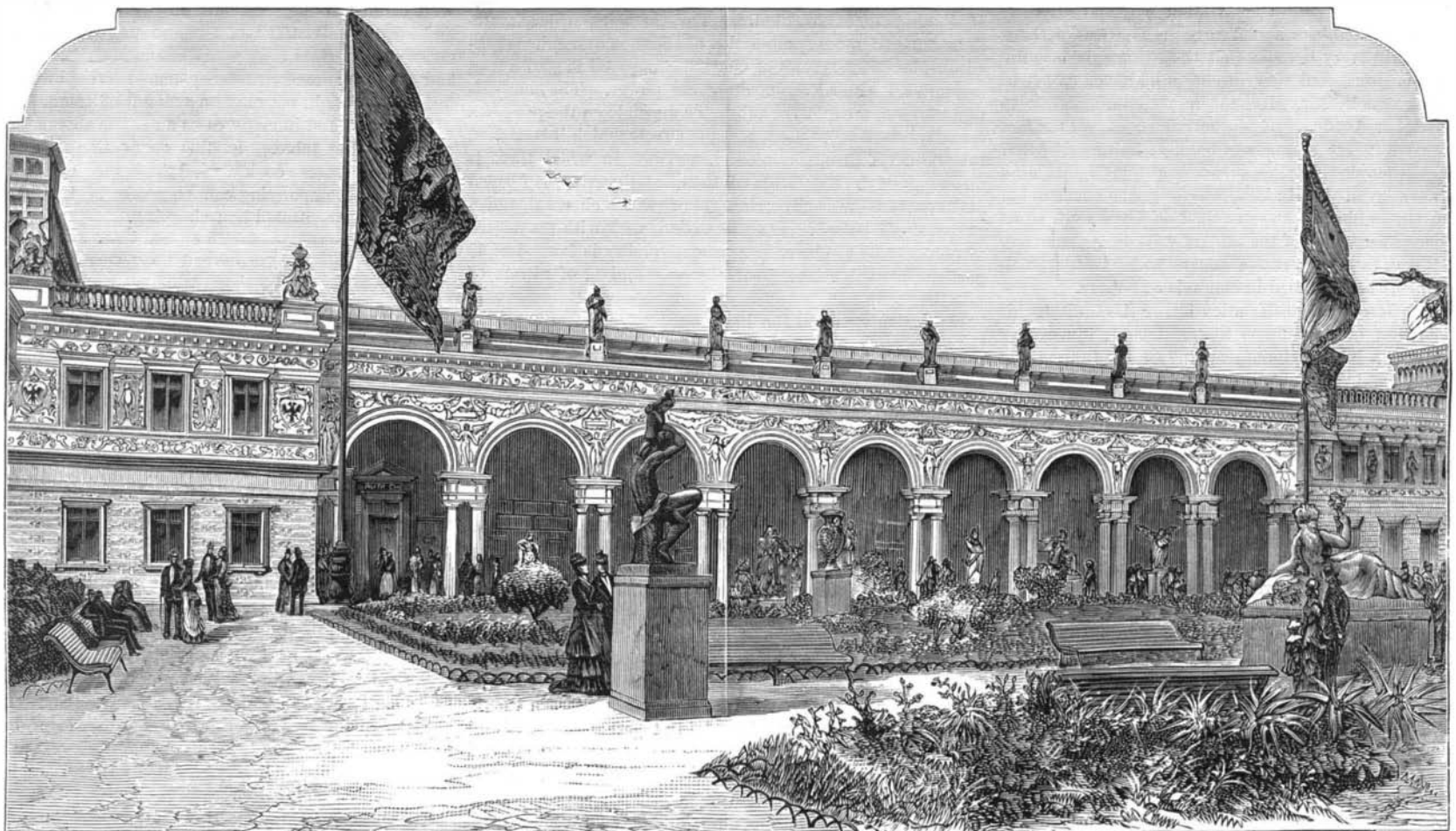
diver, but a bad flier. "Their powers of diving and remaining under water are equal to those of any bird I have ever met with; on the other hand, the powers of flight are very weak. They will, however, mount up fifteen or twenty yards and fly from one end of the lake to the other, a distance of half or three quarters of a mile; but generally they merely rise above the surface of the water and fly off for about a hundred yards. During flight their long legs are thrown out horizontally to their full length. While feeding they utter a slowly repeated 'cluck, cluck.' The stomach is extremely muscular, and the food consists of aquatic insects and some kind of vegetable matter."

The general color of the common jacana is black, with a

slight greenish gloss, taking a rusty red tinting on the back of the wing coverts. The primary quill feathers of the wing are green, and the wings are furnished at the bend with long sharp claws. In the African species these spurs are hardly perceptible. At the base of the beak is a curious leathery appendage, rising upon the forehead above and depending toward the chin below. The claws are all very long, especially that of the hind toe, which is nearly straight and longer than the toe from which it proceeds. We take our engraving from Wood's "Natural History."

Natural History.—The Cope Collection.

When E. D. Cope, the Philadelphia naturalist, bought the Argentine Confederation's collection of fossil bones at the Paris Exhibition, he bore away a prize in the face of a powerful competition. Russia wanted them, or the best part of them; a Vienna scientific institution wanted them; Belgium wanted them, and Paris herself had set her heart on them, intending to place them in the Jardin des Plantes. In the face of all opposition, says the Philadelphia *Times*, a Philadelphian secured the lot, and careful hands have securely packed them in boxes preparatory to sending them to America, where they are expected some time this month. These fossils are peculiarly valuable to this country for the reason that the chief portion of them are not to be found anywhere in the United States, and there are some specimens the like of which no country in Europe can show. They are a sort of connecting link to collections which America already has. The locality from which they come, Patagonia, is regarded as entitled to rank first in the chain or series of specimens which has been dug up in Ecuador, in the valley of Mexico and in the Western and Middle States. In Phoenixville, several years ago, fossil remains were found similar to those discovered in the Western States, Mexico, and South America. These specimens coming from Patagonia, the southern extremity of the western hemisphere, and bearing such a resemblance to those found in North America, have a value which naturalists, knowing and understanding the relations which one collection bears to another, alone can fully appreciate. The collection includes about one hundred different specimens of animals. The perfect state in which some of the remains are preserved gives them an increased value. There are nineteen skeletons, chiefly of large animals, almost completely whole. The species most numerous represented in the collection are the armadillo and sloth. Among the armadillos there are several kinds of skeletons, pronounced by Mr. Cope entirely new to science. One of these is an immense specimen with a curious sort of tail. It increases in size toward the end, at which point it takes an oval shape and is from a foot to 18 inches wide. Unlike that of all other known kinds of armadillo, the tail is without joints—except one at the base, which enabled it to be swung about—and is incased in a hard, shell like box, as hard as the back of a turtle. The tail is supposed to have been, in the lifetime of the animal, its chief weapon of attack or defense. At intervals on the hard, oval surface at the end holes are found, which are supposed to have contained short protuberances, or horns, giving the beast a weapon like a spiked club. Swung with all the strength which an animal as big as the largest elephant of modern times could muster, this armadillo's tail is believed by scientific men to have been more formidable than are now the jaws or claws of a lion or tiger. Another rare



PARIS EXHIBITION.—FACADE OF AUSTRIA AND HUNGARY.