ENGINEERING INVENTIONS.
An elevator has been patented by Mr. Geo. A. Sazer, of New Brighton, N. Y. By various combinations of devices in connection with the hoisting rope,
incluading pawls, brakes, and safety wed ges, the stopping appliances being moved independently of the car a great degree of safety is obtained, and every facility afforded for managing the car.
A safety shell for blasting bas been patent ed by Mr. George Freund, of Durango, Colo. This in improvements on invention patented by same invent or last year, the object being to $\bullet$ otain greater safety
not only in handling material, but in tamping the not only in handling material, but in tamping the
charge and connectng the fuse to the stick, candle, charge and connecting the fuse
other form of explosive material
A bell ringing attachment for locomotives has ben
Pa. The bell is suspended in the usual manner from journaled yoke or shaft, and by suitable belt or gearing is connected with the running part of the locomotive
but sothat this cearing may be thrown in and out very easily, thus enabling the bell to be rung automatically as desired
A steam boiler or novel means of combus tion of gases in the fire box before they pass to the
boiler tubes, has been patented by Mr. John Alves, of Dunedin, New Zealand. A construction is provided for by which air passes under the grate bars and in the
rear of the bridge wall, from the sides of which it rear of the bridge wall, from the sides of which it it
discharged over the fire and also from a projection for ward
nace.
A
A
A steam pumping engine has been patented by Mr. Edward G. Shortt, of Carthage, N. Y. It is direct-acting, with the pump piston and ateam piston
connected together and working in unison in a containing case, one end of which forms the pump, the other
liaving valves and ports, and making an engine within laving valves and ports, and making an engine within
the same case. This invention covers several features in 1881

A furnace for treating ores continuously has been patented by Mr. Amedee M. G. Sebiliot,
Paris, France. This invention covers an improvemet n ore furnace of the same inventor patented las year. In a tunnel-shaped furnace is a tunnel-shapea
mufte, connected by fues with a receiver for the of the materials in the cars, which fit closely witbin tbe munfle, and are slowly:moved therem by an end less chain in a gutter or trough in the bottom of the furnace, the
chain baving catches to take hold of projectious from chain baving catches to t.
the bottoms of the cars.

## MECHANICAL INVENTIONS.

An improved saw set has been patented by Mr. John S. Long, of Murphysborough, III. It is a
novel construction and arrangement of parts, to be worked by tbe foot of the userengement so the pammer delivers upon the saw teeth a blow of uniform torce,regu
lated with precision by a thumb screw; the blow ma be made heavy or light, for thick or thin saws, but its
A lifting jack bas been patented by Mr Benjamin F. Mansfield, of Centerville, Oregon. Atooth ed wheelis rigidly mounted on a screw spinde below
the liead, the wheel being held between the shanks o the forked end of a lever; two pawls are pivoted on opposite sided of this for ked end, the ir inner ends be
ing pressed outwaraly by springs, so the outer ends en gage with the teeth of the toot bed whel, the wh
making it easy to rapidly raise and lower the screw.
An improved jack has been patented by Mr . Samuel J . Wis isdom, of Montgomery, Ala. The ob-
ject of the invention is to obtain a compact and powerful means of purchase for removing piston rods from
the cross heads of steam engines, etc, tor which is provided a cone-pointed screw, a nut in which it, works, and means to take the wedge strain, by which great
power can be applied without need of hammering or power can be applied with
bruising the filuished parts.
An improved loose collar attachment for hanging circular saws has been patented by Mr. Wil-
liam D. Sherman, of Grand Haven, Mich. By the liam D. Sherman, of Grand Haven, Mich. By this
means the lug or drivigg pins projecting from the fast means the lag or driving pins projecting from the fast
collar of the arbor, and passing through holes in the saw and loose collar, are so connected as to relieve the lug pins of wear, strain, and breakage, and bold the
loose collar as frmiy as a fast one, while preventing irregularities or obstructions in the holes of thelug pins and saw.

## agricultural inventions.

A corn planter bas been patented by Mr. Thomas Bell, of Shelby City, Ky. It is simple in con
struction, $t$ trong, light, and durable, will drop the corr struction, trong, light, and durable, will drop the corn
at the reauired dislances, and has an automatic marker indicating the position of the corn dropped, thereby
making it easy to passobstructions and plant the corn making it easy

A separator for grain has been patented by Mr. Frank L. Fidder, of Terre Haute, Ind. This inve tion provides for a separator formed of screws, with
connected threads intermeshing but not in contact with each other, and mechanism to rotate the adjacent surfaces of each pair of screws in opposite directions, in hopper, etc.

## miscellaneous inventions.

## A mail sack tag bas been patented by Mr.

 A George W. D. Denger, of Brooklyn, N. . . . . It is is ormedof a rigide piece with a longitudinal beveled slot, a tranof a rigid piece with a longitudinal bevelea slot, a tran-
verse slot, and a spring tongue, and can be easily and rapidly attached and detached from mail sacks or bags. A toy target bas been patented hy Messrs. Arthur H. Hoffman and William F. Lloyd, of Eas New York, and Joseph H. Block, of Brooklyn, N. Y.
It is a simple and amusing toy for children, combining toy cannon with different targets, figures, etc., awd can toy cannon with different targe
he manufactured at small cost.

A skewer puller bas been patented hy Mr. Augustus F. Friend, of Gravesend, N. Y. It is intended to faclitate the withdrawal of skewers from cooked at their for
A broom holder bas been patented by Mr. Herman C. Berg, of College Point, N. Y. This is an exceedingly simple device, made of a single piece of
wire, bent in such shape tbat tit may be attached to the wall and will hold the broom in an inverted position by A shading pencil has been patented by Mr.
George B. Hecklinger, of Streator, III. It provides for George B. Hecklinger, of Streator, IIl. It provides for
a handle inclosing leads of different colors placed side by side, which permits of two or more such leads being colors may be made at a single stroke.
A door and gate latch has been patented by Mr. Charles Wormuth, of Little Falls, N. Y. This in vention covers improvements in latches with reverselyhooked ends to engage catches on door or gate frame and the wall, and, while simple, strong, and dur A butter cutter has been patented by Mr . Newtou H. Sweet, of Stephentown Center, N. Y. It is
an improved device for removing butter, lard, etc., n improved device for removing butter, lard, etc.
from jars and tubs, in regular shaped cakes or blocks, which may be made of specifed sizes; it may also be used as a butter trier, and that which is not required
back in the tub.
A sole for rubber boots and shoes has been patented by Mr. Henry A. Wattson, of Granite, Colo of rubber bootsand shoes with metallic studs embedded heir resistance to wear, and in his way being especially desirable for miners' use.
A filter has been patented by Mr. Justin Durel, of New Orleans, La. This invention provides
for filtering, under pressure of a force pump, such lifor filtering, under pressure of a force pump, such li-
quors as the cane juice or sirup of sugar plantations, so quors as the cane juice or sirup of sugar plantations, 80
that the sediment and coarse matters wili settle away from rather than be forced through the filter proper and the filter can be easily cleaned.
An improved roller fixture bas been patentd by Mr. James H. Skidmore, of New York city. It is eive a roller with a bracket with antopen bearing to re be kept from accidental displacement,top revent shade. lowel, and other
A checker and baselall combination game has been patented by Mr. Hicam S. Towner, of Dutton,
Mich. The game board is divided after the manner of checter board, with additional outside squares, and ine game is played with two sets of stones of nine men aseball areput down in the score books.
An asb sifter has been patented by Mr. William T. Adams, of Baitimore, Md. This is a com bination of a sieve, slanting shelf, and drawers, inclos refuse coal and ashes are dumped together, the box may be closed, the sifting done without dust, and the coal An improved tuyere has been patented by Mr. Enoch P. H. Martin, of Wilmington, Del. An annular space surrounds the central space through which
cinders and ashes fall from the fire above, this space be ing protected from the cinders, fire above, this space bir distributed to the fire, so the fire will not clog, a bette consumption will be effected, with ec
and labor in cleaning out ashes is saved.
An apparatus for bottling and siruping aerated beverages has been patented by Messrs. James by a cam or eccentric on y revolving shaft operated by a cam or eccentric on a revolving shaft, an ad justa-
ble valve controls the sirup charge, there are revolving bottle carriers, and the operation is such as to allow the air to escape from the buttles being filled.
An unlocking attachment for time locks has been patented by Mr. Hiram P. Pruim, of Gran
Haven, Mich. It provides for a weighted lever worke by the mechanism of the lock, and connected by a pawl and ratchet wheel with a train of gear wheels operating of a time lock, so the latch can be tripped by the con
inued movement of the combination lock mechanism.
by Mr. Mathew S. Holt, of Weston, W Va. This ed invention covers a novel construction whereby, with a supplemental leaf, a large book may be held with itt
right hand cover in line with the writer's arm, and i right hand cover in line with the writer's arm, and in
many leaves are turned over, the adjacent leaf may be owered, to bring the surface of the page being written
A separator and conveyer has been patent d by Mr. John S. Fairly, of Charleston, S. C. Thi invention covers a screw conveyer with flights in sec
tions, armed at their outeryedges with flexible or pli ion, , armed at their outerledges with flexible or plia ox, more especially designed for separating the kernels of cott.
the huller.
An improved pearl button has been patent d by Mr. Henry Smith, of Newark, N. J. The object
of this invention is to improve the construction of buttons for which a patent was issued to the same invento last year, the tuhular rivet being provided with trans verse openings in its sides for the cross bar, and othe
changes made to insure a stronger and more durable button.
A sash bolder has been patented by Mr. William A. McDonald, of Minneapolis, Minn. It is
imple in construction and action, is entirely out o sight, permits the free raising and lowering of the sash while holding it in the desired position, is durable, an prevents the sash, door, etc., from rattling by the wind
It consists of a novel construction in that class of fasteners where a friction roll is pressed by springs.

A polishing machine has been paten ted by Mr. Jean Pierron, of Elizabethport, N. N. T. The object
of this invention is to furnish an improved machine fo of this invention is to furnish an improved machine fo polishing wood, stone, and other materials, and to thi
end there are various devices whereby the position of end there are various devices whereby the position
the abrading wheel may be adjusted and its work defi nitely gauged, its disk being pressed on the material A steam hated by Mr Robert W. Turner of Thos ben ed by Mr. Robert W. Turner, of Thornton, Tex. Thi tion of cane juice to sirup, and covers receptacle wit a surrounding chest, botb of which are contained in vat, a steam coil surrounding tbe chest and steam pipe connecting with it as desired, and also a pipe for con
densing vapor leading from the interior receptacle. Changeable scenery for theaters forms th subject of a patent granted to Mr. Lafayette $W$. Seavey,
of New York city. Each separate piece or portion is mounted on roller arranged to rest upon the stage, that all may be revolved in either direction. To brin a sel scene into any desired position tie rods are built
up in sections, and suilably connected, to serve as

A sad iron has been patented by Mr. A1 fred R. White, of Stevens Point, Wis. The ironing block or baseis of approximately diamond shape, an spring catch for engaging a detachable handle, the lat-
ter preferably made in two parts; his handle can be ter preferably made in two parts; ihis handle can be
adjusted in a lengthwise or crosswise position, to betadjusted in a lengthwise or crosswise position, to bet-
ter adapt the iron for working on wide or narrow surter adaa
faces.
A f

A fire escape has been patented by $\mathbf{M r}$ Robert Stevenson, of Ferrysburg, Mich. A balcony is
devised for each floor of the building, the balustrad devised for each floor of the building, the balustrade
and fioor of which fold up against the side wall under the windows, and are secured by catches, connected wish a rod for releasing any one, when the floor fall
on supporting brackets and the balustrade swings upright by springs, ladders being provided with the ba conies to be let down by hooks.
A washing machine has been patented by Mr. Lars Christiansen, of Council Bluffs, Iowa. A sud box or tub has a series of brushes on the bottom, stand
ing vertically, with another series fixed to the sides, while a hubstanding in the center has brushes on its circumference, working in combination with a vertical
shaft with radial arms, so portions of the clothes ma shaft with radial arms, so portions of the clothes may
be held between the cover and arms, and other portions bbed against the stationary brushes.
A polisher and cleaner for metal and otber surfaces hasbeen patented by Mr. William Heard, of ing and polishing cutlery in kitchen use, but or clean scrubber for floors, walls, etc. There is a container and a percolator of cork, rubber, leather, or an equivalent, the container holding the polishing material, and over the surface to be polished or cleaned, as the pol isher is passed backward and forward over it.
An apparatus for the application of com pressed air to the mannfacture of glass has been patent
ed by Messrs. Adrien A.and Leon A. Appert, of Paris, ed by Messrs. Adrien A. and Leon A. Appert, of Paris, ing can be done mechanically there for all kinds ing can be done mechanically there for all kinds of
such work, and the escape and expansion of the com pressed air can be atilized for the cooling of the glass as well as other metal or monlds,
manufacture and saving moulds.
A barrel finishing machine has been patent d.by Mr. Robert O. Dobbin, of Waterloo, Ontario Canada. This invention, while recognizing former pa-
tents in the same line, provides new and special mech. tents in the same line, provides new and special mech-
amism for finishing barrels after they are set up in trus hoops. There are two rotating chucks and a stationary huck with adjustable jaws, so a barrel may be cen when the jaws of the central chuck are radially with drawn, and the barrel may be revolved. There are numerous special features, and while the machine ca is most economical, and all the hoops, heads, staves etc., of one barrel will fit any otber of the same kind
educigg the cost of both manufacturing and repairing.
An apparatus for the manufacture of carbon back has been patented by Mr. George G. Shoemaker of Edenburg, Pa. 'This invention relates more particu larly to making the black from crude petroleum an fineries, the fuel being supplied under pressure to material. Over the cup-like burners inclined cone are rotated, their apex upward, and over their upper surfaces cold water is distributed from perforations, so the fiames strike cool portions of the cones, and the fumes are condensed, while steel scrapers extend up the opposite sides of the cones and detach the carbon
black formed as ihe cones rotate, the black descending ! into a f
moval.

## NEW BOOKS AND PUBLICATIONS

Observations of the Great Comet of
1882 , made at the United States 1882, made at THe United States
Naval Observatory. Prepared by William C. Winlock, Assistant Astrono mer. Go
ington.
This appendix to regular report of 1880 is valuable affording a complete and chronologically arranged September 19, 1882, to April 4, 1883. The comet observ ed was the visitor whose nucleus presented so many of forms, which are well illustrated in the exquisitely eautiful plates here given. No theories respecting comets find place in this concise record, which em W. T. Sampson, Prof. J. R. Eastman, and Prof. Edga Skinnerand William C. Winlock

## ¥pectial.

REVIEW OF A GREAT AND BENEFICENT WORK
of human life have been completed since we began this work. It is meet that we
nake a halt, long enough at least to take note of the region over which we have journeyed, and to examine twice seven years
Tws up to us.
Twice seven years ago oneof us started single-handed
to inaugurate and develop a new use, at once scientific and practical, professional and commercial, business. and practical, professional and commercial, businessthe difficulties to be encountered in creativg an entirely new business and securing its recognized entrance into
the rank and file of business. That we have done this sives us the right to speak.
For eight years this single-handed work was prose-
cuted. The operator had a conviction that in the Compound Oxygen he had found a mode of redeeming his nd benign than the world had ever seen. This inspire him with the courage to abandon a lucrative practice which he had been twelve years in building, and to over come al obstacles in the way of realizing his dream-of
proving to the world that his conviction was securely san mproved health-stand ready to testify.
Sixteen years ago the senior partner had his attention called to a few persons who were taking the Compound oxygen. They declared that they were improving with
satisfaction. He felt sure that they were being stimu lated; and that, consequently, they would soon show the
effect of all stimulation, and retrograde below the point of health at which they began the treatmen
By carefully watching the cases for several months, then induced several of his own patients-cases which any physician would have considered very doubtful under anysystem of medication-to try the effect of the Compound Oxygen. With surprise he watched them
making commendable speed healthward. He then put nembers of his own family under treatment, and with like good results.
All this provoked a conflict in his mind. He had proof that in the Compound Oxygen there was an agent that would cure many sick ones whose condition would amfe many oth ers whom he might cure in six or twelve months would get
tion of thatragent.
Non ofthatragent
Now the question forced itself upon his mind and per-
emptorily demanded an answer : "What are you going to 10 with this latter class of patients, who confide to your care the restoration of their health? As a faithful phy way to secure to them that for which they are paying way to se.cure to them that for which they are paying
you?" Well, what is the proposition? "Evidently, send than they can be under your care and ministration,"
But that would be suicidal. "No, the proportionof such patients would be small." True, but the public will no discriminate. They will see only that the doctor sends
his patients elsewhere to be cured, and therefore he acks confidence in his own medical skill. "Well, there is one way out of the dilemma; get possession of the superior curative agent, and thus make peace with your professional conscience and prove yourself a friend to
suffering humanity." What, and be jeered by one's That ap and taboed by one's Brice. But what is the alternative?"' Result: He gives up his hard-earned prac-
tice, secures at a great price the knowledge of and the tice, secures at a great price the knowledge of and the
right to administer the Compound Oxygen in this city. Thisincluded only the Office Treatment in Philadelphia. Soon he was exercised by the fact that the opera-
tion of an office business was very limited. Somethin must be one to dispense the blessing far and wide. Ac cordingly, at no little expense, he hastened to make
known to his professional brethren the virtues of Com. pound Oxygen, and to furnish them with outfits for ad-
ministering it. As he ought to haveknown would bethe case, his efforts excited ridicule and reproaches
Nothing daunted, he entered upon a long series of ex-
periments, which resulted in the conviction that there wasa much better method of accomplishing the end in
view thanthe one which had failed. Hence the widely known Home Treatment.
In this untried field he labored for a year; meetna at dely required. On the last of June, ten years ago, the
practicability of the enterprise was demonstrated. But he had exhausted his resources, broken his health, and almost sacrificed his life. The ship was b ut and
launched, but three years' struggle proved to him that he could not freight and man it. Six and a half years
ago he found a man who could apprectate the value of ago he found a man who could apprectate the value of the work in hand. Our united
brightest hopes of the pioneer.
brightest hopes of the pioneer.
A new departure was the orderof the day. The first A new departure was the orderof the day. The frst
and essential thing to be done was, to let those who needed our curative agent know that we were in posses-
sion of it. K nowing that many fortuneshave been sunk sion of it. K nowing that many fortunes have been sunk
in advertismg, we decided to put that part of the buslness into the hands of one whose skill and experience had been proven. It is enough to say that the methods
which he adopted have revolutionized important branch es of advertising.
From the outset we have dealt truthfully ith the suffering sick, realizing that they at least had a right to de-
mand such dealing. We knew that we had a curative agent superior to any other in the world, and therefore
the simple truth about it would be the best credentials it the simple truth about it would be the best credentials
could have; hence we were not tempted to invent testi any.
The growth of the business has been phenomenal
During the frst year the business doubled each month Durmg the lastf our years we have recorded in our books
statements of diseases, reports of progress, repeated advice and prescriptions, of over twenty thousand per of our work asa commercial enterprise; but let this suf fice. It is of much greater importance to prove that our professional success has exceeded the other.
What,have we to show in this direction? D
ourteen years we have treated thirty tho during those Among these a large proportion had been sick for years all schools, different sanitariums, various natural healt resorts, shops of nostrum-mongers, and months of hygito remove the baleful effects of the treatment practice on them, than those of the original disease. How many of them have been desperate cases may be inferred from the fact that we have fled scores of orders-sent uncon
promising multitude, ninet
cured or greatly benefited.
We have proved that a number of diseases which by common consent have been assigned to the category o
"incurables," no longer belong there. We havecured a "incurables," no longer belong there. We have cured
number of cases of Bright's disease. Two of these case were brothers whose father, one brother, and one sis ter had died of the same disease. Wehave treated fou cases of Locomotor ataxia, or progressive paralysis. In all
of these the progress of the disease has been arrested of these the progress of the disease has been arrested
(which no system of medication has ever been known to do), and the patients have made genuine progress towa health. We almost never fail to cure asthma-even of fifteen years' standing-unless the case has been spoiled
by the use of narcotics, which served as palliatives but by the use of narcotics, which served as palliatives bu
constantly aggravated the disease. The same can be said of that "opprobrium medendi," hay fever. Thecase said of that "opprobrium medion-confrmed phthisis-which the compound Oxygenhascured can be counted by scores. We are confident that we make more genuine cures of ca-tarrh-nasal, laryngeal, bronchial, and pu
all the catarrh specialists in thie country.
all the catarri specialists in the country.
A distinguished member of the New York , who
appeared to be a wreck both physically and mentally, and who had settled up his worldly affairs, resumed his active business after three months' treatment; and this
business be has successfully followed for a year. Mrs Mary A. Livermore, who had been disabled for nearl two years by a dangerous exhaustion of the brain, ha for a year and a half been prosecuting her professiona work with more ease and energy than ever before. Th
Hon. W. D. Kelley, the Father of the National House o Representatives, will tell any one that he owes the last Ren years of his life to Compound Oxygen; and it can hardiy be disputed that during this period his labor have not been surpassed by those of any other membe
of Congress. William Penn Nixon, of the Chicago Inter of Congress. William Penn Nixon, of the Chicago Inter
Ocean, says that he owes his life Ocean, says that he owes his life and some years of ac-
tive usefulness to the virtues of Compound Oxygen.
The public know very well the unqualifed testimony The public know very well the unqualifed testimony
which Mr. T. S. Arthur has borne in favor of the comwhich Mr. T. S. Arthur has borne in favor of
pound Oxygen as exhibited in his own case.
But why multiply examples? We have published
many hundred statements in the patients, own lan guage of the effects of Compound Oxygen in almos every kind of disease.
Now what of the
Now what of the future? Having accomplished
what we have, and against such odds, our progress what we have, and against such odds, our progress
henceforward should be broader, more successful, and
more beneficent. As was to have been expected, proprietors of sanitariums and health resorts, whose busi
ness has been diverted from them ness has been diverted from them by the popularity of the Compound Oxygen, try to show that our agent sands of wonderful cures effected by tt , their tirades are
in vain. Of course there are-and there will probably be in vain. Of course there are-and there will probably be
more-imitators of the Compound Oxygen. Some have more-imitators of the Compound Oxygen. Some have testimonials. One of thom, havingobtained from Wi his own case, now publishes it as though Mr. Nixon was cured by his treatment instead of ours! Some of thos agents may be innocuous; but we have a good reason to
believe that many of them are positively injurious They will have their day.
But despite all factious opposition Compound Ox gen must become increasingly popular, so long as it possesses the ability to effect such remarkable cures now attest its merit.
For full information regarding the treatment and
Drs. STARKEY \& PALEN,
use, address

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Expanders. R. Dudgeon 24 Columbia St., New York. Friction Clutch Pulleys. D. Frisbie \& Co., Phila. Pa Tight and Slack Barrel Machinery a specialty. John
Greenwood \& Co., Rochester, N. Y. See illus. adv. p. 93 Magic Lanterns and Stereopticons of all kinds and
prices. Views illustrating every subject for public exhibitions, Sunday schools, colleges, and home entertain ment. 116 page illustrated catalogue free. McAlli
Manufacturlng Optician, 49 Nassau St., New York. Hand and Power Bolt Culters, Screw Plates, Taps in Lightning Screw Plates, Labor-saving. Tools, p. 92.

## 

HINTS 'IO CORRESPONDENTS.
No attention will be paid to commuacations unless accompanied with the full name and address of the writer.
Name
iven to inquirers.
We renew our request that correspondents, in referrin to former answers or articles, will be kind enough to name the date of the paper and the page, or the numbe of the question.
Correspondents whose inquiries do not appear after reasonable time should repeat, them. If not then pub Editor declines them
Persons desiring special information which is pnrely of a personal character, and not of general incerest, we remit from $\$ 1$ to $\$ 5$, according to the subject obtain such information without remuneration.
Any numbers of the Scientific American Supple IENT referred to in these columns may be had at the Correspondents 10 cents each
Correspondents sending samples of minerals, etc.
for examination, should be careful to distinctly mark label their specimens so as to avoid error in their indenti fication.
(1) C. M. asks: In what proportion of bulk atmospheric air is reduced by compression into $2,3,4$, etc., atmospheres? I mean, for instance, what room
will 1 cubic foot of air occupy after having been compressed to 2, 3, 4, etc., atmospheres, showing a pressur of $45, \mathbf{6 0}, 75,90$, etc., lb. respectively? A. The pressur volumes after cooling to the normal temperature isolnmes compressed into one-

|  | 2 vol. | 44 vol. | 6 vol. | 8 vol. | 10 vol . |
| :---: | :---: | :---: | :---: | :---: | :---: | $\begin{aligned} 15 \mathrm{lb} . & 30 \mathrm{lb} .\end{aligned} 45 \mathrm{lb} . \quad 60 \mathrm{lb} . \quad 90 \mathrm{lb}$. from the liberation of the latent heat carries the pres

(2) H. M. B.-We should infer from the do scription that the substance was some sort of slag hav-
ing a melting point lower than the heat to which the bricks were exposed. It is probably a silicate of lime or iron. To positively determine its nature an analy sis would be necessary, the expense of which would
be from $\$ 10$ to $\$ 20$, and a larger quantity of the coat
(3) J. L Truires that hammering and eating are two essentials to insure a good mill pick Never strike a pick or any steel tool on edge where the red heat has left it; let all the hammering be on the flat surface, and the last blows right along the point of the
tool to bring the steel close where the greatest resist ance to the blow is required. Clean, cold, soft water
with salt enough in it to float cemer with salt enough in it to float a common potato. Giv
the pick a cherry red heat, and dip without drawing temper, if the steel is good, you will have a pick that will give good service, and you can draw them down just as in as you want the
(4) F. W. M. writes: 1. Suppose I have
gear wheel with a loose journal-bearing surface 2 in in width, revolving on a shaft $11 / 2$ inches in diame ter, and another loose gear wheel just like the first, only that the width of its journal-bearing surface is half an
inch, and it revolves on a shaft 6 inches in diameter. inch, and it revolves on a shaft 6 inches in diameter.
Will the bearing surface in both cases be the same, viz., $9 \cdot 4248+$ sq. in.? A. The bearing surface will be on the 6 in . shaft is to be revolved only one-fourth on the 6 in . shaft is to be revolved only one-fourth as
fast as the wheel on the $11 / \mathrm{in}$ in. shaft, would the friction and wear be same in each? A. The friction and wear on the small shaft will be about four times as great as on the larger. The contact surfaces in both instances are the same, but in the former case the same particles are brought in contact with one another four times while the other shaft is revolving once; and since the weight upon hoth shafts is assumed to be the same, the wear must be four times as rapid in the one instance as in the other. 3. Would it require any more thinking that under the above circumstances the wheel with the large shaft woulif suffer no more wear or friction, 'and take no more power, than the wheel with the smaller shaft. But if they were both to make a revolution in the same time, the former would wear four times as fast and take four times the power. A. It is mpossible to answer the question of power positively, as the conditions are not fully enough given. We above conditions will be ahout the same for both shafts, although theoretically a little more power will be re quired to overcome greater wear of smaller shaft.
(5) O. F., Jersey City, asks what sized air chamber is required to sustain about 2.000 lb . dead ft. of air is sufficient if made of wood.
Minerals, etc.-Specimens bave been re ceived from the following correspondents, and examined, with the results stated:
S. P.-The sample consists of pyrite (iron sulphide).
n order to determine whether it carried gold in paying guantities, an assay costing $\$ 500$, will bo quantities, an assay, costing $\$ 5.00$, will be necessary.-
c. B. S. - The specimen is decomposed limestone, of no

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