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CAUTION.

It has become necessary for us to state very distinctly that
the Scientific American Patent Agency Offices are at No 37 PARK
Row, and not at No 39.

CENTRIFUGAL FORCE.

There is a power, generated by the revolutions of bodies,
known in mechanics as centrifugal force, which is one of the
most important products of mechanical movements. In regard
to its action we think considerable misapprehension exists.
In reply to a correspondent, a short time since, we in-
cidentally mentioned the fact that belts running on pulley faces
were subject to this influence, and we did not limit the state-
ment by any proviso as to the velocity of the periphery. To
this statement we have received several replies, two of which
we noticed in No. 13. We think that each of these corre-
spondents assume, either in so many words or by implication,
that centrifugal power can only be developed at some certain
velocity of rotation. We cannot assent to this opinion, be-
lieving that all rotating bodies develop this power in some
degree, however slow the velocity of their surfaces. When
the revolving motion is so rapid as to entirely overcome the
action of gravitation—called for convenience, when exerted
on a revolving body, centripetal force—the action of the cen-
trifugal force becomes evident to our senses; as when the wa-
ter is thrown from the surface of a swiftly revolving grind-
stone, or the sand is projected from the tire of a carriage
wheel. But we have no right to assume that the slow mov-
ing grindstone or the sluggish cart wheel does not develop
this power because we do not see its results.

The idea that the tendency of a belt to work to the highest
portion of a pulley, that furthest from the center, is caused
solely by the stretching of one of its edges, does not appear
to account for every case; as, if the belt is narrow, a mere
string, it will, if it has adhesion to the pulley face, gradually
work its way to the upper portion. Now if the belt, how-
ever wide, is held while the pulley turns, so that the centri-
fugal force cannot affect it, it will gradually slide down to the
lower edge and slip off. Take the instance of a feed belt on
an engine lathe. Its motion is very slow, yet every machin-
ist knows that if he uses a belt (round) rather large for the
scores in the pulleys, it will strive continually to ride the side
flanges. Put the same round belt on a cone-shaped, smooth
surfaced pulley and it will depart greatly from a right line in
its efforts to attain the largest diameter of the pulley. It
seems, therefore, pretty evident that centrifugal motion has
much to do with the running of belts.

This force exhibits itself in many phases on machinery,
and is put to many uses in aid of machine work. The copper-
cased cartridges, now so generally used, have their heads
filled with the fulminate by the utilization of this force. The
head has an annular space, forming a collar, which is filled
with the fulminate, but the central portion contains none of
this percussion powder. The shells are held under a vertical
spindle, the end of which is cut into radial scores, and revolv-
ing swiftly, throws the fulminate to the outer edge of the an-
nular space.

All the calculations of that useful adjunct to machinery,
the fly wheel, are based on the laws of centrifugal motion.
The fly wheel by its aid becomes, for a time, actually a reser-
voir of mechanical power, apparently giving out more than
it has received.

The centrifugal drying machine used in laundries is an-
other exemplification of the employment of centrifugal force.
It is an upright cylinder inclosing a smaller one, and the an-
nular space between the two is for the reception of the clothes.
A perforated bottom allows the moisture expressed from the
clothes to run off. A rapid rotation being given the cylinder

the clothes are compressed against the surface, so that with a
rotary motion of 1,500 turns per minute the clothes are rap-
idly and perfectly dried.

This force is used in the drying of steel pens after being
tempered, in separating ores from adulterations, and has been
applied to the granulation of saccharine sirups. Its effect is
very beautiful on the buff or emery wheel, where the parti-
cles of steel or iron in contact with the flinty particles of the
emery take fire and burn brilliantly, being thrown off in a
shower at a tangent.

THE CARE AND USE OF FILES.

A correspondent asks us for information relative to "the
proper management and care of files." We can offer no facts
not already familiar to practiced workmen, but may aid the
tyro somewhat by a few directions. While the proper man-
agement—the use—of files is to be gained only by practice,
there may be verbal suggestions made which will serve to
direct the inexperienced in their proper care.

The top of the jaws of the vise should not be higher than
the bent elbow of the workman. Our rule for setting a vise is
the height from the floor to the elbow when the arm is bent at
right angles. We have, by experience, found this much better
than raising it nearer the eye; it allows the forearm to trav-
erse a horizontal plane, which is absolutely necessary to do
correct work.

In selecting files those which are warped or sprung should
be rejected; the mechanical eye can readily detect them with-
out the use of any instrument, even when, as in the bastard
file, the faces are convex. The handle is also another impor-
tant matter. A chisel handle often used for a file is graceful
in form, and, for a chisel handle just the thing, but is entirely
unfit for a file handle. We do not prefer handles of beech,
birch, maple, or hickory for files. Those are the best which
are made of what the country people call "popple"—poplar—
softer than the hard woods and harder than pine. Chunks of
wood, pieces of broom handles, etc., are not proper handles
for files, although often used by workmen who ought to know
better.

Never put a new file on a casting until the scale has been
removed, nor upon a forging of iron or steel. A very conven-
ient and useful habit is to chalk one side of a new file and
preserve that side intact until the other is pretty well worn.
New files should be first used on brass, then cast iron, then
wrought iron and steel. The scale of cast iron may be re-
moved by grinding on the ordinary grindstone, when its form
will permit, or by an old and worn file. The grand first
requisite in filing is to learn to draw the file, both point and
heel, in a right or straight line. No one can do this at the
first trial nor until after long practice, generally. The two
hands must be educated and trained to move in unison. Be-
ginners always describe an arc of a circle when first attempt-
ing to file. Files are tender tools, especially some of the finer
and smaller sorts, and it requires much experience and care to
graduate the pressure to the strength of the file. No rule can
be laid down for this; it is the result alone of practice.

Draw filing is quite an art and it is very important. It is
moving the file transversely across the work. The file is
taken in both hands, the handle in the right and the toe in
the left, holding the file across the body. The drawing mo-
tion must be equal with both hands or the file marks will be
"slashed" or diagonal. The proper style of draw filing is
also the result only of practice. The beginner's right hand
will tend to travel faster than the left. In file finishing and
also in draw filing oil is often used on the file, as it produces
a much better surface and prevents scratching.

Files are ordinarily cleaned by a piece of card, such as is
used in cotton and woolen mills, tacked to a proper handle;
but often in filing wrought iron small chips of the iron lodge
in the teeth, producing scratches and refusing to be dislodged
by the card. A simple implement for this purpose is a stout
wire of soft iron, six or seven inches long, with a ring turned
at one end for a handle, and the other flattened on the anvil,
when cold, to a chisel point. To use it rest the toe of the file
on the bench, hold the handle in the left hand, and with the
right strike the wire's edge across the file in the direction of
the teeth. Sometimes the file becomes clogged with oil and
filings and cannot be perfectly cleaned by either of these
methods. In that case hold it over the forge fire until pretty
well warmed, then card it clean.

Cross-cut files are unfit for cutting the soft metals, as cop-
per, Babbitt, and lead. Only single cut or "float" files are
adapted to this work, and they should be quite coarse. As to
recut files we do not recommend them. We have rarely seen
a recut file which was worth half as much as a new one, and
if this were generally the case the diminished cost is more than
counterbalanced by the vexation of having a file break in the
midst of a job. Better sell your worn-out files and buy new.

Inventors' Institute.

The inventors of Milwaukee County, Wis., have organized
an association for mutual protection and scientific advance-
ment, and propose to establish spacious and central rooms in
the city for fortnightly meetings of practical and scientific
discussion, and also for the collection of models, apparatus,
books, etc. This is a movement of the right sort, and capable
of great utility. The amount of error commonly cherished in
regard to the first principles of mechanical science, and of
ignorance as to the teachings of experience in every depart-
ment of invention, is quite incredible to those who have not
by considerable investigation learned how little they naturally
know. The first and most valuable result of inventors' meet-
ings would be to supply correct principles and habits of rea-
soning, and teach the necessity of consulting the experience
of predecessors in whatever may be attempted. After these

lessons are achieved, the application of truth to practice opens
a limitless field for mutual suggestion, correction and assist-
ance. "Union is strength," and intellects united are many
times multiplied.

CITY PAVEMENTS.

If there is any one part of a city in which all the people
are interested more than in another it is that part on which
they travel. The streets belong to all, and their proper con-
dition is a matter of importance even to the visitors whom
the transaction of business or the pursuit of pleasure brings
within its precincts. The main requisites of a good street
pavement are evenness of surface, good foothold for horses,
resistance to rolling pressure, and durability. In no one of
these requisites are the streets of New York what they should
be. Evenness of surface is impossible either with cobble
stones or Belgian pavement; neither of them give a secure
foothold for horses; they allow stones or blocks to become
misplaced—sunk below the surface,—and they are not durable
if by that term we consider good condition involved. Now
if all these requisites can be attained by some other form and
material of pavement there seems to be no adequate reason
why it should not be adopted. Is there such a pavement?

From an examination of a compendium of facts now on our
table—a pamphlet entitled "The Nicolson Pavement"—and
from our own observations we incline to the opinion that
there is. The Nicolson pavement has been in use in Chicago
over ten years. So well satisfied are the authorities and peo-
ple of that city with it that no other is laid there. None of
it has yet worn to such extent as to need replacing, notwith-
standing on some of the streets the heaviest loads are con-
tinually passing. On Wells street in that city, laid with this
pavement, twenty-five barrels of flour is the ordinary load
for a pair of horses, weighing, with the team, over three tons,
and some loads of pork and other merchandise are much
greater; yet the pavement appears to have suffered no extra-
ordinary deterioration during the nine or ten years it has
been in constant use.

This pavement is much less noisy than the stone pavements,
which is a feature of considerable importance in a crowded
city. It affords a good foothold for horses, and if its durabil-
ity, facility for removing and replacing when necessary, and
first cost are as satisfactory as is claimed by its advocates, it
should be tested on some of our principal streets, as well as
on a portion of two or three, more or less removed from the
center of vehicular business.

THE PATENT BILL PASSED.

The bill to increase the efficiency of the Patent Office, no-
ticed in our last number as having passed the House, soon af-
ter came up for action in the Senate, and was amended by
striking out the sections relating to a Solicitor for the Patent
Office, Disbursing Clerk, etc. The House promptly adopted
the amended bill, and the Commissioner is now clothed with
ample authority to increase the examining force of the office.
We understand that he intends to fill all new positions by
promotions, which is certainly very commendable: therefore
the crowds who are daily hanging about the hall in front of
the Commissioner's door may as well disperse.

We earnestly hope that the Commissioner will act promptly
and energetically in carrying the new measure into effect.
The business of the office is suffering very much from the de-
lay which attends the examination of cases, and now that the
Commissioner has the power, we hope that he will employ
it to infuse new life and vigor into the Department.

THE DAY LINE.

The question of the beginning of the day, which we started
in our issue of March 2d, has attracted a great deal of atten-
tion. It has been discussed in the newspapers, in debating
societies, and at private gatherings all over the land. The
question has appeared to be many-sided, for the opinions on it
are very far from being harmonious. Some persons have
gone so far as to contend that there was nothing in it at all,
and even to hint that it was intended on our part as a kind of
practical joke aimed at our readers!

But on reviewing the whole subject we find that we and
our correspondents have expressed all the facts and opinions
about it that seem of importance, and therefore we conclude
that it is time to dismiss it from the paper. To the many
correspondents whose letters have not been printed we tender
our thanks for their kindness, and our regrets that space will
not admit a continuation of the discussion.

British Art Schools.

A published government directory gives a list of ninety
well established and sustained schools of art in the United
Kingdom, which in the year 1865 taught no less than 16,621
pupils. The first of these schools was established in 1842,
and already there is not a commercial or manufacturing town
in the British isles that is not thus provided. Parliament an-
nually appropriates a large sum of money to this system of
schools, with a view to foster British manufactures by giving
them the advantage so long possessed by the French, of
beauty, finish and taste in design. The whole is a regularly
organized department of science and art, of which the Duke
of Buckingham is President, with a large staff of secretaries
and clerks, and two divisions of professional inspectors, ex-
aminers and organizers, to aid in organizing schools, to su-
pervise them while in operation, to test their efficiency, and to
judge when they are entitled to aid from the fund in charge
of the department. A project is on foot to establish an
American University of Art.