## THE CONTENTS OF A COD'S STOMACH.

Mr. Frank Buckland publishes in Land and Water the remarkable engraving herewith reproduced. The curious object is a mass of horsehair and string, the fibers of which are matted and intertwined well together by means of no less than ten fish hooks. All these are small hooks except two ; these, as can be seen by the engraving, are much larger. It is a remarkable thing that the points of all these hooks are turned upwards. He cannot quite account for the presence of so many hooks in the stomach of this cod, except that the cod who owned the stomach had somehow or another managed to get hold of haddocks or whiting caught on hooks, and in whose bodies the hooks still remained. The flesh of the whitings or haddocks had been entirely digested by the juices of the cod's stomach; the horsehair and metal of the hooks, however, resisted its action. That whiting and haddock have frequently hooks left in them is well known to all those who have the care of seals. Sea fish hooks are very cheap; and the fishermen, rather than take the trouble to extract the hook from the fish's mouth,
very frequently cut off the "snood" or line to which the fish is attached, and let the hook remain in sit $\hat{l}$. The seal swallows the fish, hook and all, the hook gets entangled in the poor seal's intestines, and of course proves fatal.
'"The cod is what is generally called a voracious fish. I have now in my museum," says Mr. Buckland, "a portion of a tallow candle, about seven inches long, also a pair of sailor's mitts, both taken from a cod's stomach."

## THE MYGALES - DOOR BUILDING SPIDERS.

 In the Paris Jardin des Plantes, says La Nature, there is a curious spider belonging to the mygale species, and commonly known as avicular, owing to the supposition that the insect finds its prey in small birds. Like all spiders, this curious creature has eight eyes. Its mandibles are armed with sharp teeth, and its feet have retractile claws, resembling those of a cat. The cephalo-thorax is of a velvety black with an olive luster; the abdomen and feet are covered with long reddish hair. Its length is about three inches and its breadth seven inches. Only the larger members of the species attack birds, as they overcome their victims by sheer strength and not by poisonous injection; for although they possess venomous capabilities, the quantity of venom is not sufficient to affect large prey. Their favorite food is crickets and insects of large size, which they capture at night, lyi torpid during daytime.The most curious member of the species is a mygale indigen ous to Corsica, a light brown spider which lies in tubes dug in clay banks. These passages run in a straight line for two thirds of their length, and then become slightly oblique at their inner extremity. A close examination of these remarkable habitations proves the existence in the spider of an instinct wonderful in its minuteness. The tubes are vaulted from end to end with a hard mortar, and this in turn is lined with a soft, silky web. Be fore, however, covering his walls with their finest hangings, the spider fastens up a coarse fabric, and on this, as a foundation, the more delicate material is se cured. Then he begins the con struction of his door, in which operation it would seem that al most reasoning faculties are em ployed. At a hasty glance, the cover appears to be merely a lit le disk of mortar lined within with web, hinged to one side of the aperture so as to open out ward, and supported by a pro longation of the lining mortar Close examination, however, shows the door to be far from carelessly constructed. Although scarcely one tenth of an inch thick, it is constructed of upwards of thirty alternate layers of web and mortar, each layer being imbedded in another, like a series of each
cups.
The
The weblayers are extended to form the hinge, so that the latter is stronger in proportion to the thickness of the door. On scrutinizing the edges of the latter, it further appears that they are beveled obliquely inwards, and that' a corresponding bevel exists in the orifice of the passage. The use of this arrangement is obvious; for were the edges of the door straight, the hinge would be the only barrier to breaking in the cover from outside, and its delicate material would quickly yield before a strong attack. With the beveled edges, it is, of course, impossible to force the door inwards. In order to hide his dwelling, the mygale covers his door with rough clay so that it cannot be distinguished from the adjacent soil, while the asperities allow him to open it easily in making a sudden retreat. Once in his den, however, it would be supposed that he would be powerless before an
enemy knowing enough to force open his door in the proper direction. But the mygale provides for that contingency, and, being unable to make a lock for his portal, converts himself into that necessary means of security
The interior of the cover, instead of being perfectly smooth, is pierced with, perhaps, thirty deep holes; and most of these are located just where a lock would be placed, that is opposite to a hinge. When the spider finds himself besieged he pokes his claws into these holes and fastens his sharp mandibles into the walls of his dwelling. Then, contracting


## FISH HOOKS AND LINES FOUNDIIN A COD'S STOMACH.

unknown, of some natural force or property; or it may be an action of one substance on another, susceptible of useful practical application. This is, briefly expressed, the dis tinction between a discovery and an invention. But the im portant point to notice is that the value of the accident de pends on the kind of man or kind of mind, by whom or by which it is first observed. If the soil is not sufficiently pre pared, the seed will not grow. Thousands of men had seen ight reflected from distant windows, and variations in the light according to the angle of reflection; but a well pre pared mind, on one occasion, suddenly drew from this phenomenon an idea which estab lished the beautiful science of the polariza tion of light. It is pleasant to read of the manner in which shrewd minds have turned an accidental observation to practical advan tage.

The reflecting apparatus for lighthouse arose out of a wager, if the facts are correctly recorded. Somewhat more than a century ago, some one in Liverpool offered to wage that he would read the small print of a news paper by the light of a farthing candle placed ten yards or thirty feet distant. The wage being accepted, he coated the inside of a wooden board with pieces of looking glass forming a rough substitute for a concave mir ror : placing a small lighted candle in front of this mirror, the rays of light were reflected, and converged to a focus ten yards on the other side of the candle, and the light at that focus was sufficient to enable the experi menter to read a newspaper. An observan practical man was present. The idea flashe
his body, he pulls his door tightly shut, and so defies the in roads of his enemies
During the day the mygale closes his portal, but at night he opens it slightly, and watches ; should a fly or cricke come within proper distance, he leaps out, the prey is grasped, and the spideris back again in his den, with the door shut, before hardly a fraction of a second can escape.
It is said that only the females build and occupy these marvelous nests, since males have never been found in them The lords of the spider creation have no fixed habitation but live under stones and in crevices of trees, and prowl around in searchof their precarious existence. It is probable that they meet the fate of all bachelor spiders, to whom matrimony is death; for it is a peculiarity of the arachnid bride to devour her loving helpmate at the earliest possible moment, and unceremoniously to throw the shell of his used up carcass out of her nest, when she cleans house in prepa ration for a new husband.


DOOR-BUILDING SPIDERS.
The mygale carries its eggs inclosed in a closely woven cocoon of white silk, forming two rounded pieces, united at their border

## Happy Accidents.

It is a fact, patent to every one conversant with the pro gress of inventions, that the most useful discoveries are generally the result of accident. These columns have borne witness to a great number of individual cases of this kind. In the May number of Chamber's Journal, a writer says: Seldom do men sit down with a steady resolve, a deter mined purpose, to discover some new principle or invent some new process. When they do so, there is a lurking idea of the kind of thing they want, a dim perception of the di ection in which success may most reasonably be sought. Generally speaking, something is concerned which, for want of a better term, we call accident. An appearance presents itself, or an effect is produced, which the observer neither designed or expected: an accident, certainly, so far as he is personally concerned. It may be a manifestation, until then
upon him that, if the light of a farthing candle could in this way be thrown out to a distance, the light of a large lamp could similarly be projected to a mile or miles away The idea grew into form, and resulted in the invention o the reflecting apparatus for lighthouses.
One day, Lundyfoot, a snuff manufacturer, was dryin some snuff. Through a little neglect, the snuff was allowe to be overheated, till it became charred. Noticing the pun gent character of the snuff, and how it tickled the nose, and knowing that some men like to have the nose tickled more thanothers, he resolved to try whether high-dried snuf could be brought into favor. It notonly did so, but proved source of wealth to him.
The writer has seen a piece of calico being printed at one of the great Manchester establishments, become a little displaced. The effect was very singular. The diagonal re petition of the pattern produced a forked lightning effect of a kind which a designer would not have been likely to hit upon. The master printer sug gested the engraving of a de sign in which the forked light ning effect should be utilized It proved to be one of the most uccessful patterns ever intro duced by the firm.
One of the producing cause of prosperity of the Stafford shire pottery manufacture wa the discovery of a cheap durable glaze. The discovery was due purely to accident. At Stanle Farm, a few miles from Burslem, maid servant was one da heating a strong solution of com mon salt, to be used in curin pork. During her absence from he kitchen, the liquid boiled over. Being in an unglazed earthen vessel, the solution, spreading over the outside, pro duced a chemical action which she little understood, and which did not compensate her for the scolding she received. Some o the elements of the liquid com bined with some of those of th highly heated brown clay sur face to produce a vitreous coat ng or enamel, which did no eel off when the vessel wa cold. The humble brown ware vessel acquired historical celeb rity. A Burslem potter, learning what had taken place, saw that glazed ware might possibly hit the taste of the public he introduced the system of glazing by means of common salt, a system at once cheap, easy, and durable; and Eng land has made many a million pounds sterling by the accidental discovery.

When maidens are doing their hair, an important elemen of daily duty in many a household, they may perhaps be gratified in learning that this process led accidentally to very useful invention. Joshua Heilman, engaged in the cot ton manufacture at Mulhouse, in Alsace, was long meditat ing on the possibility of inventing a combing machine for long-staple cotton. Brooding over the matter, he watched his daughters combing their hair, and noticed how they drew the long tresses between their fingers, alternately with drawing the comb through them. The thought struck him that, if he could successfully imitate by a machine this two fold action, so as to comb out the long fibers of cotton, and drive back the shorter by reversing the action of the comb his long-sought object would be pretty nearly attained

Armed with this new idea, he set to work with renewed cheerfulness, and invented a beautiful machine, which en abled him to comb cheap cotton into moderately fine yarn. In 1720, a potter named Astbury was journeying on horse back from Staffordshire to London. Stopping awhile at Dunstable, he obtained assistance in regard to a weakness in the in the eyes of his horse. The hostler at the inn, making use of such bits of veterinary knowledge as he possessed, took a piece of flint, calcined it in the fire, pulverized it, and blew some of the powder into the horse's eyes. The change produced in the flint, by burning from a black stone to a white powder, struck Astbury with a new idea. Would it be possible to produce white flint ware, harder and more durable than white ware made wholly of clay? He collected a small stock of tlints from the chalk hills of Dunstable, and took them back with him to Staffordshire. The result more than realized his expectations; powder of calcined flint, mixed realized his expectations; powder of calcined flint, mixed
with pipe clay, produced a most excellent ware, and estabwith pipe clay, produced a most excellent ware, and estab-
lished a new branch of the potter's art that took firm root lished a new bra
in Staffordshire.

## Railway from Boston to the Summit of Mount

 Washington.It is expected that the extension of the branch of the Boston, Concord, and Montreal Railroad, from the Fabian House to the base of Mount Washington, a distance of about seven to the base of Mount Washington, a distance of about seven
miles, there connecting directly with the Mount Washington miles, there connecting directly with the Mount Washington
Railway, extending to the summit, will be completed and Railway, extending to the summit, will be completed and
opened for public travel by the first of July, at which time opened for public travel by the first of July, at which time
passengers by this line from Boston can reach the base of Mount Washington without change of cars, and thence, by direct transfer to the cars of the Mount Washington Rail. way, reach the summit, making the entire distance by steam power. Passengers will thus be enabled to take their breakfast at Boston and their supper on the summit of Mount Washington at the usual hours of the same day, and without fatigue or the annoyance of change.

The Fast Train Across the Continent.
This remarkable enterprise ended triumphantly on Sunday. June 4, the train reaching San Francisco at $9: 23$ A. M. The total time from Jersey City to San Francisco was 83 hours 34 minutes, being 4 hours 26 minutes less than the alighted in the court of the Palace hotel, dusty and travel worn, but in good health and spirits. Engine No. 49 brought the train through from Ogden, with the assistance of an additional engine in crossing the Sierras. The time from Ogden to San Francisco was 23 hours and 52 minutes. The actual average running time from Ogden to Oakland wharf was $41 \frac{1}{8}$ miles per hour. Considerable trouble was experienced on the
Central Pacific from the wearing olt of the Central Pacific from the wearing out of the brake shoes on the Pennsylvania cars; and in the mountains the Central Pa cific Company put on two of their own coaches to brake the train. There was no accident of any kind throughout the trip. Shortly after arrival breakfast was served, to which promi nent citizens, army and navy officers, representatives of the press and the theatrical profession, railroad officials, and the Mayor of the city were invited.
A salute of thirteen guns was fired from the roof of the Palace hotel on the arrival of the train at the wharf. The remainder of the day was devoted to needed rest. The ex cursionists were serenaded in the evening.

## Inventions Patented in England by American

Comptled from the Commissioners of Patents' Journal. From April 25 to May 22 , 1876, Inclusiv
Artificial Stone.-W. H. Smith, Phladelphia, Pa.
Atomizer.-T. J. Holmes, Boston, Mass.
Axle.-G. W. Miltimore, Jamesville, wis.
Blind Roller.-s. Hartshorn, New York city.
Boiler Flue Cleaner.-A. Wiggin, Rye, n. Y.
Bookbinding.-A. Hoyt, Brooklyn, N. Y., et al.
Bottle Stopper, etc.- N. Thompson (of Brooklyn, N. Y.), London, Eng. Bottle Stopper, ETc. - Thompson (of Br
Brick Machine.-W. L. Grigg, Chicago, III.
CAb Fare indicator.-M. Runkel, Golden
Brice Machine.-W. L. Grigg, Chicago, Ill.
Cab Fare indicator.-M. Runkel, Golden Square, London, England. Calendar, etc.-M. H. Paddock, East Clark
Capstan.-J. H. David, Damaris.Cotta, Me.
$\qquad$ Cleaning Ships' Bottoms.-J. C. Seymour, New York city Clening Ships' Bottoms.-J. C. Seymour
Cofree Pot.-G. W. Hubbard, Windsor, vt. Condensing Eixhatst Steam.-J. F. Fificld, Brooklyn, n. y. Cutting Meat, etc.-W. H. Goodchild, New York city, e,
Electromagneic Enane.-L. Baste, New York city
Extracting Juices.-L. F. G. Boascaren, Cincinnati, 0 . Folding Tent, etc.-F. A. Guthrie, Addison, o.
Fori, Etc.-Brown Brothers Co., Waterbury, Conn Fountain Lamp.-R. H. Webb, Brooklyn, N. Y Gaff Fastening.-J. H. David, Damariss Cotta, Me.
Gas Extinguisher.-V. N. Taylor et al., Springfed Gas Extinguisher.-V. N. Taylor et al., Springfleld, Mass. hand Stamp.-G. K. Cooke, New York city. Hand stamp.-G. K. Cooke, New York city.
Harverting Machine.-S. Johnston, Brockport, n. Y.
Hydratict Dredge, etc.-W. If. Newton, Chitago, ill. Ironing Machine.-T. S. Wiles et al.. Albany, N. Y.
Kitchen Safe.-G. W. Bollen bacher, Bloomington, Ind. Kitchen Safe. G. W. Bollen bacher, Bloomingtor, Ind.
Knitting Machine, Etc.-C. J. Appleton, Elizabeth, N. J. Making Paper pulp.-J. W. Dixon, West Man
Making Tea, etc.-J. Miller, Himrod's, N. Y. Paper-Cuting Machine-J. Vanhorn et al., Brooklyn, n. Y
Pin.-H. M. Jenkinset al., New York cety. Pin.-H. M. Jenkins et al., New York city.
Piston Packing, etc.-J. T. Wrigit et al
Piston Packing, etc.-J. t. Wrigite et al., Dayton, ohio.
Preventing Fales in Skating.-J. T. Parlour (of N. y .), London, Eng. Printer's Galley.-J. F. Hannan, New York city. Printer's Galley.-J. F. Hannan, New Yo
Projectile.-N. Wiard, Washington, D. C.
Propeller.-F. H. b. Babbe, Antloch, Cal.
Railway, itc.-R. Stone, Vandalla, N. Y.
Railway Switchand Signal.-D. Rousseau et al., New York city. Sack-Sewing Machise.-J. S. Hall, Monterey, Cal
Sash Fastener.-N. Thompson (of Brooklyn, N. Y.
sash Fastener.-W. A. Hopkins, New York city. Y. London, England. SASA FASTENER.-W. A. Hopkins, New York clt
SCREw, ETC.-C. D. Rogers, Providence, R. I.
Soriw, eto.-E. A. Leland, New York city.
Gliff.Chosing Valive,-E, W, Lippert, Cinc

Signal buoy.-J. M. Courtenay, Cornwall,
Solving Problems.-T. hill, Portland, Me.
starching Fabrics.-T. s. Wiles et al., Albany, n. y.
Stram Cooring Vessel.-S. T. Goodwya, New Orle
Stram Enaing.-G. McNaughten, Brooklyn, N. $\bar{y}$.
Steam Enging.-G. McNaughten, Brooklyn, N. Y.
Steam Hammer.-P. B. Willams et al., Quincy, III.
Stram hammer.-P. B. Wing Propller.-F. G. Fowler, Bridgeport, Conn.
Trlegraphing Sound.-E. Gray, Chicago, ill.
Threading Screws, eto.-C. D. Rogers, Providence, r. I.
Treating Oil Refube.-W. P. Jenney, New York cty
Treating Oil Refuge.-W. P. Jenney, New York city
Trimming Cards.-V.E. Mauger, New York city. Trimmising Cards.-V.E. Mauger, New York clty
Twistine, etc.-C. Fletcheret al., Twisting Machinery, etc.-C. Fletcheret al., Providence, r. I.
Umbrella, etc.-H. Palmierl, New York city. Wheel harrow, etc.-S. H. Weston, Winooski,
Whet

## zecent ${ }^{-1}$ mericau and forcign eqatents.

NEW MECHANICAL AND ENGINEERING inventions.
improved valve-grinding machine.
William T. De Luce, Chicago, Ill--This is an improved device for holding a valve upon its center while grinding it in itsseat, which shall be so constructed as t
detaching it from the pipe.

IMPROVED RAILROAD SWITCH CHAIR.
Henry C. Fox and Joseph Hayward, St Joseph,Mo.-This consists of the base and web supports of the rails, extended up to and so fitted under the overhanging sides of the rail head that they are sup MPROVED WATER MOTOR.
Israel F. Good, Goodsville, assignor to himself and Hiram F. Seiger, Orefield, Pa.-This invention consists of a series of buckets to rise with a corresponding series of arms, some of which are made f other descending filled buckets. The empty buckets are filled t the tank, and, in turn, raise the others, the excess of the weigh of the filled buckets being applied to the performance of work.
improved device for starting pendulum clocks. Ernest A. Lourdelet, Paris, France--This consists in the applicadial or itspedestal, which axis is squared at the end to receive key or its equivalent. It also carries a lever arm whose extremity is made by partly rotating the axis to bear against the pendulum rod and set the latter oscillating.
improved leather-punching machine.
Alonzo C. Ricke and Martin D. Norris, Eldora, Iowa.-This
is a contrivance or device for punching leather straps of all kinds, but more particularly bars for leather fly nets for horses. tis adapted for punshing either by movable or stationary punches, and has a feed me hanism worked by a shaft fixed

IMPROVED STRAIN EQUALIZER FOR PULLEY ROPES. Samuel Woolston, Vincentown, N. J.-This is a device for equal
zing the strain upon the ropes of a number of sets of pulleys used ogether for moving heavy masses. It is so constructed as to enable all the ropes, or one or more of them, to be operated at a time without affecting the equalization of the strain among all of said opes.
George M Curisoned pipe tongs.
the handle is formed a crosshead in which is formed a grooveto receive a tenon formed on a curved and pivoted bar. The other end of the crosshead is concaved, and upon it is formed a tenon to nter a groove in the convex side of a pivoted semi-cylindrica
jaw. Another jaw is similarly arranged on the inner side of the outer end of the hook first mentioned. The jaws have thus sufficient play to adjust themselves to the object to be grasped.
IMPROVED RELIEF APPARATUS FOR AIR COMPRESSORS. William F. Tallman, Mineville, N.Y.-This consists of a weighted raised by the air when the pressure exceedsa certain limit. There is a piston to which the air is admitted by said valve, and raised so as to stop the action of the receiving valves of the compressor, with which it is connscted for that purpose. It thus prevents the increase of the pressur, unduly. The weighted valve falls when
the pressure of air diminishes and opens an escape for the air from the pressure of air diminishes and opens an escape for the air from
the piston, which then falls and allows the valves of the compressor to act again. The relief apparatus may be made to work spe cial valves on the compressor instead of the receiving valves.
IMPROVED PAINTER'S WHEEL HORSE.

Albert D. Osgood, Oneida, Ill-This is an improved horse fo painting the wheels of vehicles of all kinds without necessitating
the removing of the wheels. It admits the adjusting of the whee the removing of the wheels. It admits the adjusting of the whee
into any position, takes up little room, and facilitates the work. It consists of a base support or stand, with revolving upper part
improved elevator.
Alfred B. Darling, New York city.-The first part of this inven tion is a contrivance whereby ropes may be used instead of chains
for gearing the elevator cyrriage with the retarder, which is employed to regulate the descent of the carriage. The ropes are
claimed to be stronger, less noisy, and more easy in operation, and less wearing. The second part consists of the carriage connected to the hoisting drum by ropes, which wind off ond on reversely to
the accommodation of the hoisting ropes. The object is, first, to the accommodation of the hoisting ropes. The object is, first, to prevent the hoisting ropes from winding off faster than the car-
riage descends; and, second, to insure the descent of the carriage. improved gang plank.
George Malone, Memphis, Tenn.-This is a ladder of ropes and cross pieces, in combination with the stage plank of a steamer, in such manner that it can readily be removed for sliding freight on
and off the boat, and is readily applied again to afford foothold for passengers. The said ladder is also applicable for a fire escape. improved adding machine
David Carroll, Spring Creek, Pa.-The essential feature of this arrangement is a contrivance of a key for each of the fignres of the left hand, and one by the thumb. Each key turns the unit wheel the number of figures that it stands for.
improved chuck for holding metal drills.
William Frost, New Bedford, Mass.-This consists of a sliding jaw
having a triangular notch and a couple of toothed jaws fixed to having a triangular notch and a couple of toothed jaws flxed to
slide at right angles, and arranged in said notch. These are toothed, so that one meshes in the other, and have a spring between them, for opening them. All are arranged in a stock which is attached to the mandrel, and is so contrived that round, square, or othe
shapes, either taper or straight, may be held with like facility.
improved blacksmith's forging hammer.
John Koplin, Reed's Landing, Minn. - This is a new arrangement of apparatus whereby a sledge hammer to worked by a font lever of apparatus,

IMPROVED WATCHMAKER'S LATHE.
Daniel M. Williams, Calvert, Tex.-This invention consists of a novel contrivance of a bed adjustable for varying the hight of the bed relatively to the centers for different kinds of work: also of an
adjusting tail stock, and an attachment for cutting gear wheels and pinions, all of which will be found illustrated on page 194, current volume.
improved plaiting machine.
Andrew J. Decker, Fond du Lac, Wis.-This consists of a series
of removable needles in a couple of side pieces fixed in a base plata of removable needles in a couple of side pieces fixed in a base plata
and perforated with numerous holes in a row, in which the needles and perforated with numerous holes in a row, in white at one end of the apparatus is adapted for holding the cloth. The cloth is doubled plaits are fastened by stretching it along the edges after being plaits are fastened by stretching it along the edges after being
plaited. The wires are drawn out to release the plaits when completed.
improved pemping apparatus.
Wade Couts, Brownville, Neb.-This is a pumping apparatus so
constructed that cattle may be made to water themselves. As the cattle step upon a treadle platform, their weightdra wsdown a rope which, by suitable counterpoises, causes the pump to be operated. improved lifting jack.
John Y. Thurston, Medfield, Mass.-This consists of a sliding ratchet bar operated by a spring-bolt lever, and retained by a safety spring pawl.

## IMPROVED SPARK ARRESTER.

Waldo H. Jordan, New York city.-This is an uninclosed conical
annular cap, to cover both the mouth of the chimney and the mouth of the cinder receptaclewhich is made around the chimney. The interior is provided with a parabolic deflecting surface that begins at the center of the shell, curves upward and outward, then
downward to the outer edge of the shell. When the products of combustion rise, they impinge upon said deflecting surface, which serves to turn the solid particles, sending them down into the receptacle which surrounds the chimney, while the smoke and ceptacie which surrounds the chimney, while the sm
gases pass laterally from the interior to the atmosphere.
improved portable spring power hammer. Ray F. Livermore, Port Henry, N. Y.-This is a contrivance of a having a spring or springs for striking a powerful blow. The hammer may be easily handled by one man, and made to strike a pow-
erful blow. It is designed for breaking large boulders of rock erful blow. It
ores, iron, etc.
improved lifting jack.
George G. Howe, Faribault, Minn.-This consists of legs pivoted to a top support, to which a lifting lever is fulcrumed. A ratchet
and gnard of the lever serves, in connection with a pivoted locking brace link of the outerleg, to retain the lever in hoisted position.

IMPROVED CAR COUPLING.
Jabez B. Meadley, Davenport, Iowa.-This is a contrivance of spring ja ws for opening and receiving the link and securingit selfcan be opened from the top or side of the car.

IMPROVED HYDRANT.
John T. Davis, Washington, D. C.-This invention relates to an mprovement in the construction of the casing of the hy drant and the construction of the valve mechanism with the plug of the scr-
vice pipe, also to the provision of a stopcock within the casing, whereby the water may be conveniently shut off at the hydrant itself, and the valve mechanism readily removed, for repair or other purpose, and whereby other operations incident to keeping a hy-
drant in proper condition may be effected without the necessity of digging up the casing.

## improved rotary engine.

Josephus Moore, Mound Valley, Kansas.-This consists of a pair of cylinders, with pistons set opposite each other for one to take
steam when the other is not taking it. Abutments slide out and In to let the pistons pass, and are worked by cam disks outside of the cylinders. Two sets of slide valves are provided, for running the engine either way, the valves being worked by eccenrics on the shaft, outside of the case. There are two sets of exhaust ports for use according to the way the engine runs, the
valves of which are connected to the reversing valves, so as to shift alves of which are connected to the reversing valves, so as to shift form of a ring, and the pistons are in the form of a segment of a ring, and are attached to the edge of a disk keyed on the shaft, so as to be fitted with ordinary round piston packing.

## NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

improved mail bag.
John Boyle, New York city.-The object here is to construct the mail bags that are taken up by the catchers of mail cars in such a
manner that they may be more easily and securely taken hold of by the catches without danger of being dropped. The invention consists of a mail bag made with a narrower and contracted throat at the middle part, and provided with a detachable protecting
device for removing wires from bottle corks.
John Franz, Croton Falls, N. Y.-A crotched brace arranged in a
handle is placed around one side of the neck of the bottle and unhandle is placed around one side of the neck of the bottle and un-
der the wires. A forked claw engages the wire at the top of the cork and pulls it off by pressing the handle down.

IMPROVED DENTAL PLUGGER.
Cassius M. Richmond and Alexander Warner, Jr., San Francisco, Cal.-The mallet is mounted by a spring on the upper end of a tubular stock adapted for receiving different tools. A cam mounted on a revolving shaft,arranged parallel to the stock, lifts the mallet,and
the springthrows it back against the head of the tool to strike the blow. The frame in which the cam shaft runs is mounted on the tool stock, so that the latter has a little endwise motion in the frame for allowing the tool to reciprocate, and a spring in the stock, beneath the head of the latter and the frame, raises the tool after being forced down by the hammer. A joint in the frame of
the cam shaft allows the cam to be adjusted so as to strike light or the cam shaft allows the ca
heavy blows, as required.
improved combined gas and chandelier.
George P. Clark, Newton, Mass.-This is a contrivance of oil burners, in the center portion of agas chandelier. It will be found
fully described and illostrated on page 371 of our current volume. IMPROVED TWEER.
Thomas F. Witherbee, Port Henry, N. Y.-This consists of a partition in the water chamber between the inlet and outlet pipes, to
compel the water for cooling the tweer to pass entirely around it.

IMPROVED SHOE.
John C.Weil, Baltimore, Md.-This consists of a secondary insole,
held in position by tags of muslin secured between the outsole and held in position by tags of muslin secured between the outsole and
insole, and pasted down. The idea to to make the shoe easier to insole, and pasted down. The id
wear and less heating.to the foot.

