His Majesty's Patent Office.

By John Mills.

Men, my brothers, men the workers, ever reaping something new.
That which they have done but earnest of the things that they shall do.
Not in vain the distance beacons. Forward, forward, let us range,
Let the great world spin for ever down the ringing grooves of change.—Tennyson.

CHANCERY LANE, that lively thoroughfare between High Holborn and Fleet Street, is about equally divided between students and practitioners of the law on the one hand and patent agents on the other.

Here come the great army of inventors from the four corners of the earth, who hover about His Majesty's Patent Office like vultures over a dead carcass; and the patent specification, till recently clothed in blue, is the one thing ever present in most offices round about Chancery Lane. I fancy many of those constantly engaged in poring over and trying to unravel the mysteries contained in these blue-books will sometimes themselves feel blue.

As you enter the hall the inevitable sentry, with his peaked cap and blue frock-coat labelled "Patent Office," bars the way. This good old retainer knows every man in the building, and refers you at once to Room No. X Y Z, and the floor where the person sought may be found. If you happen to be lucky, the object of search may turn up quickly; but likely enough you will ramble for a while on a wild-goose chase along the wrong corridor and jump a time or two, like an escaped lunatic, out of the frying-pan into the fire. There is an air of bustling activity about the place. Decently clad, cheerful, and well-nourished officials, agents, or inventors constantly traverse the corridors, ascend and descend the great staircase, and pass in and out at the hall door; as often as not they carry in their hands the blue-clad specification which, in effect, they have individually married, so to speak, taken it for better and for worse with all its imperfections; for it is to them the way to wealth, whether the path be long or short, straight or crooked, pleasant or nauseating.

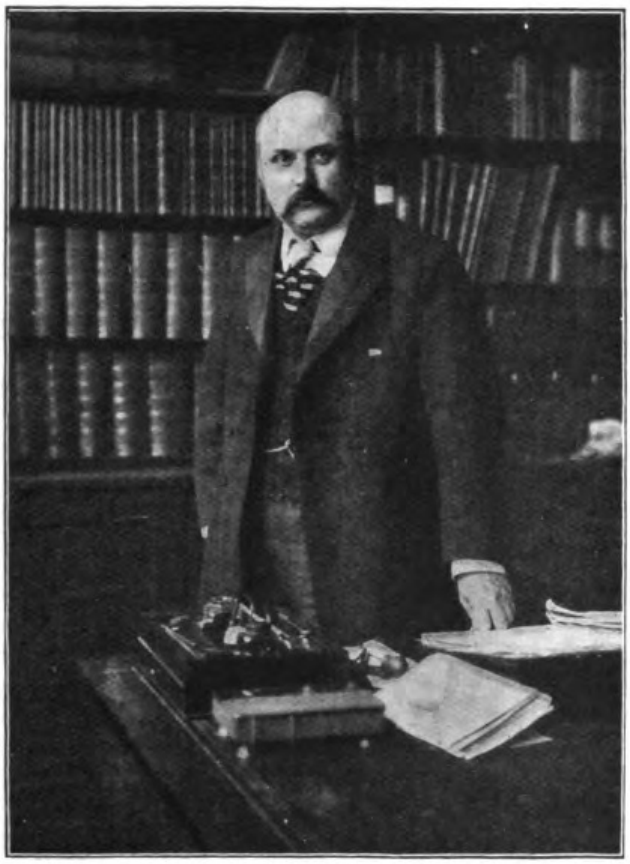
MR. C. N. DALTON, COMPTROLLER OF THE PATENT OFFICE.
From a Photo. by J. Russell & Sons.

Evelyn, in his diary, August 6th, 1657, says: "I went to see Colonel Blount, who showed me the application of the 'way-wiser' to a coach, exactly measuring the miles, and showing them by an index as we went on. It had three circles, one pointing to the number of rods, another to the miles, by ten to 1,000, with all the subdivisions of quarters; very pretty and useful."

I cannot here trace fully the many stages by means of which the present system of granting patents grew, as the result of efforts to eliminate the unjust monopolies granted in past times to favourites of the King for services rendered in connection with the Royal cause. A manuscript calendar of patents used to be kept at the old Patent Office in Quality Court, and it contained a record of grants from the year 1617 down to 1851; these have been printed at a cost of £90,000, and copies from 1617 to date may be had in the sales department. In 1884 the *Illustrated Journal of Patents* was founded; it contains only brief descriptions of the essential features of inventions with just enough illustration to elucidate the text, so that when a person wishes to know if an idea is novel, he can find out by searching this journal in about one-tenth the time it would take if the full specifications were individually consulted.

All applications for patents must be made in English, and no models are required to demonstrate that the invention is workable. Provisional protection can be obtained for nine months at a cost of £1, and at the end of that time the complete specification will require a stamp, value £3. Every patent is granted for the term of fourteen years from the date of application, subject to the

payment of the prescribed annual fees, which, for the ten instalments, amount to £95, but the annual fee gives an inventor a chance, at reasonable cost, of experimenting as to whether his novelty will succeed. Any person who represents that an article sold by him is a patented article when no patent has been granted for it is liable for every offence on summary conviction to a fine not exceeding £5. The Patent Office does not undertake to give legal advice or opinions on any subject connected with patent law, which, like other laws, is left to the interpretation of professional men. The patent laws of this country make no provision for an official search as regards novelty, and, consequently, British patents are taken out at the risk of applicants, who are expected to cause a search to be made as to the novelty of their inventions either before they make, or before they complete, their applications. It is left to every person to protect his rights by opposition or otherwise. A patent is granted upon an application which passes the prescribed stages and is unopposed, whether the invention be novel or not.



MR. HATFIELD, CHIEF EXAMINER OF PATENTS.
From a Photo. by George Newnes, Ltd.

Every application for a patent passes through known hands, and its progress is always capable of being followed, so that it could be traced at any instant to the care of the particular official attending to it. Inventors who come to the Patent Office are generally ignorant of what has gone before, and are often quite unfamiliar with the subject they are trying to improve. Sometimes by referring applicants to the illustrated abridgments they are obliged to go sadly away, though possibly still unconvinced that their ideas are old. Ladies, too, often worry the officials over patent ornaments or dress attachments.

Mr. Cornelius Neale Dalton, C.B., the Comptroller, frequently holds a court within the office to hear oppositions to the grants of patents. He sits on a rostrum, and the opposing parties are disposed on opposite sides with a barrier between them! Kick my idea, kick me, is a point on which the inventor is rather sensitive, and the barrier is sometimes useful for preventing too close an embrace when the discussions become somewhat lively and the prospects bid fair to afford a prize-ring display where cool arbitration only is intended. This court is a most useful institution, and saves large sums which might be otherwise wasted in litigation. Where a case at law might cost £300, the Comptroller, with his wide experience and the staff of experts in the office to assist him, can decide a case for as many pence, and so avoid a suit at law.

I do not regard the Patent Office as a perfect national institution as it exists at present, but it is infinitely better than it was twenty years ago, and there is a never-flagging zeal among its chiefs to approximate nearer and nearer the ideal stage. Compared with what Dickens called the "Circumlocution Office," it is changed indeed. In his "Poor Man's Tale of a Patent," Dickens gives us a vivid picture of the time and trouble and expense involved in getting a patent through. He says: "Look at the Home Secretary, the Attorney-General, the Patent Office, the Engrossing Clerk, the Lord Chancellor, the Privy Seal, the Clerk of the Patents, the Lord Chancellor's Purse-Bearer, the Clerk of the Hanaper, the Deputy Clerk of the Hanaper, the Deputy Sealer, and the Deputy Chaff-Wax. No man in England could get a patent for an india-rubber band, or an iron hoop, without feeing all of them. Some of

them, over and over again. I went through thirty-five stages. I began with the Queen upon the Throne. I ended with the Deputy Chaff-Wax. Note. I should like to see the Deputy Chaff-Wax. Is it a man, or what is it? What I had to tell, I have told. I have wrote it down. I hope it's plain. Not so much in the handwriting (though nothing to boast of there) as in the sense of it. I will now conclude with Thomas Joy. Thomas said to me, when we parted, 'John, if the laws of this country were as honest as they ought to be, you would have come to London, registered an exact description and drawing of your invention, paid half a crown or so for doing of it, and therein and thereby have got your patent.' My opinion is the same as Thomas Joy. Further, in William Butcher's delivering 'that the whole gang of Hanapers and Chaff-Waxes must be done away with, and that England has been chaffed and waxed sufficient,' I agree." At that time the officials were rather indifferent. Mr. Barnacle, junior, found those young gentlemen singeing their knees and gaping their weary way on to four o'clock. Inquirers were met with the answer: "Look here. Upon my soul, you mustn't come into the place saying you want to know, you know."

THE OLD PATENT OFFICE LIBRARY—NICKNAMED "THE DRAIN-PIPE." *From a] [Caricature.*

Applications for patents contrary to general law are refused; as, for example, those relating to gambling and to adulteration for purposes of deception, such as making milk to look like cream, or making the automatic machine give back the coin as well as the goods at certain intervals unknown to the purchaser. An inventor may take out a patent for almost any purpose imaginable, and it is therefore a great problem to classify such a higgledy-piggledy collection of subjects, so as to be convenient for reference, coming in as they do at the rate of about 30,000 annually, or 100 per day. The kernel, however, is taken out of each specification by the abridger, and they are roughly divided into 146 classes of illustrated volumes handy for searching rapidly, as they are as nearly as practicable kept up to date. It has been suggested to further subdivide these classified volumes into 7 multiplied by 146, or 1,022! At the end of last year there were about 340,000 British specifications of patents, ranging from the year 1617 to 1900. The number of applications for patents during the year 1897 was 30,936, as compared with 30,194 in 1896 and 25,065 in 1895.

Although the number of patents applied for illustrates the progress of inventive activity, it does not afford any reliable criterion as to the number which arrive at maturity. Out of the 30,194 in 1896, for example, only 13,360 were completed, the rest being allowed to lapse after the nine months' protection. In one hundred years 650,123 patents were granted in the United States. France comes next with 308,558; England, 278,000; Belgium, 154,155; Germany, 126,114; Austria-Hungary, 82,933; Canada, 65,510; Italy, 49,990. Thomas A. Edison, with 727 patents, is, perhaps, the most prolific of inventors. There are about forty other inventors each of whom has upwards of one hundred patents to his credit. Of 25,786 applications for patents in this country in 1899, 15,340 were from England and Wales, 3,022 the United States, 2,921 Germany, 1,116 Scotland, 1,031 France, 431 Austria, 396 Ireland, 208 Belgium, 163 Canada, 137 Switzerland, 125 Russia, and 112 Italy. No other country contributed as many as one hundred.

The staff of skilled examiners of patent specifications includes men with special knowledge of almost every branch of applied science, so that inventions upon being filed are relegated for attention to persons having the necessary competence for dealing with particular cases. There are also several

From a] THE PRESENT PATENT OFFICE LIBRARY. [*Photograph.*

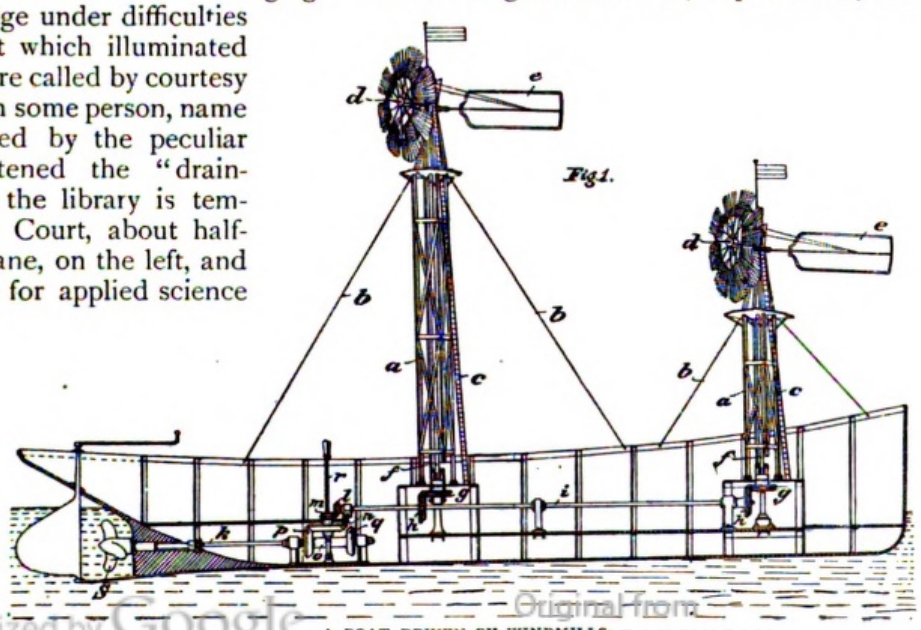
barristers in the office, and to one of these I am indebted for much friendly assistance in preparing this article.

For a study in the evolution of libraries the Patent Office affords an interesting object-lesson. This most useful auxiliary to the numerous searchers after novelty began its career in a sort of tunnel in the old building which was pulled down a couple of years ago to make room for the fine new library buildings now approaching completion. A long table ran down the middle of the tunnel, and it was a rather comical scene to see the readers in varied attitudes rummaging about after knowledge under difficulties in the artificial light which illuminated that peculiar structure called by courtesy the library, but which some person, name not recorded, tickled by the peculiar phenomenon, christened the "drain-pipe." At present the library is temporarily at Bishop's Court, about half-way up Chancery Lane, on the left, and as a working library for applied science and all that concerns invention there is nothing in London to compare with it. All departments of technical science and industry are represented; text-books and periodicals and proceedings of learned societies for each subject are arranged so that the reader can locate himself near the literature he wishes to study, and open access is granted to practically all the library contains. Pens, ink, blotting-paper, and note-paper are supplied free and without stint, so that a reader may enter the library empty-handed and leave it with a complete essay in his possession, and then go to the A.B.C. or B.T.T. round the corner for a refreshing cup of tea, feeling that he can afford it.

"An age is known by its inventions," says an old writer. If he meant by this that an age is great in proportion as its inventions are numerous, then he would have reckoned the present one great indeed. The variety of patents is endless, ranging from pins to flying machines and Keeley motors.

Some of the specifications are very curious. There is a machine for washing and peeling potatoes, a workman's dinner-can with a never-cooling food-warmer, a pie-funnel, and

Fig 1.

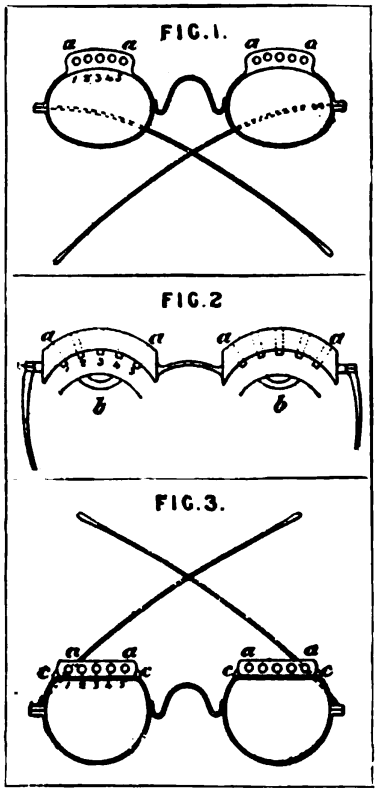


A BOAT DRIVEN BY WINDMILLS.

crust supporter combined; and all kinds of domestic appliances.

A patent for propelling boats by means of windmills embodies a good idea if it could only be made to work. A pair of windmills is arranged upon a vessel with hollow masts through which vertical shafts drive a horizontal shaft in the hull by bevel gearing, and motion is communicated to gearing wheels which may be connected by a sliding clutch for propelling in either direction, and should one windmill rotate faster than the other, and make the boat spin round instead of moving forward, the second windmill is thrown out of gear. The preceding illustration will make this plain. Considering that a battleship takes such a tremendous amount of coal to keep it alive, the Admiralty might take a hint from this; or, if they cannot maintain equilibrium by thus placing the prime mover at the top, they might succeed better by putting the fleet on telescopic stilts adjustable as to depth of sea, and let them wade.

Lecturers, clergymen, and lawyers whose memory may sometimes be rather treacherous will appreciate the genius of the inventor of the microphotoscope, of which we reproduce his own plans. It consists of a pair of spectacles, or eye-glasses, with one or a number of minute photographs arranged in or along the rim. The minute photographs are placed behind suitable magnifying glasses, and are so arranged that the eyes of the wearer may see either one or all the photographs without moving the spectacles. They may be photographs of written or printed matter, maps, views, landscapes, or any group of objects from which a photograph may be taken. Some of the uses to which the microphotoscope may be put are the following: For the student, the series of minute photographs along the rim might consist of photographs of an epitomized grammar, history, geography, etc. As the rims can be changed so often as new microphotographs can be obtained, the student would be spared the trouble of carrying books about with him. A lecturer might have lecture notes photographed and placed in the rims of his spectacles; a lawyer his briefs, a clergyman his sermons, a tourist maps and views of the country he is travelling through, a shop-keeper a ready-reckoner, a doctor formulæ, a musician whole pieces of music, and a detective criminals wanted.



THE MICROPHOTOSCOPE, OR READY-REFERENCE SPECTACLES.

Acrobats are invited to use a patent shoe, soled with iron, which will enable the wearers, with the aid of powerful electro-magnets, to walk head downwards along a metallic ceiling like so many overgrown insects. A Paris invention is for making imitation damask by coating the linen or cotton fabric with celluloid and impressing patterns upon it. From Vienna comes the idea of a coffin-cover made of a material to prevent crushing by the weight of the earth, and to accelerate decomposition. Another patent is for the protection of colouring matters by a compound which rejoices in the name of Nitro-alphylide-anthraquinone. In the year 1599 a grant was made to Captain Thomas Hayes for making of instruments of war for ten years. It was a military "hold-all" to contain a spade, a mattock, a hatchet, a saw, and not omitting an anvil and fourteen days' victuals. There is a proviso that the requirements of the Crown shall be supplied. In 1604 the patentee notified his intention to present the above invention to the Crown, offering the Master of the Ordnance £2,000 if he could get the invention introduced into the southern counties.

During the Civil War an inventor applied for a patent for a plough and cannon combined. The handles were to be guns, so that if the ploughman were attacked he wheeled about, fired his gun, and, if the enemy fled, went on with his ploughing.

Tommy Atkins is not ignored by the inventor of the present time, who comes to his aid in order to gradually and easily initiate him into the mysteries of military art. For this purpose the necessary instructions to infantry are printed on a pocket-handkerchief so that the attention of the user may be constantly directed to the details of the rifle printed thereon; the trumpet-calls are musically represented, and drawings illustra-

FIG. 1.—WALKING ON THE BOTTOM.

FIG. 2.—PADDLING.

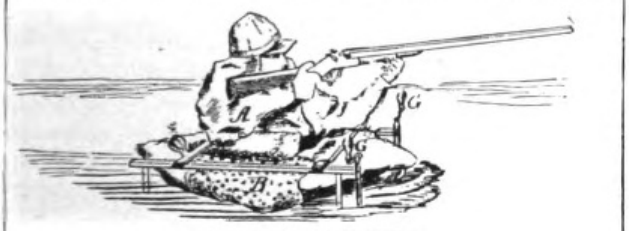


FIG. 3.—DUCK-SHOOTING.

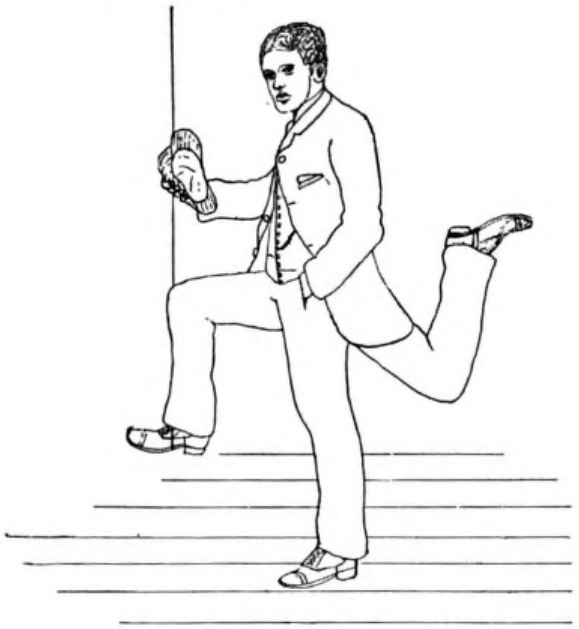
AN INGENIOUS DRESS FOR DUCK-SHOOTING.

tive of the attitude to be taken up or precautions to be observed by the soldier when left to his own resources are presented with printed instructions around the outer margin of the handkerchief. Getting gold from wheat by exchange at so many sovereigns per ton is plausible enough, but one inventor cuts up the wheat straw into fine square snips, and puts them in a jar of ordinary cold water. Allowing the steep to remain quiet for ten hours at a temperature of 59deg. Fah., he then strains off the liquor into a shallow pan, allows it to stand for twenty-four hours, and afterwards catches up the skim, allows it to dry, "so getting some results of films of gold."

A rather jolly and exhilarating contrivance for sportsmen consists of a waterproof dress with a buoy or float to encircle the waist of the wearer. As will be seen from the annexed drawings, within the buoy are fitted two separate tight chambers of india-rubber cloth for protection in case of collision and to maintain steadiness in the water as in the case of a boat. The body, floated waist-high, can be urged forward by a screw propeller, and on the float is fitted an apparatus like enlarged duck-feet for working like a small pair of oars or paddles. Four persons, as well as the operator, can be supported on the float without overbalancing it. "For duck-shooting, where the use of a boat would disturb the birds, the dress or apparatus would enable the sportsman to approach almost insensibly, carrying his gun horizontally fixed on to the float by suitable fittings which protect the gun. This dress or apparatus is also adapted for use in deep-sea fishing, crossing rivers, navigating, and exploring purposes."

One of the most curious ideas I have come across is that of an inventor of "hair-scent extract." The scent or smell of the hair of healthy females possessing good digestion is said to possess energizing and animating influences, and is advantageous to the health. He makes an extract from human hair by means of milk and sugar and adds a small quantity of the purest alcohol. The resulting liquid is added in drops to water used in the preparation of viands, etc.

Another queer invention (here depicted) is designed to enable a person photographed to resemble the arms of the Isle of Man (three legs), by fixing to the person a third artificial leg



A DEVICE TO ENABLE THE USER TO RESEMBLE THE MANX ARMS.

behind. It is either strapped to the person, hooked on by hooks or springs, or supported independently as a separate article of furniture, against which the "sitter" rests or presses. "This photographic studio appliance will be found to have a limited use in acting, and possibly other trades and professions besides photography—in fact, anywhere where the human figure can be advantageously made to mimic the Manx arms."

Volcanoes, those ulcerations of the earth's crust which vomit liquid fire, are, according to one inventor, to be harnessed and applied to useful purposes. The volcanic heat is to be drawn into receptacles provided with tubes for distribution to public and private buildings, even to great distances; the invention may be applied to heating baths, drying-rooms, and for distilling water. The water of marshes is to be purified by distillation, and "to condense it more quickly, ice-houses may be added to the centres." Really!

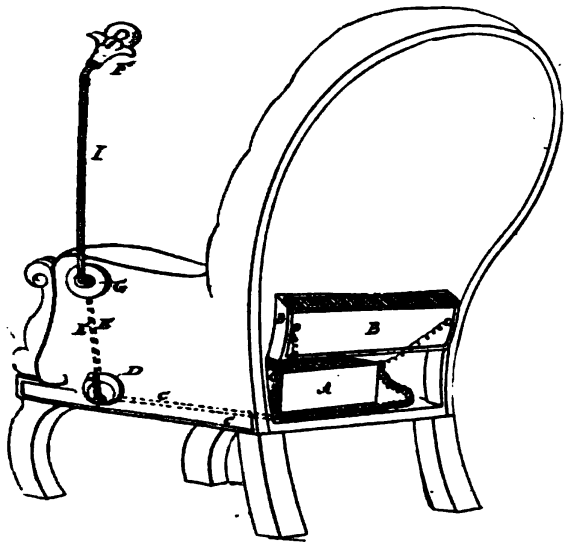
Children come in for a treat by way of what the inventor calls "Confectionery Jewellery." The object is to prevent all such mischiefs as the swallowing of hard materials used in the manufacture of jewellery by discarding such substances as coral, jet, glass, and metal, and replacing them by confectionery. Necklaces, brooches, earrings, and bracelets in the young wearer's untiring fingers and accommodating mouth will reduce the chances of harmful accidents, "and besides this, the pleasure derived from the wearing a pretty ornament will be supplemented by the satisfaction of enjoying a sweetmeat afterwards."

To devise an instrument able to record automatically not only the distance travelled by a bicycle or other vehicle, but also the various directions followed during the journey and the hills ascended or descended, would be by many people pronounced impossible. However, a little piece of apparatus called the "pathometer" has been invented which claims to do all these things. The record of distance travelled, of course, presents no difficulties. The record of directions is not so simple, but, as might be expected, it is obtained by means of a compass. As to ascents and declines, the problem is solved by a pendulum. The pathometer is fixed to the frame of the vehicle in such a way that this pendulum is free to move to and fro in the line of travel. Against the recording tape, which is carried on a drum that is rotated as the bicycle moves by the action of a "kicker" as in an ordinary cyclometer, there presses a wheel with sharp teeth, able to cut into the paper. This wheel is controlled from the pendulum in such a way that when the latter is hanging in its middle position—as it does when the road is quite level—the line cut in the tape is straight and parallel to the edges of the strip, but when the pendulum is swung forwards or backwards the line is diagonal, its obliquity being proportional to the steepness of the road traversed. Hence with a knowledge of the constants of the instrument the gradients over which the vehicle has passed can be easily calculated.

Lamp-posts come in for a fair share of attention. In one case the inventor seeks to connect them with drains. Over the cage containing the light there are trays filled with disinfectants, so that as the sewage gas ascends through the lamp-post into the warm chamber chemical action with the disinfectants is facilitated, and the previously contaminated air escapes purified. The combination lamp-post and hydrant consists of a lamp-post carrying the usual lantern for gas or electric lighting, upon the glass of which the word "Fire" shows out in bold red letters. The usual fire-alarm drum for either electric or telegraphic communication, coupling-up hose for fire purposes, for filling water-carts, and for street-flushing, draw-off tap for use on cab-ranks, or for domestic water supply in time of frost are attached.

An artificial leg and foot which will enable a mutilated person to walk is a desideratum. The novelty consists in the foot being mainly a hollow india-rubber chamber which is inflated in the same way as is a bicycle tyre. The skeleton of the foot, so to speak, is of wood, and contains within it a rubber-faced joint which permits movements like those which take place at the ankle. A pair of rubber pneumatic pads surround the stump itself, so that no undue pressure is exerted on the tissues. It is said that a person who had undergone amputation of both legs below the knee, and who was wearing two of these limbs, although having little or no command over the knee-joint, was yet able to walk fairly well, and to go up and down stairs safely.

A mechanical duck that does everything except lay eggs has been invented by a Frenchman. The bird goes waddling in search of food and picks up seeds. These pass into its stomach through a series of triturations, and accomplish a process of digestion. It is said to be impossible to distinguish this duck from a living one. It

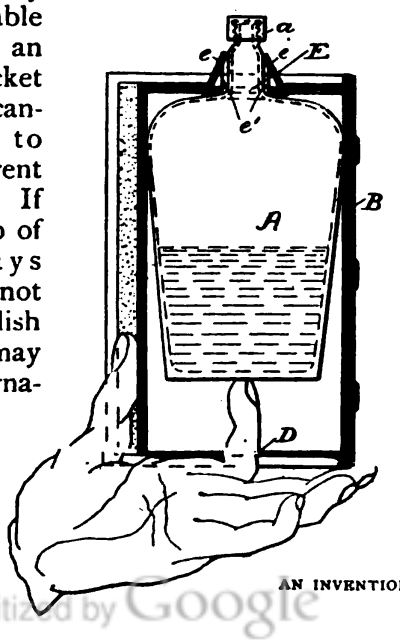


A CHAIR WHICH GENERATES ITS OWN ELECTRIC LIGHT.

splashes about in the water, flaps its wings, and quacks most realistically. The amphibious tricycle is also of French origin. It is constructed entirely of aluminium, with the exception of the chain and certain other parts, which require the use of steel. The wheels have enormous inflated rubber tyres, which make each wheel a watertight float, buoying up the machine on the water. The tricycle can be used indiscriminately on land or sea, and, although it does not run very rapidly, it may be of considerable use in special cases. It weighs but 66lb., and sinks, when fully loaded, to a depth of only 1ft.

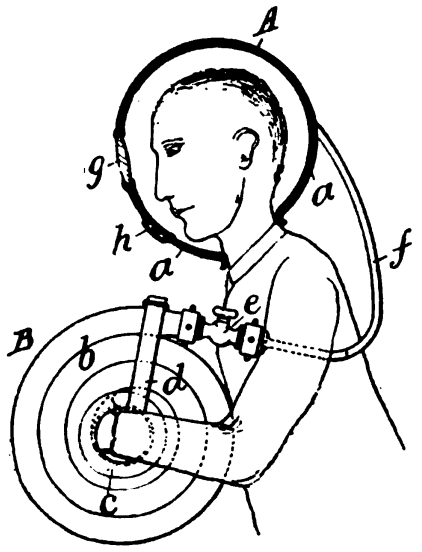
You may have incandescent lamps combined with your easy chair, sofa, and bed. A secondary or primary battery is arranged under, or within, or at the back of any piece of movable furniture, and an adjustable bracket supports the incandescent lamp, to which the current is led by wires. If you like a drop of whisky always handy and do not desire to publish the fact, you may have it in an ornamental covering made so as to entirely conceal the flask from observation, and at the same time admit of ready access to its contents. For example, you can keep it on your shelves or desk in the form of a book labelled "Legal Decisions, Vol. I." There are trap-doors at the top to let out the neck of the flask, when raised by the finger through an aperture at the bottom. We give illustrations of both these ingenious devices.

FIG. 1.



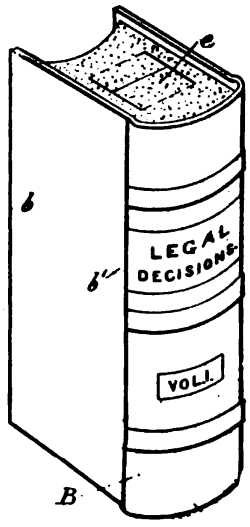
AN INVENTION FOR RENDERING THE LAW LESS DRY.

For the use of miners, more especially, one inventor makes a coiled tube containing compressed air and carried like a lady's muff, handy for regulating a supply of fresh air to persons in a poisoned atmosphere. The idea will be easily understood from the illustration. A hood which fits over the head is connected with this reservoir, and thus only pure air is breathed. Means are adopted for letting out the impure air, and also a window for seeing through the hood.



A MUFF WHICH SUPPLIES FRESH AIR.

FIG. 2.

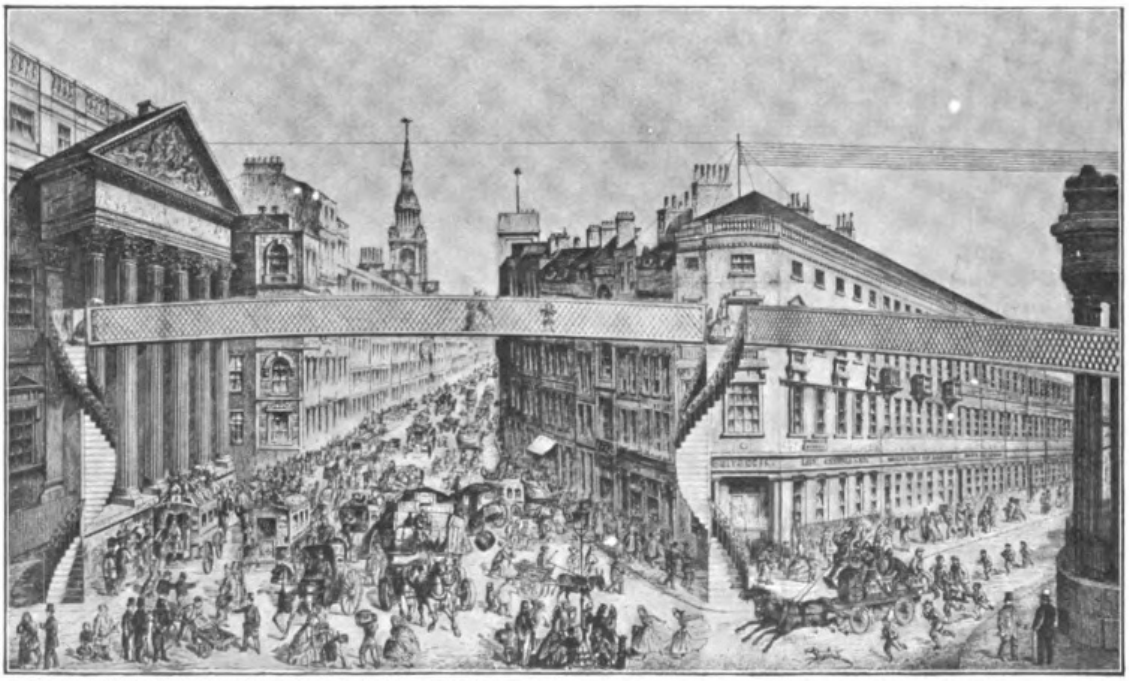


The largest specification of an invention ever presented at the Patent Office is next shown side by side with an ordinary specification. There are 104 large sheets of most elaborate drawings, and enough descriptive letterpress to fill an ordinary book. I have selected one

THE LARGEST SPECIFICATION EVER PRESENTED, SIDE BY SIDE WITH AN ORDINARY SPECIFICATION.

sheet as a sample of the industry of the inventor. It is a foot-bridge representing a means of crossing from the Mansion House to the Bank of England, but it is, of course, intended to apply equally well to any other crowded thoroughfare.

Kant, the philosopher, said that probably no really new idea ever occurs to anyone. It is more than likely that among all the millions upon millions of untold ages every conceivable idea has presented itself to someone or another, and Macaulay says: "Truth is discovered by the highest minds a little before it becomes manifest to the multitude. This is the extent of their superiority. They are the first to catch and reflect a light which, without their assistance, must, in a short time, be visible to those who lie far beneath them." Nevertheless, invention and the development of machinery constitute the most striking feature of the century just closed. Imagination, it is true, has constantly anticipated the slow advance of science, and although we may smile at those writers who would endow mechanism with consciousness, "there are machines that have stomachs of their own, and consume the food themselves." I will close this article with a quotation from George Eliot in "Theophrastus Such": "What I would ask you is, to show me why . . . . there should not at length be a machine of such high mechanical and chemical powers that it would find and assimilate the material to supply its own waste, and then, by a further evolution of internal molecular movements, reproduce itself by some process of fission or budding." And so the speculative thinker shoots ahead of the workaday inventor.



ONE OF THE DRAWINGS FROM THE LARGEST SPECIFICATION—A FOOTBRIDGE FROM THE MANSION HOUSE TO THE BANK.