one would be better, as the frietion of the steam in the pipe would be sut
ficiently less to compensate for the loss of heat by radiation, etc., by the aving in fuel, if it costs as much as it does generally. A quarter of pound friction in a pipe amounts to considerable in time, as it is constant
for instance, a cent per minute for ten hours will amount to six dollars engineers in general is tha seemingly trifing matters for the sake of saving in cost; while, if the Cutting Bevels.-C. H. S. asks for a rule for mitering bevels or "flaring boxes." I submit two methods, original as far as know. 1st. Draw a rectangular parallelogram the shortest side corre-
sponding with the thickness of the board to be mitered. the other side with a line cutting the board horizontally when set at the required flare Draw the diagonal line and the angle formed by the diagonal, and the
shortest side is the required miter. If different sides of the box or sem shortest side is the required miter. If different sides of the box or seat 2d. Add half as many degrees to the miter angle (forty-five degrees) the side of the box deflects from the perpendicular. For instance, if the side of the box flares at an angle of forty-five degrees, an angle of sixt
seven and a half degrees will miter the corner. -J. S. O., of N. J. Case Hardening.-If E. N. G. will make a paste of prus siate of potash, and cover his screws and nuts with it, and then heat until
red hot, he will have them case hardened. Any quantity can be heated red hot, he will have them case hardened. Any quantity can be heated
at a time provided he has a furnace large enough. - E. O. McC., of S. C.

## Queties.

[ We present herevoith a series of inquiries embractng a variety of toptcs of oreater or less general intsrest. The questions are simplat
prefer to elioit practical answers from our readers.]
1.-Liquid Glde.-M. M.. Havana, Cuba, asks :-Can any of your correspondents inform me through your scientific paper, how to
2.-Marking Floid.-Will some of your many readers in form me ho
3.-Ventilating Ice Houses.-Can any of your corres-
4.-Biniodide of Mercury in Solution.-I often have prescriptions calling for bichloride of mercury with potass iodide, combinng which I have the biniodide of mercury ( Hg 12 ) as a precipitate. I wish
5.-Soldering Cast Iron.-Will you inform us what prepG. D. \& s .
6.-Decay of India Rubber Bands.-Is there any maner of rendering elastic rubber bands proof against decay? Those now in
use in business houses are useless after a year or two. - w. H.
7.-Deoxidising Zinc.-Can any one inform me of any method by which I can restore oxidized zinc or spelter? I use it in a liquid
state, but have a great deal of waste by over heating.-G. A.
8.-Fireproofing Timber.-Can any oneinformus of any ash that can be applied to wood to make it freproof? We have a building
9.-Compound Gearing on Screw Cutting Lathe.-I wish a simple and reliable rule for compounding gearing on screw cuttin
10.-Battery Power.-How many cups of Daniell's bat tery would be required to work a telegraph line 650 feet long
sounders at each end? The wire is copper, No. 16.-E. M. D.
11.-Salt and Ice.-Why is salt mixed with ice to freeze ice cream, while, in winter, we put salt in our pumps to keep them from
12.-Carbon Battery Plates.-I wish to know how to ake carbon battery plates for voltaic batteries.-A. N.
13.-Dressing for Shoes.-Can anyone give me a receipt formakine the best dressing for ladies' and children's shoes, waterproof, an that will not injure the leather? -M. L. K
14.-Freezing of Mortar.-Does lime mortar undergo ny chemical change by freezing when in a softstate? I am informed that
itis customary, upon the continent of Europe and in England, for all lime mortar which is to be used in the masonry of buildings of inportance to be
made up montins, or perhaps longer, before itisused. Is it ever allowed $t$ made up montins, or perhaps longer, before itisused. Is it ever allowed to
freeze, or doesit injnre the setting ofit, or the durability after ithas set, by reezingin a mass when wet?-H. D. C.
15.-Resultant Power.-Does the resultant equal the power applied, in that class of machinery where the power is applied at the
axde (asin reapers), no account beingtaken of friction ort the power to draw the weight of the machine? If any power is lost, how can it be ac countedfor, or, in other words, what becomes of it?-C. A. B. of IIl.
16.-Land and Sea Breezes.-I would like to inquire what causesthe dark? Ihave often noticed the same at sea, and on land in heavy upales.- -B. R., J
17.-Jeweller's Lap.-Can any onegive medirections for $m$ aking a lap, such as is used generally by jewellers in polishing? I wan to know what the different
that I may cast one.-O. B.
18.-Revolution of Bodies.-The following question has given rise to a good deal of discussionin this place, and both parties have
agreed to leave the matter for y our readers to decide: A man starts to go around a aquirrel that is on the trunk of a tree, and, as the man goes round the squirreltravels around the tree, and remansin the same position to th man until both arrive at the po
round the squirrel ?-R. O. H.
19.-Hygrometer.-I wish to know what to do with my hygrometer, that is, the wet bulb thermometer. When it is so cold that wat freezes, sothat I can find the relative humidity of the air? Is there an in
20.-Annealing Lamp Chimney.-Every person who has the kerosenelamps in common use are an imposition on the public. Can any of y our readers give a simple process to anneal or temper them, so that
they, with judicious care and careful usage, will not be broken by the heat o its burning wick?-R. L.
21.-Marking Ink.-How can I make a good marking ink,
22.--Restoring Buffalo Robes.-What can be applied to buffalo robes to make them soft and pliable after having been wet? T. $\mathrm{L} . \mathrm{s}$.
23.-Softening Lead.- Will some one please give me, through your paper, a receipt for soften
repeated melting and using?-C. $\mathbf{W}$. L.
24.-Bronzing.-Can any one give me some information about bronzing? And where can I obtain a work on bronzing, and which is

Zefent gurcicay aud foreign eatentg.
nder this heading we shall publish
nent home and foreagn patents.
Cutting and Assorting Playing Cards and Strips.-Victor E. Mauger of New York city.-This invention has for its object to produce simple and egular order-the several strips or pieces cut from strips. The invention is to be more particularly applicable in the manufacture of playing cards
but may also be advantageously used for other work. Playing cards byrotary knives, cut from large sheets, each sheet containing about thirty or more cards. Every sheet is frst printed, and then, by parallel incisions cut into strips, each strip being subsequently cut ap into as many cards as
it contains. When thus cut rapidly, the cards of several sheets are apt to it contains. When thus cut rapidy, the cards of several sheets are apt to
become mixed, and those of each sheet are liable to be indiscriminately ar become mixed, and those of each sheet are liable to be indiscriminately ar-
ranged, making it diffcult and laborious to assort them into "packs;" but by this invention the cards of each sheet are regularly arranged and placed one upon another in desired succession, so that the entire labor of subse quent assorting is dispensed with. The invention consists chiefly in the us of a graduated plate, upon which the strips cut from sheets or the cardas at
rom strips are deposited, and in the use thereon of a sliding carriage o belt, which conveys each higher strip or card to the one next below it an解 with the combination, with the graduated plate, of guide chutes, which convey the several pieces, respect vely, to the several steps of the plate.
Watch Escapement. - Don J. Mozart, of New York city.-The ordinary escapement has a projecting pin or ruby on the staff, which receives an im pulse from the double pronged anchor alternately in opposite directions.
The impulse for either movement is given when the ruby pin is in one-th The impulsefor either movement is given when the ruby pin 18 in one-th
central-position, and exerts its influence to the very end of its extent-o in other words, until the power of the hair spring exceeds that of the impulse The hair spring will then, in attempting to adjust itself, carry the staf back
until the ruby pin is again in the central position, where it receives an im pulse in the opposite direction, and so torth, every stroke using the entire
force of the impulse as against that of the hair spring. This arrangement force of the impulse as against that of the hair spring. This arrangement exactness, since too much reliance is placed upon the slender hair spring
whose slight power varies under the least change of temperature and atmos phere. The division of the movements of the second hand, which is, mor than any other part of the watch, dependent upon the exactitude of escape-
ment, becomes difficult by the use of the old mechanism, and has, whenever nent, becomes diffcult by the use of the old mechanism, and has, whenever
effected, added greatly to the complication and expense of the watch. By a double regulating and impeling mechanism the inventor is enabled to give the impulse at the end of each swing of the balance wheel between certain
definite limits. A beautiful precision is thus produced by simplemeans, and defnite limits. A beautiful precision is thus produced by simple means, an
the subdivision of the second movement made easy by the mere applic ation the subdivision of the second
of detent arm to the arbor.
Boring Machink.-Frank S. Allen and Charles F. Ritchel, of New Yor ity.-This improved boring machine is designed more especially for use i and arranged that all the holes, whatever or however differenttheir inclination, may be bored at the same time and at one operation; and it consists in
the construction and combination of various parts, which can not well be described in such a notice as the present, but which constitute a very inge ious invention.
Key for Sewing Machine Lock.-Edward L. Gaylord, of Bridgeport, lonn. - This invention has for its object to furnish an improved key fo
locks to be attached to sewing machine covers and other articles that ar turned up or over so that the key is liable to fall out and be lost, and which
shall be so constructed as to retain its place in the key hole however much he article to which the lock is attached may be turned up. Theker is mad in two parts, secured to each other at the handle end by rivets. The forwar ds of the parts or pieces of the key are made square, and are beveled ly inserted in the square key hole of the lock. The parts of the key ar made elastic and their forward parts are set out, so as to be pressed inward or toward each other when the key is pressed into the key hole, where the y wil
Ash Pans for Steam Boilers.- John Gates, of Portland, Oregon.-This of steam boilers A surrounding pan, within which the ash pan the ash pas o adjusted that a water space will be formed between the two stays proper strength are interposed for holding them the requisite distance apar
nd supporting the ash pan. A water sapply leads to the water space. A and supporting the ash pan. A water supply leads to the water space. An adjusted pipe extending from the side of the outer pan is bent upwara, and its upper end is bent down to discharge water into a funnel held on a dis-
charge pipe. The water entering the space through the supply pipe circutes around the ash pan and escapes through the discharge pipe. The e of water is interrupted or not. Air is admitted to the ash pan in fron hrough an opening. A hinged door or damper is applied to the front of the boner the purpose or more or less closing the opening, and thereby regutingthe draught. A rope or chain is connected with the damper, and ex end is, or may be, weighted to balance the door in any desired position, or is therwise secured or connected in such manner that the engineer can readily fre.
Roce Driliting A pparatus. - Lycurgus Nelson, of Smyrna, Tenn.-This in pontion has for its object to so combine the necessary shafts and devices and pumpine may be carried on without much preparation or difleut change or gearing. The arrangement consists in a general new arrange ment of parts, which appears to be admirably adapted to the purpose in tended
ings.

Combined Washer and boiler.-George C. Taylor and John B. Chris man, Port Jervis, N. Y.-This invention furnishes an improved washing uickly, thoroughly, and without injuring them, and, at the same time 80 constructed that the wate may be heated and the clothes boiled in the machine. A heater is placed below the water chamber, in which the clothe re agitated by suitable mechanism, and provision is made for the circula ion of the wherto and from the chamber or heater trough pipes.
Skate Fasteninas.-Edward Lawson Fenerty, Halifax, Canada.-Thi invention hasforits object to furnish an improved skate fasteningwhich shal frmly secured to the boot by a single motion. When the fastenings have been adjusted to the hoot, the skate is placed upon the boot sole with the rear side of the boot heel resting against the fixed jaws. A lever is then brought up to its catch. This forces a jaw back against the forward side o wider hoot heel, and draws the forward fastening back from a narrower to
wide boot sole, so as to clamp the edges of the sole and hold it wider pa
firmly.
APPAR
apparate for Testing Cans, Barrels, etc.-William D. Brooks, Bal els, and . In this case, an apparatus is constructedfortesting cans, barot perfectly tight, the condensed air therein will leak out and indicate the spot where the hole is, the fact of leakage being revealed by the backward pump.
Fire Place Fenders.-Charles C. Algeo, Pittsburgh, Pa.-This invention onsists in having an inwardly projecting flange at the base of the fender With the spindle or pivot of the caster passing through said flange up to the
under side of the top of the fender, where a cavity is made for the reception of the top of the spindle, and the latter is confued against falling out by a in construction, and is claimed to afford a more durable arrangement than any other in use.
fliditing Sad Irons.-Edward A. Franklin. of Brenham, Texas.-This in ention relates to a new combination of fluting and sad iron, of such kin thus no loose or separate parts required for the two functions. The body of
the thus no loose or separate parts required for the two functions. The body of
the sad iron has a projecting stem. The lower roller hangsin a cavity which is provided in the top of the iron, while the projecting axle of the upper roller is itted tlirough a hole in the stem which thus constitutes the support
for said roller. The operating crank is screwed to a lett-handed thread of the axle of the lower roller, and will thus, when used for fluting, so turn the When not used for futing, the crank is unscrewed and the croller transferred o the upper part of the stem where there is a hole for the reception of the xle. After the crank is re-applied, the roller is in position to constitute the andle of the sad iron.
Lifting Jacks.-Walter S. Burgin, of Washington, Vt.-This invention wagon jack. The case or main frame of the jack is made in form of a rectan zular narrow box, standing on a stout base or board, and ope: on top fo crm of steps. to be originally ower end of the slide rests, with a small rounded point which is formed on t, upon a lever pivoted to the case. The free end of the lever project
hrough a slot in the case, and is, by a link, connected with the short arm lever handle, which is pivoted to ears projecting from the side of the case y swinging the handle down, the lever will be swung up and the slide ele ghinge or pivot between the link and handle ied bey ond the line drawn through the lower hinge or pivot of the link eight on the slide from crowding it down. By swingtng the handle up the lide will be let down. The combined leverage cives great power and facil ates the raising of heavy weights.
Sash Holders.-Charles T. Tessier, of New York city.-This invention onsistz of a T headed lever, a sliding locking bolt with a retracting spring, aid roller, all arranged in a case adapted to be applied to the stile of the sash, and to lock the sashby the bolt, and free it from the flexible roller by a down movement of the lever, the bolt being employed for locking the sash
when down. By an upward movement of the lever the bolt is freed so as $t$ t when down. By an upward movement of the lever the bolt is freed so as to e withdrawn by its spring, and the shifting inclined plate, behind the tiexi-
ble roller is actuated to press the roller against the window frame, so that it ill jam between said plate and frame to hold the sash up.
Stone Crushrr.-Peter Wood, Jersey City, N. J.-This is a powerf wheel shaft receives power from a belt, and, through a crank of short radius nd a stout pitman, actuates a powerfulever, which, through a bar, applies he force thus multipiled to toggle levers which actuate a pivoted jaw hich,
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