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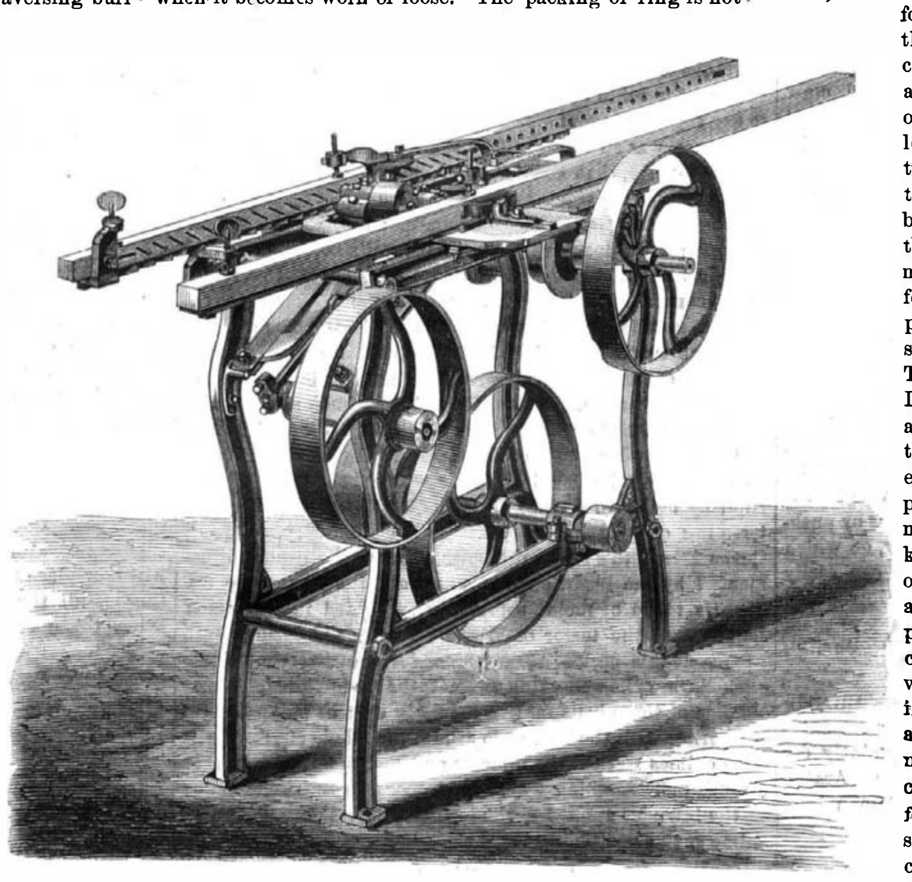
Improved Combined Mortising and Boring Machine.

The use of reciprocating mortising machines for recessing the stiles of shades for the reception of the ends of slats is not uncommon. Upright and horizontal boring machines for those blinds in which the slats may be turned have also been extensively used. This machine, represented in the engraving—which was patented through the Scientific American Patent Agency some time ago—is entirely automatic in its operation, and either bores the round holes for the reception of the pivots of turning slats, or mortises the recesses for the reception of the ends of those slats designed to be permanently fixed at a certain angle. The latter are made on this machine by means similar to those used in boring a simple round hole, the tool being a reciprocatory or traversing burr or bit, which can be used on hard wood, knotty pine, and other obstinate descriptions of wood, where ordinary machine chisels fail. The machine is self-operating in all its parts, and all the workman has to do is to put in the stiles and set the machine in motion, when it does its work, and, having done it, stops.

As seen by the engraving, the machine is very simple in construction, made entirely of metal, easy of operation, and durable. Agents for its introduction throughout the United States are wanted. For particulars address Martin Buck, Lebanon, N. H.



PATENT MACHINE FOR BORING AND MORTISING STILES OF BLINDS.

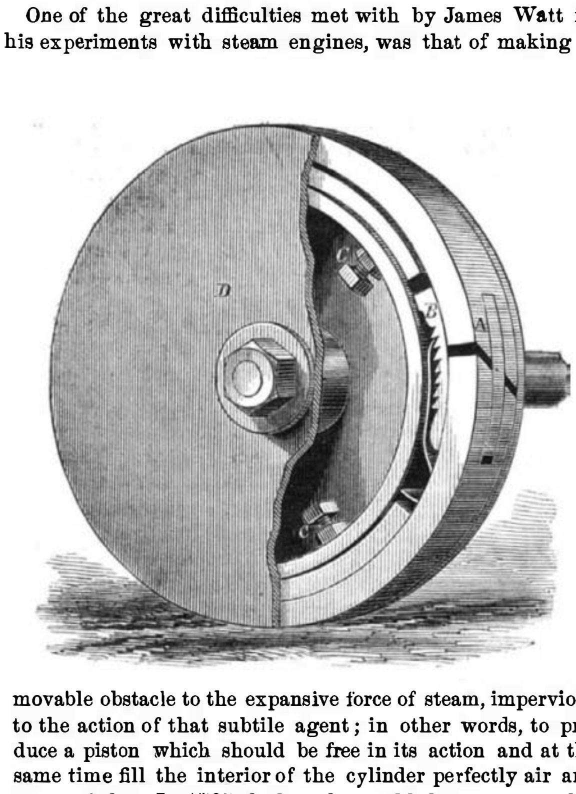
Sulphurized Paper.

Patented by Charles F. Crehore, of Newton Lower Falls, Mass.:—

The invention consists in subjecting the paper to the action of sulphur, preferably by immersing it in a bath of boiling or melted sulphur, the temperature of which is to be regulated by the required hardness of the finished material. The action of the sulphur has the effect of rendering the paper hard, semi-elastic, and water-proof, as well as compact in body, and with a susceptibility of high finish, if desired. Among the various instances of application of which the invention is susceptible, so far as the experiments made have proved it a success, a particular one is its use as press-paper for cloth printer's use, as well as for those of ordinary printing, the advantages of which will at once manifest themselves to persons skilled in the craft. For bookbinders' use the requisite amount of rigidity may be obtained with great reduction in bulk and weight, and, as a consequence, in cost, as compared with the material now in use.

ASKWITH'S IMPROVED PISTON PACKING.

One of the great difficulties met with by James Watt in his experiments with steam engines, was that of making a



movable obstacle to the expansive force of steam, impervious to the action of that subtile agent; in other words, to produce a piston which should be free in its action and at the same time fill the interior of the cylinder perfectly air and steam tight. In 1765 the best he could do was to employ several metallic glands or disks, holding rings of varnished canvas to bear against the interior surface of the cylinder.

Metallic packing, in which metal meets metal—unless separated by an infinitesimal quantity of water—is now the rule, and such packing has proved itself far superior to such makeshifts as those of which Mr. Watt was compelled to make use. Steam packing pistons and various spring and ring pistons have been brought to the attention of engineers, each claiming some peculiar advantage.

The one in the engraving is a single ring piston, the ring having across its cut a partition piece, A, pivoted at one end and shutting into a recess cut in the ring so as to prevent the passage of steam across the cut. The inner side of the ring has a piece, B, with ratchet teeth cut in it, with which teeth a fixed spring engages, acting as a catch or stay to hold the packing ring in place when expanded. The inner portion of the flange of the spider is furnished with set screws and check nuts, C, setting out against the ring. These are for keeping the ring in a central position and for expanding it when it becomes worn or loose. The packing or ring is not intended to fit closely between the flange of the spider and the follower, D, but to allow a small portion of steam to pass to the interior of the piston, and through minute holes in the projecting circle of the spider through which the set screws, C, pass, to the interior face of the ring. It will be seen that this packing ring makes, with the spider and follower, a combination piston, being steam-packed and also adjustable. The ring for a 16-inch cylinder is only seven eighths of an inch wide by five eighths thick. In ordinary self-setting packing rings, when the steam is shut off, the ring will contract, thus permitting the steam to blow through if the throttle is suddenly opened, as is frequently done on locomotives. The spring and ratchet in this piston are intended to overcome this difficulty.

Patented through the Scientific American Patent Agency March 5, 1867, by John Askwith, of Chicago, Ill., who may be addressed for rights, etc., at No. 694 South Canal street, Chicago.

Preserving Eggs.

"I take about 10 lbs. of unslaked lime and 8 lbs. of common salt and dissolve or mix them with twenty gallons of water. In this solution I place the fresh eggs to be preserved, and let them remain from ten to twenty days. I then dissolve, in a small quantity of water, the following substances, viz., one quarter pound of chloride of calcium; one half pound of liquid phosphoric acid; one pound chloride of lime (or bleaching powder): one half pound of nitrate of potash. This solution I add to the former containing the eggs. In this preparation the eggs should remain for about thirty days before they are taken out or ready to market.

"The chloride of calcium prevents the eggs from drying up, and any other deliquescent salt may be substituted for it, but I prefer the chloride of calcium. Nitrate of soda, or other soluble nitrate, may be used instead of nitrate of potash, and any equivalent chloride compound may be used instead of the bleaching powder." Patented by A. Van Camp, Washington, D. C.

Roofing Compound.

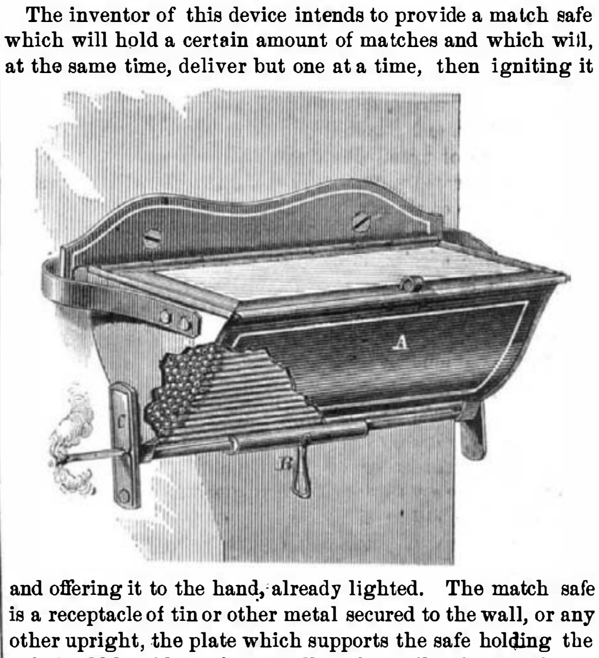
Here is another of the many tar compounds for roofing, recently patented by R. C. Graves, of Barnesville, Ohio. Take forty gallons of coal tar, thirty gallons pulverized slate, ten gallons pulverized clay, five pounds boiled rice, one pound glue, one pound terra de sienna, and one gallon lin I mix the coal tar, slate, and clay together. I then boil the rice and strain it through a fine sieve, and liquefy the glue by heat. I then add the rice, glue and terra de sienna to the linseed oil, and thoroughly incorporate the entire compound together. It is then ready for use, and may be applied with a brush or trowel. This makes a roofing compound impervious to water, unaffected by heat or cold, and, when it hardens, perfectly fire proof.

Dietetic Salt.

One of the great evils that owes its origin to the scientific enterprise of the present age, is that any promising scientific scheme, after being brought into prominent notice, becomes for the time being quite the fashion, and is then entirely forgotten, often, too, from mere caprice. We hope that this fate may still be averted from Dr. Lankester's ingenious scheme of supplying necessary, but frequently overlooked, articles of diet, by means of his dietetic salt. This compound is a proposed substitute for ordinary table salt, chloride of sodium being a notable constituent; but in addition to this, which is far from being the sole or even most important inorganic constituent of our food, we have phosphate of lime, chloride of potassium, sulphates of potash and soda, with smaller quantities of magnesian and iron salts. The argument for their use is very strong. Leaving out the large proportion of epidemics, almost all the common diseases are directly traceable by modern physicians to dietetic errors; and those that certainly are due in part to deficiency of inorganic food, form by no means a contemptible list. Scurvy is known to arise from a deficiency of the salts of potash. Scrofula and consumption, rickets, and softening of the bones, occur when the phosphates of lime and other bases are deficient. Anæmia, chlorosis, and a variety of nervous disorders, are the result of an absence of iron, and are at once cured by the use of this agent as a remedy. In such cases, the medical man is in the habit of prescribing medicines containing these agents; and there can, therefore, be no doubt that the habitual use of these substances in the food, in the same way as common salt is employed, would be a means of preventing the occurrence of a large number of diseases. The quantities of the saline ingredients employed, in addition to the common salt, are so calculated that they shall be supplied in the same proportion by its use, as they exist in the human blood, and are got rid of in the body. Dietetic salt is one of those simple but useful applications of science of which the value is at once perceived; it deserves to hold a prominent place in the rank of articles of food, and it is to be hoped that it will not be lost in the crowd of similar inventions.—*Chemical News.*

ROESLER'S IMPROVEMENT IN MATCH SAFES.

The inventor of this device intends to provide a match safe which will hold a certain amount of matches and which will, at the same time, deliver but one at a time, then igniting it



and offering it to the hand, already lighted. The match safe is a receptacle of tin or other metal secured to the wall, or any other upright, the plate which supports the safe holding the safe itself by side springs to allow for a vibrating motion to the article when operated, so as to aid the matches in settling to the bottom of the safe.

The safe, A, is a little more than twice the length of an ordinary round match, having a partition across it in the center, and a longitudinal opening at the bottom. Directly below this opening is a rod and

C, forming, where they meet, a circular hole with serrated teeth for igniting the match.

In operation, the slide, B, is moved quickly toward either end of the safe, carrying with it—or, rather pushing before it—a match, which is ignited as seen and left with most of its length protruding from the jaws of the springs ready for the hand. This device was patented Oct. 29, 1867, by Adolph Roesler, who may be addressed for rights, etc., at Warsaw, Hancock county, Ill.

ANCIENT LOCKS AND KEYS.

If the time-honored maxim, "Love laughs at locksmiths," has, like the Spanish proverb, "held good in every age and clime," the muscles of Cupid's chubby face must have been relaxed toward that particular class of craftsmen, for a period not far short of forty centuries. The Egyptian locksmith, as he fashioned his curious contrivance out of the world-renowned Damascus steel, was probably the first to excite the sly god's mirth. Next in order came the fabricator of the "doore fastenings of dyverse colors made of brass and ivory," of ancient Rome; followed by the maker of the still more elaborate *Serrure de Tabernacle* in the medieval age, immortalized in early Christian Missals. The locksmith of the Celestial Empire then began to make his "strange instruments having wooden slides," the architecture of which was peculiarly adapted to the Summer House, in which the fair heroine of the "willow pattern" was kept in durance vile. Then the locksmith began to flourish in England; and by the time of good Queen Bess, the operations of the craft were so fully established in the towns of Staffordshire—to wit, Wolverhampton, Willenhall, and Wednesbury, that Cupid must have indulged in peals of laughter worthy of the immortal Comus; and after all the enterprise of later years, with its levers and wards, "detectors," and master keys, the Muse of Love is still able to chant, even in the hearing of Hobbs and Chubb:

"My father he has locked the door,
My mother keeps the key,
But neither bolts nor bars can part
My own true love and me."

The Egyptian lock, the rude carvings of which are said to have embellished the walls of ancient Karnak's temple and the Herculaneum, is thus described by Mr. E. Beckett Denison, Q. C.: "In this lock, three pins fall into a similar number of cavities in the bolt, and so hold it fast; they are raised again by putting in the key through the large key-hole in the bolt, and raising it a little, so that the locking pins are pushed by the key out of the bolt. The security afforded by this lock is very small, as it is easy to find the places of the pins by pushing in a piece of wood covered with clay or tallow, on which the holes will leave their impress, and the depth can easily be ascertained by trial." These locks were first introduced into England by the merchants of Phœnicia, who gave them to the Cornish miners in exchange for tin. Strangely enough locks of similar construction, but evidently "home made," are still to be found on the doors of many of the peasantry in Cornwall and Devon.

The locks of ancient Greece and Rome are quaintly described by the philosophers and poets of the time. Aratus compares the constellation of Cassiopeia to a Roman key, "having a curved stem," and a handle "shaped like the south stars" of the group. Curved stems were common in the keys of that age, and the poet Ariston applies to one of those articles the epithet, "deeply bent." Eustathius says that these ancient keys resembled sickles, and were sometimes so large as to be carried on the shoulder, as reapers bear their sickles to the harvest field. This statement is confirmed by Callimachus in his *Hymn to Ceres*, where he represents the priestess of Nicippe carrying a key on her shoulders. Homer's allusion to the lock and key on the wardrobe of the fair Penelope, will probably be better known. The passage is thus rendered by Pope:

"A brazen key she held, the handle turned,
With steel and polish'd ivory adorned.
The bolt, obedient to the silken string,
Forsakes the staple as she pulls the ring;
The wards respondent to the key, turn round,
The bars fly back, the flying valves resound;
Loud as a bull, makes hill and valley ring,
So roared the lock when it released the spring."

Eustathius, a Greek commentator on Homer, who flourished in the twelfth century, says that the key here referred to was very ancient, and was known as the "serpent key," from its resemblance of form. It was in use before the siege of Troy, although some writers persist in ascribing its invention to Theodore of Samos.

The medieval locks were, perhaps, among the most elaborate and artistic specimens of those articles ever produced. Beads, scrolls, or floral wreaths, exquisitely graven in steel, lined the edges. Angel forms, similarly wrought, surmounted the escutcheon, like the twin guardians of the fairies' grotto in the pantomime; while the surface of the lock presented as great a variety of leaves and flowers, all chased with the utmost skill, as Eugene Rimmel's beautiful bouquet. These locks were mostly found on the doors of the ancient continental cathedrals, or on the magnificent cabinets for which the middle ages were so famous; and Mr. Fairholt assures us, that, in either case, the lock constituted no mean part of the profuse decoration of the door to which it was affixed. The skill of continental locksmiths, after a considerable slumber, was revived in the seventeenth century, in the person of M. Reignier, a French artisan, who acquired great fame as the maker of "letter locks," with which the couriers' dispatch boxes were secured. A Dutch writer, Von Euse, passing over the claims of his own countrymen, ascribes to M. Reignier the invention of the letter lock, which is, in reality of Dutch origin, and was made a century before this French Chubb saw the light. An allusion to it is mad in Beaumont and Fletcher's play, "The Noble Gentleman," printed as early as the year 1615, which completely sets aside M. Reignier's claim to the invention:

"A cap case for your linen and your plate,
With a strange lock that opens with A. M. E. N.:"—

and Carew, in some verses written five years later, has this reference:

"As doeth a lock that goes
With letters, for till every one be known
The lock's as fast as though you had found none."

The latter quotation partly explains the construction of the letter lock, with which M. Reignier's name will always be connected as their most famous manufacturer. The letters of the alphabet were engraved on four parallel revolving rings, which by pre-arrangement on the part of the owner were made to spell a certain word, or number of words, before the lock could be opened. If even the owner chanced to forget the "open sesame" on which he had determined, like the luckless youth in the story of Ali Baba, the door would remain closed against him, till the magic watchword was recalled.

The ancient Chinese lock verifies one of the wise sayings of King Solomon—"Men have sought out many inventions. . . . . . there is nothing new under the sun." The fact has lately been disclosed that locks, "having sliders and tumblers," have for centuries been made in China, on the identical principles of action which have been "re-invented" by English patentees at various periods during the last hundred years. Some of the very oldest locks made by Chinese workmen were constructed almost entirely of wood, and adorned with grotesque carvings of "Celestial scenes," such as those with which modern tea-caddies have made us so familiar.

Tradition assures us that locks were made in England as early as the reign of Alfred the Great, and some go so far as to say that the ingenious monarch himself, like Louis XVI., of France, was an amateur fabricator of those articles. It is true, no doubt, that even at so remote a period, ingenious blacksmiths were wont to construct clumsy locks and keys, together with other articles of domestic use, when occasion demanded; but lockmaking was not recognized as a distinct craft in England until the fourteenth century; and two hundred years followed before it assumed proportions at all equal to those attained in earlier times on the Continent, in China, and in ancient Egypt. The locks produced in England in the fifteenth century were massive and strong; but chiefly of simple construction. Almost the only specimen now remaining is to be found on the parish church of Snodland, in Kent. In the sixteenth century commenced the display of ingenuity on the part of English locksmiths which has been uninterruptedly maintained since that time, and which forms an interesting chapter in the Curiosities of Industry. During Queen Elizabeth's reign, the bows of keys were usually ornamented by the insertion of a cross, and the locks were frequently made of metal, sometimes imbedded in oak cases. Latch keys—the terror of Mistress Caudle—also came into use about this period. Lock were for the first time made with alarm bells and chimes during the same period.

Some of these bells rang so loudly in case of any unlawful tampering with the lock as to arouse the whole street. Bells with chimes warned the inmates and alarmed the burglar in a much more soothing way. No sooner was the skeleton key of the intruder applied to the lock than the latter began to chime such some plaintive air as—

"Home, sweet home,
Be it ever so humble,
There's no place like home:"

a sentiment with which the chagrined housebreaker would doubtless concur as he took his precipitate flight.—*The Ironmonger.*

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D, F.R.S.

Lecture VI.—Concluded.

I have had occasion to say to you once or twice in these lectures that no body in nature is absolutely cold. All bodies are more or less hot. Even ice itself is a hot body compared with solid carbonic acid. In fact, ice would be quite competent to make a mixture of solid carbonic acid and ether boil, it being hot in comparison. All bodies are warm, and all bodies are emitting rays of heat. Here is a platinum wire in front of the table, such as we have already operated upon. At the present time that platinum wire is emitting rays of heat of a perfectly definite character. If I connect this wire with our battery you will observe our old experiment. You see the wire is heated to redness; it emits rays of heat, and also, to some extent, rays of light. Before the electric current passes the wire emits rays of heat which are incompetent to excite vision; but when I raise the temperature of the wire thus, by sending the electric current through it, what becomes of its old rays of heat which it emitted in this invisible state? They still maintain themselves, and they become much stronger, but they are still obscure. We mix, with the luminous rays of that wire, the obscure radiation that issued from it before the current made it incandescent. If I go on shortening the wire, as in an experiment we made in an early portion of these lectures, we find it gets brighter and brighter, but the rays it emitted before it became red-hot at all are still mingled with the visible radiation. They exist, but they exist greatly intensified; so that the rays which issued from that wire before it became incandescent, are present, as well as the visible rays, but they are raised to a thousand times the intensity which they first possessed. They are still obscure, and have no power to excite vision, but they are, nevertheless, there with a thousand fold their first intensity. Now I must try to separate before you these luminous rays from the obscure rays; and I must endeavor to operate upon the obscure rays so as to show you some effects that they can produce. I think you will understand the process by which this can be done. I have here a small concave mirror, and this I will place behind the electric lamp. We shall have an image of the carbon points of the lamp produced in that way, and I will throw that image upon the screen. We have now thrown upon the screen an image of the carbon points, whence issues the electric light. If I take another mirror, and converge the rays by it, I can give you a larger image, which, perhaps, will be better seen. Here is now a large image of the carbon points produced in that way. The image is inverted. You see a considerable amount of light there, but Mr. Cottrell will now fill a vessel with an opaque liquid. The liquid which we use to obtain the opaque solution is called bisulphide of carbon: it is perfectly transparent; and here is the substance called iodine—very well known to many people. This bisulphide of carbon dissolves the iodine with great freedom, and the consequence is the production of this dark liquid, which is so wonderfully opaque that it would cut off the light of the sun at noonday. Strange to say, it is the quality and property of this wonderful substance to entirely cut away the luminous or visible rays upon which depend the colors you saw on the screen, whereas it allows all the rays of heat to pass through. The liquid is opaque to light, but perfectly transparent to radiant heat. Mr. Chapman will place a lens in front of the electric lamp; and thus we obtain this beautiful convergent beam or cone tracking its way through the dust of the room toward the thermo-electric pile, Mr. Chapman will, when I tell him, place the cell containing this opaque liquid in front of the electric light. That will cut off bodily all the light, but still the spot where the pile will be placed will remain very hot. [The cell and pile were then placed in position.] You see all light is cut away; but you observe that the needle at once marches away, thus proving that although the light is cut off, the heat rays are left behind.

I want now to try and make these heat rays more evident to you still, and for that purpose I have placed within this camera an electric lamp similar to what I have just used; and behind the electric lamp I have placed a silvered mirror. This mirror will reflect the rays of light from the electric lamp, and will cause them to issue through the window which you see in front. This window i salt is exceedingly transparent to the rays of heat, and also to the rays of light; and it is for that reason that I use that substance. I now obtain a convergent beam from the electric lamp. You see a brilliant cone of rays. Mr. Cottrell will now place the opaque solution in front. There it is, cutting off all the light, so that you see nothing. But now I bring this piece of platinum opposite the dark liquid, and observe what occurs. The platinum is raised to a red heat, in perfectly dark air. If, instead of platinum, I take some dry paper, and hold it in the focus of the dark rays, you see I can ignite that paper. The paper is set on fire. This ignition is caused by the invisible rays of heat issuing from the electric lamp. I now take a thick piece of metal and hold it in the dark rays of heat: you see it is melted by the radiant heat, and drops down in liquid state. I will now burn a piece of zinc here. There, you see the zinc is actually set on fire in a place where there was perfect darkness. The air where this zinc is set on fire is perfectly unwarmed. Nothing would be easier than to ignite a cigar in this way in perfect darkness. For instance, here is one which I will ignite. You see it is instantly set alight in a place where there is absolutely no light. You might put your eye where that platinum was raised to red heat. I have cautiously approached my eye to that burning focus that you saw there, and allowed the rays bodily to enter the eye, and could neither see light nor feel heat. The retina was perfectly dead to those very powerful rays. Sometimes we obtain the combustion of magnesium by these rays. Here you see we have that beautiful metal set on fire in a place where there were no lights whatever—a space of utter darkness. I might set London on fire by means of these dark rays. I have here a glass jar containing oxygen gas, and into this jar I dip a piece of charcoal. I now bring the charcoal into the focus of the invisible rays of heat, and you see the charcoal is ignited by these dark rays, and burns brilliantly in this gas.

I want now to make one or two more experiments in connection with this subject. For this purpose I will take the same mirror which I have just used, and employ another camera which is at the end of the table. The mirror will be placed behind the light, and will reflect a beam of light along the table. Instead of allowing this beam to fall upon the audience, and annoying you, I will catch it upon another mirror just as I caught the ray of light by the mirror near the ceiling in an experiment early in the lecture. I dare say many of you see the intense reflection here. There is a focus which would burn your fingers most fearfully if you put them there. I dare say we shall be able to inflame paper at that focus. There you see the paper instantly set in a blaze; and this blaze is produced, not by the luminous rays, but by the dark ones. You might put a sensitive thermometer there and have no result. It is only when the heat falls upon this paper that the heat is produced. We can burn zinc here as I did in the dark rays. You see the zinc is set on fire and blazes up almost like a piece of paper. Here is a small vessel containing water, and I will place that in the focus of the rays. I now place another vessel of water in such a way that the light has to pass through it. This will intercept the dark rays which give the heat, though it does not sensibly interrupt the rays of light. At the present time the focus of rays falls upon the former vessel of water without any effect whatever