## Recent Eruption of Kilanea.

This great volcano has been active for several months past, the orincipal characteristic being a remarkable rise and fall of melted lava within the crater. L. A. Thurston gives the following among other particulars in the Pacific Commercial Advertiser. In ticulars in the Pacific Commercial Advertiser. In
March, 1894, the lava had risen almost to the top of the March, 1894, the lava had risen almost to the
crater, the rise being 447 feet in 19 months.
rater, the rise being 447 feet in 19 months.
On the evening of July 6 , a party of tourists found the lake in a state of moderate activity, the surface of the lava being about twelve feet below the banks.
On Saturday, the 7th, the surface of the lake raised so that the entire surface was visible from the Volcano House. That night it overflowed into the main crater, and a blow hole was thrown up some 200 yards outside and to the north of the lake, from which a flow issued. There were two other hot cones in the immediate vicinity which were thrown up about three weeks bevicin. On Sunday, Monday and Tuesday, July 8, 9 and 10 , the surface of the lake rose and fell several times, varying from full to the brim to 15 feet below the edge of the banks.
On the morning of the 11th the hill was found to have sunk down to the level of the other banks, and frequent columns of rising dust indicated that the banks were falling in. The lake had fallen some 50 feet, through the escape of the lava by some subter ranean passage, and the wall of the lake formed by the hill was falling in at frequent intervals.
The lava in the lake continued to fall steadily, at the rate of about 20 feet an hour from 10 o'clock in the morning until 8 in the evening. There was scarcely a moment when the crash of the falling banks was not going on. As the level of the lake sank, the falling rocks of the banks, undermined by the escape of the lava, caused a constantly increasing commotion in the lake as they struck the surface of the molten lava in from 200 to 500 feet long, 150 to 200 feet high, and 20 from 200 to 500 feet long, 150 to 200 feet high, and 20
to 30 feet thick, would split off from the adjoining to 30 feet thick, would split off from the adjoining
rocks, and with a tremendous roar, amid a blinding
cloud of steam, smoke and dust, fall with an appalling down-plunge into the boiling lake, causing great waves and breakers of fire to dash into the air, and a mighty "ground swell" to sweep across the lake, dashing against the opposite cliffs like storm waves upon a lee shore.
Most of the falling rocks were immediately swallowed up by the lake, but when one of the great downfalls referred to occurred, it would not immediately sink, but would float off across the lake, a great floating island of rock.
As the lava subsided, most of the surrounding banks were seen to be slightly overhanging, and as the lateral support of the molten lava was withdrawn, great slices of the overhanging banks on all sides of the lake would suddenly split off and fall into the lake beneath. As these changes took place the exposed surface, sometimes 100 feet across and upward, would be left red hot, the break, evidently, having taken place on the line of a heat crack which had extended down into the lake.
From 6 to 8 o'clock the entire face of this bluff, some 800 feet in length and over 200 feet in height, was a shifting mass of color, varying from the intense light of molten lava to all the varying shades of rose and red to black, as the different portions were successively exposed by a fall of rock and then cooled by exposure to the air. During this period the crash of the fall ing banks was incessant. Sometimes a great mass
would fall forward like a wall; at others it would simply collapse and slide down, making red-hot fiery landslides; and again enormous bowlders, as big as a house, singly and in groups, would leap from their fastenings and, all aglow, chase each other down and leap far out into the lake.
The awful grandeur and terrible magnificence of the scene at this stage are indescribable. As night came on, and yet hotter recesses were uncovered, the molten ava which remained in the many caverns leading off through the banks to other portious of the crater began to run back and fall down into the lake beneath,
making fiery cascades down the sides of the bluff. There were five such lava streams at one time.
The light from the surface of the lake, the red hot walls and the molten streams lighted up the entire area, bringing out every detail with the utmost dis tinctness, and lighted up a tall column of dust and tinctness, and lighted up a tall column of dust and period of the subsidence the lava fountains upon period of the subsidence the lava fountains upon
the surface of the lake continued in action, precisely as though nothing unusual was taking place.

## Rassian Iron Production.

A consular report issued recently on the iron industry of Enropean Russia states that during the past twelve years the output of pig iron has more than doubled, rising from 460,000 tons to $1,060,000$ tons, and the combined output of wrought iron and steel has risen from 575,000 tons to $1,000,000$ tons. A notable feature is the increased pace at which the production rises during the closing years of this period, marking the decisive expansion of the home industry at the expense of imports. Thus, pig iron rose at the rate of , 0 to 24,000 ons a year up to 1886 , after which 189 to 177,000 tons. Steel fell after 1881, an abnormal year, owing to the issue of great government orders for stee rails; shows no advance from 1883-89, but between 1889 rails; shows no advance from $1883-89$, but between 1889
92 rises from 253,000 tons to 516,000 tons. Wrought iron is stationary from 1884-88, and rises constantly up to 1892. A corresponding movement is noticeable in imports of pig iron, which from 1886-91 fell from 258,000 tons to 80,000 tons, and of wrought iron, which rose up to 1890 , and from $1890 \cdot 92$ fell from 93,000 tons to 49,800 tons. The import of steel rose up to 1890, and from 1890-91 fell from 16,000 tons to 12,900 tons. While the gross production of steel rose from $1882-92$ from 242,000 tons to 516,000 tons, the manufacture of steel rails shows little change ( 153,000 tons in 1882to 182,000 tons in 1892). Nearly half the total weight of steel prepared in Russia is used in the manufacture of steel rails.

## recently patented inventions.

 Engineering.Increasing Crank Throw of Steat Evarwss.-HenryI. Schanck, Holmdel, N.J. According to this improvement there are two cranks on the main shaft joined by a heavy wrist pin on which are two ec
centrice, and on the outer end of the piston rod is centrics, and on the outer end of the piston rod is a
longitudinally channeled and slotted crosshead, there being a heart-shaped cam block in the channel, in the slots of the crosshead, while there are guides for the crossbead, cranks on the ends of the cam shaft,
rode between the cranks and the eccentric straps, and a rode between the cranks and the eceentric straps, and a
main forked connecting rod. The improvement is more main forked connecting rod. The improvement is more
particularly applicable to high pressure, unick speed, horizontal and upright
crease their efficiency.
Sectional Boiler.-Harry A. R. Diet rich, South Bethlehem, Pa. This is an improvement on proved boiler being deigned for steam or hot water heat ing, and particularly a adapted for heating bullaings by hot
watericirculation. A particular feature coniets of a hollow bottom wall, affording an exiended heating surface which receives heat from the ash pit and from a central heat conduit, and there are throttle gates Bo controlling the
heat currents that increased aboortion is secured tor the heat currents that increased absorption is secured for the
water in the legs of the boiler sections. The main hea conduit and flue connections insure extended contact of the heat currents with water-heating surfaces, increasing the efficiency of the boiler and conducing to economy
Steam Boller.-Harry H. Kelley, Elyria, Ohio. This boiler has a ateam drum from which
depends a shell containing a cylinder perforated at its lower end and adapted to receive the feed water, there being a specially constructed water circulating pipe ex teriorly on the shell. The shell is made in sections, other by stay bolts, the apper head opening into the bottom of the boiler, and the shell depending into the boiler furnace, while the cylinder
from the lowermost head.

Rallway Appliances.
Tie Plate.-Walter H. Wilson, New York City. This is a plate forpreserving wooden ties by
preventing checking, etc., and also preventing the rail rom shearing or grinding the spike heads. The plate has on its upper surface a rail seat and its under gide is
concaved in $a$ direction longitudinal with the rail seat, while there are cutting edges at the sides of the concave forentering the tie. The plate is of comparatively ligh weight, has spike holes, and the metal is upset in such way that the plate may be quickly and securely applied nd will embed iterelf in the tie
applying Hose to Couplings. -Peer Whyte, Meridian, Miss. For connecting air brake
pipes this inventor has devised a almple and efficient ap paratus tor applying the serew clampe which fasten the ose sections to the nipples. Combined with a recipro aing, whereby they are adapted to move toward or fro each other laterally, is a tapered socket adapted to re eive the jaws and close them upon a hose, with means
or forcing the clamp forward into the socket, and a device for holding the nipple.

## Electrical.

Voltage Regulator for Dynamos
Malcom P. Ryder, New York City. This is a aimple
device which, in connection with a rheostat, operates a
tomatically to maintain a constant voltage in the lin the arrangement being such that the rheostat may be
operated by hand without interfering with the system. operated by hand without interfering with the system.
Combined with a regulator magnet and swinging armature a circuit breaker actuated by the armature and compris hg a slide plate on which is an imsulated conducting
block, while conducting springs secured to a stationary support are adapted to contact with the conducting plate. When the improvement is applied to the alter nating system, the controller is connected to the station transformer, and the current to
magnets is taken from the exciter.
Registering Mechanism for Light crecurs.-Wiliam McNiell, Chicago, Ill, and Jame H. Tinder, Winchester, Ky. This is a positively acting mechanism for indicating the lamp hours to be charged the swinging bar Cambing pallets aring in a slid ing swinging bar carrying pallets moving in right line tro-maguetic
ro-maguetic mechanism for reciprocating the bar, a
egistering and carrying wheels and number disks.
Closed Conduit for Railways.
CLOSED CONDUIT FOR RAILWAYS.-
Charles D. Tisdale, Boston, Mass. According to this invention the main conductor is inserted in a tube of flexible material, upon which is placed an ausiliary sectonal conductor provided with contact pins extending
thrcugh the walls of the tube in position to be brought thrcugh the walls of the tube in position to be brough into contact with the main conductor when the auxiliar conductor and the tube are compressed by the trolley car making local connections with the main conductor, and avoid the dangers attending the use of an exposed main
Cab Signal for Riailways.-Edgar C. Wiley, Bristol, Tenn. This is an improvement on a y patented invention of the same nalarm bell on the locomotive has a local battery and ets along the roadbed. The present invention mag loys an ordinary make-and-break circuit bell, suplements the weakness of a relay operated by induction, nd saves waste in the battery power for energizing the ment of circuits, batteries, and their connection with the various mechanical parts.

## Mining.

Settling Tank.-Daniel W. Fall Frank B. Wineland, and Samuel L. Richards, Breckenridge, Col. This tank has partitions for classifying the
simes in the treatment of ores, and an agitating fan heel creating within the tank a regulated current forcing the floating slimes to travel over all of the partitions and to one end of the tank. It also has a valve control the discharge of sand and water, the force receives the floating slimes beneath the surface of the water, a part sinking to the bottom, and the tank havin an overflow chute so arranged that only a fluid wil pass.

## Mechanical.

Well 'Drill.-Charlie M. Lindholm Rancho, Texas. This invention relates to deep wel
inking apparatus, providing a drill arranged to auto natically expand in the bottom of the well below the tubing, cutting a hole large enough for the tubing with out requiring a second drilling or reaming. Two bit
parts are arranged on opposite sides of and inclosing the
the other is pivoted to the shank, the cutting edges of $\begin{aligned} & \text { wcreen: }\end{aligned}$ the pivoted bit section having a bevel engaged by a
Type Founding Machine.-Auguste Foucher, 71 Boulevard Voltaire, Paris, France. This is machme to cast two types simuitaneously, having two models and two finishing mechanisms, the moulas and
their sprue breaking, body dressing and flnishing mechir sprue breaking, body dressing and finishing me
chanims being arranged in sequence, but echeloned in different vertical planes, whilefthe corresponding moving parts are rigidly coupled together to be moved simultaneously in the esame directions. All parts of the machine may be overlooked by the operator, and two finished
types are made at each cast instead of one. The in types are made at each cast instead of one. The in-
vention is an improvement apon an invention patented in 1887 is

## Miscellaneous.

Ice Velocipede. - Dan Gं. Bolton, Cooperstown, N. Y. The frame of this device is supported by single front and rear runners, to which it is chain traveling along the nnder surface of the rear runner is driven from a pedal shaft by a spocket wheel mounted on the pivot connecting the runner with the frame. The runners are capable of sufficient rocking motion to permit passing over uneven ground, and the ront runner is turned for steering purposes by a handle bar. The machine is designed to enable a
over snow and ice at a
Printing on Glass, etc.-Alfred Brookman, New York City; To give clean and disinct mpressions of the designs without danger of breaking apparatus in which two beds having independent sliding movement may be separately actuated, a transfer pad being pivotally mounted on a slide arranged between the beds and adapted to be locked to either of them to slide therewith, while rollers journaled in stationary bearings contact with the transfer pad during the sliding movement. The rollers may, if desirea, be employed for
printing, in connection with the movable beds, without the pad, the rollers then having an air cushion, over position.
Decorating Glass, Etc.-James Budd, New York City. For the production of signs, letters, and ornamental designs on glass or enameled
surfaces by acid or sand blast processes, this inventor has devised an improved method of producing and applying the necessary protective coating, which consists of covered with printers' roller composition is employed to apply the coating. the design on a block or plate being first inked with a varnish and picked up by the roller for transfer to the surface to be coated, and the coating thus transferred being dusted with the flnishing covering toenableit to resist the acid or sand blast. The improved method is designed to give better results, and
cost than the processes heretofore followed.
Coal Screen.-George W. Cross, Pittston, Pa. This screen is particularls adapted for
picking or separating slate from the coal, and is made of picking or separating slate from the coal, and is made o ate troughs and ribs the walls of the ribs converging of their upper edges and the troughs having in their bottoms slotted perforations. Both the troughs and the ribs diminish toward the lower end of the segmenta meeting near the lower end a flat slotted surface from

Open Grate Heater.-John Lawlor Brooklyn, N. Y. This improvement may be used in connection with an ordinary open fireplace, and may also thoroughly ventilating a room, relieving it of heavy and mpure air, insuring a uniform, perfect araught and complete combustion, without the use of a blower, whil into the chimney flue. When used independently of open fireplace, a heater casing is employed, adapted to rest on the floor or hearth, when convenient connection may be had with the smoke flue.
Door Hanger.-Theodore C. Prouty, St. Joseph, Mich. This invention relates more particularly to double track hangers for sliding doors, providing for such service a cheap and durable ball-bearing hanger to be struck up from sheet metal. The hanger may be used in connection with the ordinary double-way woo racks, and the carriage is adjustably connected to th oor to receive a shaft centrally mounted on two rows
bearing balls, one on each side of its middle, the two ends of the shaft receiving the supporting wheels. The hanger is adjustably coingected to the door to permit of properly placing the door verticaly with relation to the apporting track.
Wagon Brake.-James W. Brubaker, Tracy, Iowa. The back pressure on the pole as the wagon descends a grade, according to the improvement patented by this inventor, operates to draw forward connecting rod and forcibly set the brakes, but tb wagon may be backed without setting the brakes on eetting a simple form of brake latch. The brake bar normally held set by a spring when the wagon is at a
standstill, in opposition to which the draught devices act when the draught is on, and in conjunction there with when the draught strain is off, so that the greate the back pressure, with a heavy load, the harder will th brake be applied.
Halter.-Edward P. Waters, Rose ville, Ill. This halter is very similar to the ordinary ve-ring halter, but is inexpensively made, substantially of a single piece, doubled upon itself to form a nose band, extended in opposite directions through a ring and and its ends overlapped to form a crown piece, the ends bing made fast to the chin pieces and the cheek pieces at their junctions, bit rings being held in the lower ends cheek pieces.
Fire Alarm. - John P. Williams by this inventor, Tenn. The alarm mechanism devise the several rooms of a building and having a series of fusible joints. alarm bells being connected with the wire, which has weights or tension devices at each end. When the wires separate, the sections are drawn ou ward and the belis connected are operated. Supplemen tripper devices to normally hold the bells from pivoted and, where the devices are used in a lare building on end of each of the wires preferably leads to an indicato in the office, to locate the floor on which the fire occurs.
Hotel Register.-David F. Riegle Portland, Oregon. As an improved article of manufac
ture this register has its covers provided, beyond the leaves, with separable hinged extensions containing transparently covered advertising panels, the arrange mentbeing such that when the book is flled and filed away the extension may be severed from it. Advertise-
ments on the outer and inner faces of the extensions

## are pro open.

Trunk. - William S. Foster, Dallas, Wis. The shell of this trunk is cylindrical, and has rims, so that the closed trunk may be convenientlyrolled
about on the floor or ground. Mounted to turn in the shell is a cylindrical compartment box with partitions right angles to each other, the partitions forming two sets of compartments, one set provided with lids and the other with straps. The shell is made in two hinged sections, and when these are opened one half of the com
partment box is disclosed. By turning thie box on its partment box is disclosed. By turning thie box on its
truinnions all of the compartments are successively brought to the top, as required, for packing or removing
goods. Bag.-William H. Field, Port Chester N. Y. A strong and very cheap bag is made by this ina double bottom and relatively light sides, flat handle on the sides at the top connecting with the double bot-
tom in such way that the bag will withstand the strain tom in such way that the ba
and may be easily carried.
Dispensing Liquors, etc. - James Tomlinson, Granby, Canada. This is an apparatus for
registering the amount sold, and consists of reservoirs in a case, each having a discharge pipe terminating in a faucet provided with a filter, induction pipes being voir. Tell-tale tubes connected with the faucets are carved at their upper ends and provided with cups for receiving any liquor that may be forced out of the pipes. the drachm or glass only, one for wine measure only, and one combininglboth the drachm and wine measure
scales.
Bottling Machine.-August Werner, Brooklyn, N. Y. Connected with the storage cask are a
liquid supply pipe and a gas supply pipe, while a bottle-
filling valve of especial construction is connected with the bottle, the liquid supply pipe, and the gas suppls pipe, in such manner that on first opening the valve plug the gas passes into the botle to drive out the ai and on further opening the valve the air escape is cut off and the bottle filled with the liquid, the gas in the bottle receding to the storage cask. The machine is compara tively simple and fills beer and other liquids into will retain its valuable properties without danger spoiling.
Ice Shaver and Pick.-William M. casing Goldman Landing, La. This shaver comprise adjusted distance through the slot, and a hinged cover having on ite pivot end an extension within the casing, opush the accumulated ice forward on opening the lid The casing forms a handle for a pick of the ordinar kind, whic
wing nut.
Tce Cream Freezer. - Ed ward L. Weston, Washington, D. C. Two or more kinds of greater labor than that of freezing one kind in an dinary freezer. Independent freezers or cylinders ar located in a single tube, surrounded by the necessary ce, and the handle shafts are journaled in a shaft frame ployed by which the sections may be locked coupling em freed to move independently.
Garment Fitting Pattern.-Simon Christiansen, New Fork City. Two patents have bee proved this inventor under this title, both showing in same inventor. One patent provides a plate of fiexible material, with angular edge, the plate having a border ncision to form a flexible edge strip connected at on nd only, tabs connected to the strip to be adjusted oward and from the plate, while other tabs are also ad ginal strip. According to the other pory a fexible marplate has an edge with angular outline, and pivotally secured to its.outer edge is a series of independent articulated links extending outwardly, each consisting of plurality of pivotally connected members, a flexible trip being connected with the outer ends of the outer members, whereby any portion of the strip may be moved toward or from the plate. The improvement is
designed to facilitate taking correct measures, and enasigued the operator to at once cut the material from the pattern.
Sleeve Pattern.-This is a further tent of the same inventor for an improvement facilitating the taking of the proper measure of the arm and
the convenient cutting of the material into upper and ne convenient culceve parts. The pattern comprises a series sections in sets of two pivotally connected by links, and also pivotally connected with each other, a rod engaging held onione of the pattern sections has a sliding connection,with the first rod. No especial skill is required in using the pattern to obtain simultaneously th
shape of both the upper and under sleeve parts.
Under Coat Slefve Holder. James Hoffman, New York City. This is a device for is being put on, preventing the sleeve of the under coat rom slipping upward. It consista of a curved body plate having one end upturned to form a hook, an elastic with double loops being fastened to the plate. The de-
vice is quickly applied and may be folded to vice is quickly applied and
animal Trap.-Juhn Ross, Halifax, anada. This is practically a double trap, and has proits upper side near the ends, and downwardly inclined gates beneath the doors, in connection with tubular end sections in which are sliding pistons to forcibly eject nimals through the doors. There are trap doors in the the box deliver, a bait rod sustaining on the top of platforms.
Animal Trap. - Charles A. Snow, Lime Springs, Iowa. This trap when sprung actuates a knife which kills the animal, the traparafterwardresetting
itself: It is made with a cylindrical case, cut away in
front and slotted to allow for the swing or revolution of
knife, spring actuated, but held normally knife, spring actuated, but held normally stationary e depressed by the weight of the animal. On the dehe kion of the platform the trigger is disengaged and in positio swings around, the trigger being then again the animal and sweeps him from the platform during its revolution.
Game Apparatus. - William A. Barnes, New York City. This is an apparatus for use is connection with biliand, pool, or bagatelle tables. The rangement and then inlosed by ring of tirer rangement, and then inclosed by a ring of tissue pape board, or other substance, that the numbers on the different balls may not be seen. With the impact of the cue ball the paper envelope is broken and the balls he player holding a similarly numbered small ball, of

DoLl. - Frederick B. Schultz, New York City. Thisis an improvement in jointed dolls pre ention providing a doll in which the articulated men bers can be readily turned without danger of breaking r dislocating the jointed parts. The parts are joined by ball and socket joints, and an individual ehain is nded with sieldiculated member, each chain being pro n the yielding devices to permit of exerting puls them.
Not
Nots.-Copies of any of the above patents will be send-name-बf the patentee,title of invention. and date send-name-ef
of this paper.

SCIENTIFIC AMERICAN

## BUILDING EDITION.

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New York City
Plate in colors showing a very attractive stone dwell ng recently erected for H. J. Peet, Esq., at Buena plans. A pleasing design. Mr. J. L. Silsby, architect, Chicago, III.
3. A dwelling at Bridgeport, Conn., recently erected for Frank Fowler, Esq, Two perspective elevation Beers, architect, Bridgeport, Conn.
cottage at Stratford, Conn., recently completed or Robert Wheeler, Esq. Perspective elevation and foor plan. A unique design presenting pleas ing elevations and a well arranged plan. Cóst $\$ 6,200$ complete. Mr. Edgar Osborne, builder,
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in the modern Colonial style. Two perspective elevations and floor plans. Cost $\$ 6,850$ complete. Mesars. Rossiter \& Wright, architects, New York City.

## Colonial double house recently completed at Bayonne City, N. J. Perspective elevation and

 loor plans. Cost $\$ 4,800$. Mr. Arthur C. Long year, architect, New York Cityor John P. Jepson, Esq. An excellent erected or a suburban home. Two perspective elevation and floor plans. Cost $\$ 5,620$ complete, ready for occupancy. Mr. William H. Mersereau, architect,
New York City: New York Cíty.
8. A dwelling at Flatbush, L. I., recently completed for Richard Ficken. Esq. A design in the Colonial
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or in this department. cuch must take his turn. Buye
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n houses manufacturing or carrying the same. personal rather than general interest cannot be Scientific A merican Supplements referred
to may he had at the offce. Price 10 conts each.
Books referred to promptly supplied on receipt of Minerals sent for examination should be distinctly
marked or labeled.
(6263) J. D. F. says : Please tell me how to color old gun barrels where the color has worn off.
Want blue and brown. A. Bluing barrels.-The bluing of gyn barrels is effected by heating evenly in muffe until the desired blue color is raised, the barrel ing no marks of grease or dirt upon the metal when the ing no marks of grease or dirt upon the metal when the
bluingtakes place, and then allow to cool in the air. It requires considerable experience to obtain an even clear
blue. Browning guns.-The following recipe for browning is from the United States Ordnance Manual: Spirits of wine, $13 / 2$ ounce; tincture of iron, $11 / 2$ ounce; corrosive blue vitriol, 1 ounce; nitric acid, $3 / 4$ ounce. Mix and dissolve in 1 quart of warm water and keep in a glass jar. Clean the barrel well with caustic soda water to remove grease or oil. Then clean the surface of all stains and arks by emery paper or cloth, so as to produce an even
bright surface for the acid to act upon, and one without finger marks. Stop the bore and vent with wooden plugs Then apply the mixture to every part with a sponge or rag, and expose to the air for twenty-four hours, when
the loose rust should be rubbed off with a steel scratch brush. Use the mixture and the scratch brush twice, and more if necessary, and finally wash in boiling water, dry quickly, and wipe with linseed oil or varnish with shellac.
(6264) E. R. asks: 1. Upon our ranch we have a hydraulic ram which forces water for domestic pun artesian well and the water has a fall of 24 inches to it. Every six or seven months, the air chamber becomes so filled with water that it scarcely operates until the the chamber is in that condition, the valve in operating pounds very hard, as though it was striking something solid. What causes the chamber to fill with water? A. The air in the air chamber is absorbed by the water under pressure, when the water having no air cushion and being non-elastic produces a sharp concussion of the valve as observed. The air chamber should have an air cock at
the bottom to let out the water and allow air to draw in when botom to let out the water and allow air to draw in when the air in the chamber has been absorbed. 2. Can dig a deep trench in moist earth, then stand a copper plate $4 \times 4$ feet upright in one end of the trench, then a zinc plate. same size, a short distance from the copper, and so on, copper and zinc alternately. indefinitely; the space between the plates to be filled with moist earth Would the current become stronger if salt deposits were
made between the sheets of metals? A. This will make an earth battery if you connect all your zincs together and all your copper plates together. No zinc and cop$\mathrm{p} r$ must touch. The battery will be very feeble, and
will if used soon polarize. No reliable calculation of its power in watts can be given. Salt water poured on the rface would increase the power
(6265) J. M. S. asks if there is any way of prolonging the life of a fish 20 or 24 hours in bucket. If the matter consumed by them to retain life coold be artifcially supplied, and if so how? A. Fish
may live for several days in a very small quantity of water if it is aerated sufficiently to keep up the supply of air drawn from the water by the fish. A small tabe
reaching to the bottom of the pail and air blown into the water by a bellows for a few minutes, every few hours is all that is necessary. A very little food only is required, so as not to contaminate the water by the dissolved food. TO INVENTORS,


INDEX OF INVENTIONS
United States were Granted the
October 2, 1894,
AND EACH BEARING THAT DATE.


