ANOTHER NEW MOTOR.

We have to acknowledge the receipt of a pamphlet containing a description of the "Keely Motor," and a report upon the merits thereof, by Charles Haswell, C. E. This report is addressed to Messrs. Israel Corse and F. W. Foote, Jr., of this city, gentlemen of prominence in commercial circles. The new motor has become the subject of lively discussion among certain wealthy people here, by whom its success is considered certain. Every share of the stock has been taken, the offers of money having been greatly in excess of the supply of shares. The proprietors expect to reap a large harvest by the sale of rights when the invention is more fully developed—an event which is soon expected to take place.

The following account of the invention is given in the pamphlet.

KEELY-MOTOR,

OR HYDRO-PNEUMATIC-PULSATING-VACUO ENGINE.

"Professor Faraday, of England, asserts that a grain of water contains electrical relations equivalent to a very powerful flash of lightning." Knowing that the equilibrium of these relations is sometimes destroyed in the heavens, merely by a change in conditions, resulting in enormous mechanical work: and, as we are constantly discovering means to change natural conditions: the question arises (which seems a legitimate one) why are not our locomotives and steamships propelled with grains of water, instead of tuns? the only answer that can be given is: We have as yet no knowledge of suitable means to destroy the equilibrium of these relations."

"Mr. John W. Keely, of Philadelphia, has discovered a method of destroying this equilibrium, or something analogous to it, and made it the basis of an invention by which these conditions are changed.

DESCRIPTION.

"During a period of about two months, several tests have been made of the Keely-Motor power, at Philadelphia, in the presence of many persons, several of whom were among our ablest civil and mechanical engineers and experts; the main facts connected therewith are thus given:

"By a peculiar *mechanical device* hitherto unknown, a force is generated which can readily be applied to driving all kinds of machinery for which steam or other motive power is generated and applied, *without cost other than the mechanical device or generating machine and the necessary wear of machinery.* The generator is simple and comparatively inexpensive, occupying but a small space, and is light compared with the requirements of steam power; and since this power is produced *without heat, electricity, galvanism, magnetism, or chemicals*, it is destined at an early day to revolutionize completely the present motive powers of the world, by reason of the economy of its cost and space.

"The power, so far as at present evolved and tested, has shown a pressure of fully 10,000 pounds per square inch, as the following explanation will show: The principal part of this power generator, now in use, is made of metal, globular in shape, about fifteen inches in diameter, and hollow, having walls about three fourths of an inch thick, a strong iron tube, an inch in diameter, connecting the generator with a cylinder used as a receiver of the power or force from the generator. This cylinder is made of charcoal iron, forty inches in length, four and one half inches internal diameter, with screw-fitted and welded heads, two inches thick, tested to a pressure of 10,000 pounds per square inch; its capacity is about three and one fourth gallons. This receiver was charged from the generator of the power in five seconds, and the power remained therein at least eight days without any addition, and from it a great number of tests were made without any apparent diminution of its energy or force.

"At the end of the charged cylinder is attached a flexible brass conductor of drawn tubing, one fourth inch in diameter, with a bore of one thirty-second of an inch, passing from cylinder to ceiling, and thence to the other side of the room, for a distance of twenty feet to the test apparatus or force register; this apparatus consists of a thick bed plate of iron, to which was bolted and packed a cylinder four inches in diameter, having a plunger or piston, the area of which was a little less than one square inch in surface. Below this piston is a chamber of about two cubic inches, with which the tubing from the charged cylinder is connected. The plunger or piston, acting perpendicularly, was the point at which the power was applied to a compound lever, which, according to Mr. Haswell's measurement, was as one to fifty-two. The end of the short arm was securely bolted and fastened to the iron bed plate of the apparatus; upon the long arm of the compound lever was suspended an iron weight of 200 pounds. On opening the stopcock of the charged cylinder connecting the tubes, the weight of 200 pounds was at once raised to the limit of the upward movement of the lever; thus, with the weight of the lever and its connections, indicating a pressure power of about 10,400 pounds per square inch, as stated before. The power generator and receiver was supposed to be, when constructed, fully adequate in strength to generate and develop the full power of the invention, but it has been found too weak; the force has proved to be so enormous that Mr. Keely has not dared to apply more than half of the power he can attain. An apparatus is now in process of construction which will be able to generate and sustain a pressure greatly in excess of that already shown, without rupture, though Mr. Keely does not expect he will need one of more than 25,000 pounds to fully develop his power. When the full power is measured and balanced, it will then be comparatively easy to construct an apparatus of the requisite capacity and strength for engines of any desired power. When an apparatus of sufficient strength to allow the generation of the complement or maximum of force is constructed, and the vapor generated is applied to the working of an engine, the exhaust vapor is at once resolved into its original elements, and is easily returned to the generator for a "re-expulsion," thus making the action automatic, and requiring no additional element for continuous working of the power.

"The following named gentlemen have witnessed the exhibition of the above tests, and may be referred to for the correctness of this statement: Charles H. Haswell, civil and marine engineer, New York city, and formerly Engineer-in-Chief, U. S. N.; William W. W. Wood, Chief of Bureau of Steam Engineering, U. S. N., Washington, D. C.; S. Parrish, gas engineer, Jersey City, N. J.; Joseph Patten, engineer, Elizabeth, N. J.; F. Glocker, machinist, Philadelphia, Pa.; William Boeckel, machinist, Philadelphia, Pa."

In connection with the foregoing statement, a professional report is given in the pamphlet, by Mr. Haswell, one of the referees mentioned above. He certifies, as the results of two actual working trials of the invention, as follows:

"Mr. Keely developed a cold vapor of a density that enabled it, when admitted to a cylinder having a piston $1\frac{1}{16}$ inches in diameter, to raise a weight of 150 lbs. suspended from a compound lever, connected as 1 to 42, which, with the weight of the lever and the friction due to the absence of a knife edge or rotating joint, was fully equal to an energy of 7,800 lbs. per square inch."

"That the vapor under the piston had expansive energy. That the temperature of the vapor reservoir and of the vapor itself did not exceed that of the surrounding air. That to operate a 45 horse power engine, a supply of the vapor of 793½ cubic feet per minute, at 7,680 lbs. per square inch, would be required. That the inventor alleges that, by the introduction within the apparatus of a very small volume of water, he can generate a vapor having an expansive energy of from 1 to 20,000 lbs. per square inch in the brief period of a few seconds; the only obstacle to the generation of this vapor in great volume being the capacity of materials to retain it without rupture. That it is proposed to reduce the great pressure above mentioned by allowing the vapor to expand into an intermediate chamber, from which pipes will lead the vapor, which may then be employed in lieu of steam in ordinary steam engines, the use of steam boilers and the consumption of fuel being no longer necessary."

We consider it very kind in Chief Engineer Wood, Mr. Haswell, Mr. Parrish, and their associate mechanicians, to serve as referees for this peculiar invention. In the absence of such capable referees, the public in general, and perhaps the investing capitalists in particular, might have looked upon the scheme in the manner we do, namely, as an arrant humbug from beginning to end.

Jugglery has a bewitching influence upon some minds. The learned Dr. William Crookes, of London, certified that the lever of his weighing machine was raised when the spiritual medium, Home, simply pointed his finger at it. [See engraving, SCIENTIFIC AMERICAN, 1871.] Several of the Doctor's associates, eminent people, corroborated the story. Mr. Haswell certifies that it was cold vapor, having a pressure of 7,860 lbs. to the inch, developed by Keely, that lifted his (Haswell's) lever. Home's trick being simpler we consider it the better of the two.

Among Mr. Keely's most recent predecessors in the "new motor" line was Paine, with his electric engine of 1871–2. Faraday said, you know, that every drop of water contains force elements equal to a streak of lightning. Paine developed this force by means of water, adding, however, a little acid and zinc. With a two quart cup, Paine claimed to be able to generate power enough to drive vessels of the largest class across the ocean at the highest velocity. But he required a brand new engine in every case, whereas Keely will use the existing steam engines.

We have before us the claims of still another aspirant for "new motor" fame. He is an unsophisticated genius from Virginia. He, too, has read about the Faradaic drop of water, and, like Keely, brings out the power by means of a mechanical device—a pendulum. A child may swing a pendulum of great weight. The pendulum works an air pump which compresses air to twenty thousand pounds per square inch if need be. Thereafter a small portion of the air or vapor is used to maintain the swinging of the pendulum, while the remainder of the gigantic power is to be used to drive an engine on the Keely plan.

It is barely possible that the capitalists who have been disappointed in obtaining shares in the "Keely Motor" might meet with better success in applying for the Pendulum stock. But should this likewise prove to be all taken, we are confident that Mr. Paine will be able to supply them. The reason we think so is because he is so kind-hearted, finding it less difficult to make new shares than to refuse to sell those on hand.

THE OREMATION QUESTION.

The question of the disposition of the dead by burning the bodies, after the manner of the ancients, is a subject which has for some years past been under discussion in the scientific circles of Europe. Various processes have been devised as substitutes for inhumation, among others petrifaction and preserving in antiseptic solutions; but in the end, it appears that the total disaggregation of the body by cremation has been considered and announced by many of the ablest foreign savants as the proper and indeed only way of avoiding the noxious effects resulting from the natural changes in the thousands of human remains buried in the neighborhood of thickly populated localities. Taking its origin in Europe, the movement during the last few months has, under the influence of Sir Henry Thompson and other eminent scientific authorities, who have strongly advocated its principles, taken a new life and has rapidly spread over the continent. The people of Switzerland, and Germany especially, have accepted it to no small extent. At Zurich recently, 2,000 persons subscribed to an association having the burning of the dead as its sole object. At Basle, the orthodox clergymen publicly announced their approval of the movement, and in Germany a new apparatus for carrying out the operation of incineration has been invented and advertised. More important than this to us is the wide spread discussion which the subject has evoked at the present time also in this country. A society has already been formed in New York city, including among its members Mr. Henry Bergh, Drs. Sexton, Lorilliard, and J. W. S. Arnold, with many other well known citizens, for the purposes of promoting cremation and securing its practical application, and columns of the daily journals are given up to correspondence and the views of the people upon the advantages and disadvantages of the system.

The reader unversed in the process, which it is proposed to substitute for slow moldering in the grave, will naturally think of the ancient pyre and probably suppose that it is the intention of the advocates of the plan to burn the bodies upon huge piles of variously scented wood, after the Greek or Roman fashion. Little would be gained in an æsthetic or even a sanitary point of view if such were the system, for the gases and fumes evolved would be far from healthy. The body of the poet Shelley was thus destroyed, and his biographer tells us that, so far from being the beautiful and poetic rite intended, the process was a very disagreeable and nauseous operation. Science provides a better plan for reducing "ashes to ashes" in the apparatus especially devised by Professor Brunetti for the purpose, and by that inventor recently described in the French *Revue Scientifique.* After having made several experiments on the human subject, in which the bodies were burned in the retorts of gas manufactories, in closed receptacles, and with free access of air, Professor Brunetti finds that an oblong furnace of fireproof brick is required, having 10 holes below, by means of which the intensity of the fire can be regulated. The upper part of this is hollowed to receive the coffin, over which a domed cover is placed, by which the flames as in a reverbatory furnace, may be directed upon the body. Within the cofin is a metal support or table on which the body rests, fixed by thick iron wire. The operation embraces three periods: the heating of the body, the spontaneous combustion, and the calcination of the bones. During the first period, and about half an hour after the pile of wood in the furnace has been lighted, the combustion of the body commences. If the wood has been well arranged, two hours suffice to produce complete carbonization. During the third period, the air holes being opened, the carbonized mass is collected and placed upon a fresh plate and the heat is urged to the utmost, a fresh supply of wood being inserted. By means of this arrangement, at the expense of about 150 pounds of wood, complete incremation may be effected in two hours. When the furnace has cooled, the cinders and bones are collected and deposited in a funeral urn.

So far as sanitary benefit to the people is concerned, we cannot but think the arguments of the advocates of cremation are cogent and forcible. It is well known that numbers have been rendered ill by water from springs and wells which have become contaminated by the near proximity of graveyards, and it is also a fact that there is a miasm arising from these receptacles which, as is universally recognized, renders their presence in crowded localities dangerous to health. We do not see the ground of the assertion that by burial the fertilizing properties of the bodies are lost to the earth, for it seems to us that they are in as good a condition for absorption as if sprinkled in the form of ashes over the surface. Neither can we incline to the belief, that by adopting cremation, a point of economy will be gained, in avoiding the expensive paraphernalia of modern funerals, since the latter are governed purely by the dictates of fashion, and that fickle individual would speedily make the jeweled urn as costly an affair as the sculptured stone.

Anything which seeks to subvert a settled popular custom strengthened not only by long usage but by a prejudice growing out of a religious feeling, presents, however, at best a doubtful prospect of success. There is not a person, we may safely say, who, when the horrors of possible living burial, the slow decomposition, and the changes of the form of a loved one to a loathsome thing, to poison the health of the living, are laid before him, will not admit that the closed furnace, the pure fire flame, and the final handful of dry clean changeless ashes are much the better of the two means of disposition; but his admission in the end will be found to apply to everybody in the world except himself and his family. It is a question of the heart in the end, not of the mind. Science, cold and passionless, may point out the better way; but if its adoption is to tear wider the wounds caused by separation from those we love, no amount of reasoning will induce us to follow it. A husband may give his wife, a mother her child, into the embraces of the earth, and endure the keenest sufferings as the dirt and stone rattle on the coffin lid; but this act, revolting as it may be, is connected in the imagination with the highest and holiest of thoughts—the hereafter. We may bury those nearest to us in our own bit of ground; we may imagine that their forms remain where we put them, and we may tend the flowers which bloom over their resting places as messengers from them to us. All this we can do: but there are few, we think, who would have the heart to hand his dead child or wife to a public official to be burned, or would care to see the ashes of his ancestors scattered over the earth as manure.

POSTAL CARDS are so extremely popular in this country that, although it is not long since they were introduced, the enormous number of one hundred millions have been printed and issued.

South African Diamonds.

Hon. Theophilus Shepstone has pointed out that Africa, south of the equator, consists of a great central, irregularly shaped basin, the outer edge of which varies in hight from 4,000 to 10,000 feet above the level of sea, and that through this rim the Orange River to the southwest, and the Limpopo River to the northeast, cut their way. It is near the exit of the former, from the enormous basin, that the diamond fields lie, while gold in large quantities is being obtained from the northeastern district. The author of this paper conjectures that this basin is the dry bed of an enormous inland sea, and that the diamonds which are found in it are formed by carbonic acid gas, ejected by the action of subterranean heat through fissures in the earth's surface, into the bed of the dried-up sea, the water of which was sufficiently deep to imprison and liquefy the gas after its evolution. The discovery of the process by which this liquid gas became crystallized, whether by electric or magnetic current, or by the potent influence of iron in some of its numerous forms, must be left to future scientific investigations.

Dr. Robert Mann, late Superintendent of Education in the Colony of Natal, states that, since the serious working of the diamond fields in 1871, large numbers of diamonds had been obtained, and it was estimated that in 1872 there were no less 20,000 miners engaged in searching for them. So large had been the yield that a very material diminution had been brought about in the value of the larger gems in the home market, and the diggers are now leaving the diamond fields for the more profitable northeastern gold fields. The result of the discovery of these fields has been to develop South African commercial enterprize, and to civilize the wild tribes in that part of the continent.

Mr. Sopen, a diamond merchant, states that the number of diamonds of the purest water received from the Cape was very small, not amounting, on the whole, to more than two or three per cent, while of ten carat stones not one in 10,000 was perfect. In consequence of the large quantity of second class stones received from the Cape, such gems were now sixty or seventy per cent cheaper than they were three years ago. Stones which some time since would have realised $7,500 would now only fetch $1,000. The first class diamonds, however, were rather dearer than formerly

IMPROVED PORTABLE OILER.

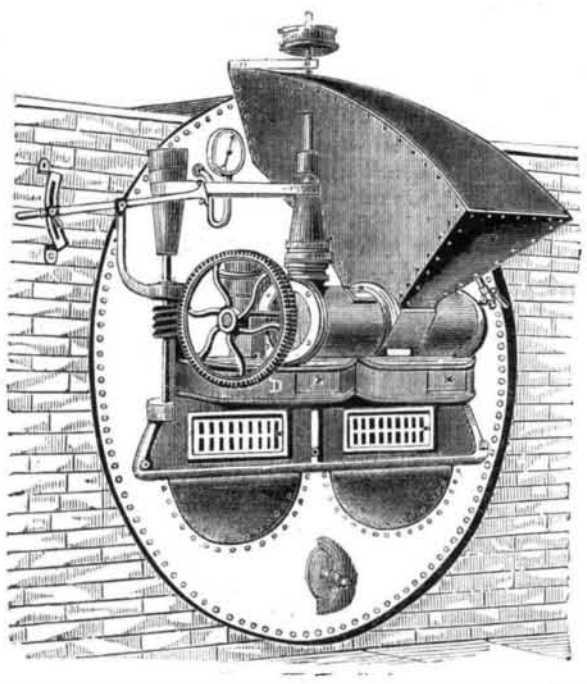
Our engraving illustrates a novel combination of an oiler with a pair of tongs, in such a manner that, by compressing the tongs, the oiler will be turned so as to bring its spout downward. The handles f the tongs are of sufcient length to enable person to reach journal boxes overhead without the necessity of a tep ladder. In the cener of the flat sides of he oil can are secured ournals, one of which s simply pivoted in an rm of the tongs, while ne other, A, is made ong and with a quarter urn twist. This, playng in a slot in the other aw of the tongs, gives he oiler a quarter turn hen the former are ompressed. After the aws are brought togethr so as to meet the ide of the can, further ressure squeezes the atter, forcing out the il, and this is conlinued until the handles re freed, when the pring, placed at B, ushes the jaws apart, nd thereby causes the iler to return to its upright position. The wire pin or point, C, is designed for picking out the holes in boxes before oiling. This, when the tongs are compressed, turns around out of the way. This ingenious device was patented by Mr. Gabriel W. Crossley, of Cleveland, Ohio.

Mechanical Stokers.

Contrivances for mechanical stoking appear to be among the most promising devices for economizing fuel. The attempts to supply an automatic feed for furnaces are usually, and perhaps wisely, imitations of the hand method, which is in the main so good that, whenever volumes of smoke are perceived issuing from a chimney, it may be inferred that the stoker is somewhat in fault.

The patent mechanical stoker of Mr. Dillwyn Smith, illustrated herewith, is, like the others, an attempt to work the hand-stoking method by mechanical means. A hopper machine, known as Standley's, was in use forty years ago, and was considered to act well; but was so complicated in its parts that, owing to the rough nature of the material with which it had to deal, it was liable to continually get out of order. Mr. Smith claims to have entirely overcome these difficulties in his machine. The first object which he seeks to attain is the saving of coal. The first step towards this is by regular distribution of the fuel, which is brought from the hopper by a screw, and falls upon a pair of fans running at a high speed, which project it over the fire and spread it with remarkable evenness. Consequent upon this regular feed, the gases, which are usually lost and go up the chimney as smoke, are consumed. Not the least advantage of improved methods of stoking is the boon of freedom from the dense smoke which now hangs over our manufacturing towns, especially when this now worse than useless substance is turned to profitable account. Another source of economy in fuel is found in the rocking bars supplied with the machine, which so far do away with the opening of the fire doors that, in some boilers, the doors are only opened when the works are stopped for meals.

From experiments with measured coal and water the results on land are stated to be, as contrasted with ordinary Cornish boilers with specially good hand firing, a saving of



from ten to twelve per cent by the use of this machine, apart from the avoidance of the smoke nuisance, and the saving to the boiler, and of labor to the fireman.

But beyond its value upon land, it is even of more importance in its application to steamers, especially those which sail to tropical climates. A strong recommendation of these mechanical appliances is the fact that, by their use, the heat in the stokehole on board the Lisboness, under the equator, was reduced by thirty degrees, and that this steamer made a faster run with six fires then she had ever done previously with eight. The saving in the cost of fuel alone is, in this case, alleged to have been 30 per cent. Anything which promises so favorably as this must be well worthy of the serious consideration of all steamship owners, especially as a decrease of stokers' labor to the extent of 70 per cent is also recorded in favor of the machine.

In mechanical, as in hand stoking, there are three principal points—a regular supply of fuel, its equable distribution over the bars, and a very carefully adjusted supply of air. Each of these is so intimately dependent upon the other two that all three must be effected together if the problem which mechanical stokers attack is to be solved at all. Mr. Smith's seems to be a praiseworthy attempt to deal with it, and the recorded performances of his machine appear to be very satisfactory.—*Iron.*

Labor Legislation in California.

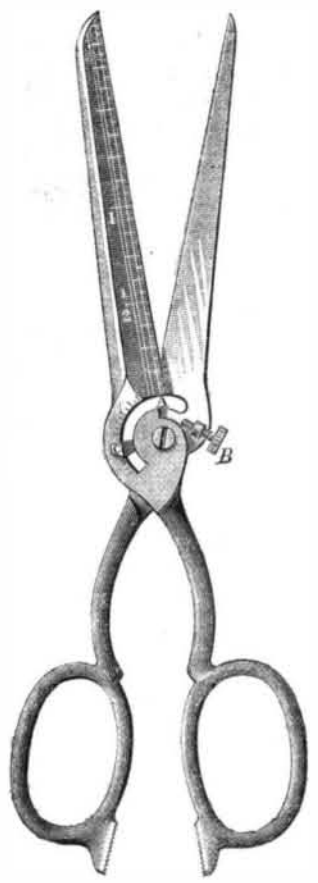
The Legislature of California recently passed a bill providing that no conductor or driver of a street car should be compelled to labor more than twelve hours a day without extra pay. Governor Booth vetoed the bill, giving his reasons in the following language:

"I am clearly of opinion that [under the operation of the inexorable law of supply and demand the wages of labor cannot be fixed by legislative enactment; and that the practical effect of this bill would be to reduce wages in the two instances specified, in the same proportion as the hours are reduced, and compel an additional reduction by the friction it creates. The laborer, too, often has to sell Monday's labor to buy Tuesday's bread, and every artificial obstruction in the sale of Monday's labor only tends to make the bread of Tuesday harder and scantier. The bill in effect says to the man seeking employment as driver or conductor: Whatever may be your necessities or hopes, you shall not labor for one employer more than twelve hours per day. All occupations are equally open to drivers and conductors with all other men. Can the law make a better contract for them than they can make for themselves? If a man prefers to work in his vocation fifteen hours for $2.50, rather than twelve hours for $2, is the law which prevents him a substantial kindness to him? That the necessity which lies behind such a choice, or which induces him to make either contract, is a hardship is too true. If the law could remove that, it would indeed be blessed. But, since it cannot, does not attempt it, cannot even judge of its extent in individual cases, is it wise to prevent the individual from making his own choice in his individual case? No man will accept employment for more than twelve hours per day, except to escape from some greater hardship. Is it right to close this avenue of escape—to cut off his right to choose for himself between want in his family and extreme toil for himself? The classes this bill seeks to benefit would hardly admit that there was anything in the nature of their employment to differentiate it from that of all other free labor, and assimilate it to that of servitude, which the law must of necessity regulate in the absence of free agency. The fact that any man in a land of plenty is compelled to work more than twelve hours a day to procure bread for his family is a sad commentary upon our civilization and society—the more sad when we know there are hundreds of applicants for so poor a boon as the opportunity to do so. The great evil is not that a few men in one employment do this, but that there are so many who would be glad to. If the necessity for laboring for disproportionate pay, or of devoting the natural hours of rest and recreation to severe toil, were peculiar to the classes named, the law might possibly modify the wrong: or, it is more reasonable to think, society itself would soon supply a complete remedy. It is because the same unadjusted conflict between the right and wrong is active and clearly visible, in many other occupations, that legislation, looking only to one feature of a vast system, is of questionable power. To remember the car driver and forget the seamstress; to pity and provide for the conductor and forget the many who have equal claims to consideration; to guard one class against oppression and neglect a larger number, in whose tacit demands for relief precisely the same principle is involved, is to invest the statute with a character which is partial, and is to make the law invidious. Overwork and underpay are common factors in a great problem; they constitute an evil in all countries. This great central evil there is no attempt to reach. In the sharp competitions of society, in the relations between capital and labor, which are the outgrowth of our imperfect civilization, perhaps any attempt to reach it by direct legislation would be futile. It is a part of the theory of our government that its adult citizens are free agents; that they can select their employments and judge of their abilities and necessities to better advantage for themselves than the State can do for them. Deeply convinced that this is in contravention of that theory, and that it, in practical effect, would be an injury to the class it seeks to benefit, I am constrained to return it without approval."

IMPROVED COMBINATION SCISSORS.

Mr. Casper Van Hoosen, of New York city, is the inventor of the novel form of scissors represented in the accompanying engraving, and has provided a device which, we imagine, will be found a quite convenient addition to the work basket.

At the inner edges of the blades, and near the pivot of the same, are formed curved slots, which cause said edges to terminate in sharp corners. The slot on the broad blade is shouldered at A, and the projection thus formed, when the scissors are sufficiently closed, strikes against the stop, B, which is a simple screw readily turned in and out of a nut. C is a stop which slides, and is held by friction upon the edge of one slot, as shown, the latter being suitably graduated.



The object of this arrangement is to enable a number of button hole slits to be cut with uniformity and accuracy after the scissors are once adjusted. The operation is as follows: The blades being widely opened, the cloth is carried between them, and its edge led into the curved slot. The distance from the sharp inner lower corners of the blades to the stop, C, measures the space of the inner end of the button hole from the edge of the cloth, and consequently, by moving the stop, C, along its slot, this space can be altered at will. The length of the button hole is governed by the stop, B, which is screwed in more or less, so that the shoulder, A, takes against it sooner or later. The proper adjustment once made, it is evident that the operator can cut as many slits as rapidly as he chooses, and all will be of the same size; and by noting the position of the stop, C, with reference to the divisions on the slot, and also that of the angle formed by the blades when brought as near together as the stop, B, will allow, with reference to the markings on the broad blade, the same adjustment may accurately be remade at any time. Upon the ends of the handles are formed two jaws, so located that, when the handles are brought together, a pair of pliers or tweezers is formed.

CEMENT FOR AQUARIA.—An adhesive cement for aquaria may be made, according to Klein, by mixing equal parts of flowers of sulphur, pulverized sal ammoniac, and iron filings, with good linseed oil varnish, and then adding enough of pure white lead to form a firm, easily worked mass.

DR. HANBURY SMITH writes to say that our mention of a gallon of water as containing 277·274 cubic inches is an error. The English imperial gallon is 277·274 inches, and is about one fifth more than the American gallon, which is exactly 231 cubic inches capacity.