Machinery and Tools as they are.---The Steam Engine.

(Continued from page 75.)

Before dismissing the subject of the side-lever engine, we will make a few remarks on some parts of the machinery which are common to all the varieties of the marine engine, and foremost in importance is the subject of the condenser. Singular as it may seem, it is nevertheless certain, that the condensing engine is an invention of older origin than the high pressure engine, which latter is much less complex, and would appear likely to have first occurred to the inventor. The use of the condenser is to convert the steam, after it has done its duty in the cylinder, into water, which is effected by exposing the steam to the chilling influence of a jet of water, which passes from the sea through a pipe into the above-named vessel.

At each successive stroke of the engine it is necessary to remove the water that is in the condenser; this is effected by the air-pump, the arrangement of valves for this purpose being as follows:—The foot-valve opens to permit the water and uncondensed vapor to enter the air-pump, from which they are removed by the air-pump bucket, which is furnished with a valve opening upwards.—Another valve, termed the delivery-valve, prevents the return of the water from the hot-well into which it is pumped. The present shape of the foot and delivery valves is that of a rectangular plate working on a joint, so as to close against the valve seating which inclines at an angle. The valve of the bucket is either simply a circular plate with a hole in the centre, through which the air-pump rod passes, so as to allow the valve to slide upand down, or if that shape is rejected, the butter-cup valve is used, which is merely a semi-circular flap on each side of the bucket. It is evident that, in engines of high power, these valves are of great size; the diameter of the air-pump is about one-eighth of the diameter of the cylinder, and the area of the delivery-valve is one-third of that of the air-pump, so that the continual jarring of these valves against their seats is an evil which requires a remedy. Canvas and india rubber have been employed in the air-pump valves for this purpose, with considerable advantage. The feed-water for the boilers is taken from the hot-well and forced into them by the feed-pumps. These operations, it will be perceived, consume a considerable amount of the power, and to reduce this item of consumption is of great importance. We have mentioned that condensation is often effected by passing the steam through a great number of small tubes, which are surrounded by cold water; this allows of the employment of a much smaller air-pump, and consequently saves the power, because the condensing water has not to be pumped out, but only the water arising from the steam. The saving is, however, counterbalanced by other objections, the chief one of which has been already stated. Another mode of attaining this object, which has hitherto failed, is to expose the steam to be condensed, to the impinging on a cold metallic surface, but it is difficult, by this plan, to condense rapidly and efficiently. Could any such system be made available, the evil of employing salt water in the boilers would be got rid of, and thus cause a saving of these vessels, a diminution in the amount of fuel, and render unnecessary the operation of blowing off.

The slide valves regulate the entrance and exit of the steam to and from the cylinder, and are usually of the box or else of the D description, not having been much changed for some years. The D slide is generally preferred if the engines are of great size, being sometimes made in one long valve, and in other cases being formed of two short D slides connected by a spindle. It derives its name from the shape, which is that of a semicircle, with a strip at top and bottom, designed to close the steam ports, and projecting a little forward; the circular part, which is the back of the slide, is kept steam-tight by packing. The box slide-valve requires but little description, its name explaining its shape; suppose, for example, a shallow cast-iron box placed on the cylinder facing with the recess downwards, and the top and bottom rim made rather broad, and it will give a sufficiently accurate idea of this valve. The last-mentioned valve has been somewhat improved in many engines, by being rendered a balance-valve, of which the main object is to obviate the great pressure exerted by the steam on the back of the slide. This is effected by placing a metallic ring on the above-mentioned part of the slide which is made steam-tight by spring packing. By admitting the steam between the slide and this ring, the pressure is counterbalanced, for the ring bears against the valve-box cover as much as the face of the slide bears against the cylinder. If this construction is adopted, the valve-box cover of course must be planed and brought to a surface.

The above contrivance is particularly serviceable when the engineer requires to shift the position of the valve.

Until the epoch of transatlantic navigation, marine engineers were indifferent or incredulous to the advantages of expansion; it is now, however, generally used in all large vessels. It will be unnecessary to dwell upon its benefits, as in America its economy has been long appreciated. With reference to its employment in steam vessels, the only point in dispute is, how far it is advisable to sacrifice the saving of fuel, realized by its use, for the slight additional speed obtained by admitting the steam during the whole stroke of the piston. It is well known that expansion can be effected by a proper arrangement of the slide valve, and for this purpose some marine engines have been lately provided with the slide gearing first introduced by Stephenson, in England, for his locomotives. It is, however, generally considered preferable to use a separate valve to cut off the steam, and thus to allow the slide its full stroke. The expansion valve is regulated by a cam fixed on the main shaft, and consisting of a series of curves arranged side by side, like steps, so as to shut off the steam at any desired part of the stroke. The valve itself is a balance or equilibrium valve, and is generally of the form known as the Cornish double-beat, so that the pressure of the steam is neutralized.

We shall conclude our account of the Side-lever Engine with a few remarks on the mode of operation for connecting or disconnecting, as may be required, the crank-shaft and paddle wheels.

When, from any cause, the machinery is not in operation, although the vessel is under weigh, it is requisite to cast the paddle shafts loose from the engine, for the water acting on the floats of the paddle-wheel retards the progress of the vessel. This was formerly accomplished by removing the strap of the connecting rod, so that the whole length of the shaft, with the wheels would revolve freely. Such was a tedious mode, and various plans have been introduced to simplify the operation. The main idea, however, is the same in all, namely, permitting the paddle shafts to revolve while the crank or intermediate shaft remains stationary.

(To be Continued.)

Inventors---The Ray Premium---Conduct of the American Institute.

Messrs. Editors—In perusing your valuable paper, I have often had occasion to admire the manly independence and fearlessness with which you have upheld the rights and sustained the interests of inventors, regardless of rank or wealth; and in view of this fact, I was somewhat surprised at the mildness of your reproof, in your remarks on the conduct of the Committee of the American Institute upon the Ray Premium. You say, "it is scarcely fair to advance new conditions for testing an invention, after it has been presented." In this you are right, but I wish to say, through your columns, that, in my opinion, it is not only unfair, but positively dishonorable and dishonest, as concerning those inventors who have not the means of testing their inventions on a large scale, and who have been induced to spend their time and money upon them, on the simple conditions expressed in Mr. Ray's advertisement, of presentation at the Fair of the American Institute in October, 1852. This they have done, and now they have a right to expect that their claims will be fairly considered and acted upon; and that a committee will be appointed, possessed of sufficient scientific and mechanical knowledge to decide upon the merits of the different inventions submitted to them. If the present committee are incompetent for this business, they should be discharged, and others appointed in their stead. But it appears that inventors have been mistaken in the universality of the offer of the premium, in the view of this Committee. It was only offered to those who have the means to put their invention in operation on a large scale." To all others, "unless some good and generous patrons do it for them, the prizes have been offered in vain," i. e.—not offered at all. This conclusion of this scientific and intelligent committee reminds me of the words of a poet:—

"But if you are poor, Heaven help you!
Though your sire had royal blood within him,
And though you possess the intellect of angels, too,
'Tis all in vain, a useless matter,
The world* will ne'er inquire on such a score;
Why should it take the pains?
'Tis easier to weigh purses sure, than brains!"

* The Committee. C. F.

Buffalo, N. Y.

[We could not say any more about the action of the Committee than we have said, because we cannot obtain *positive* information about all its proceedings. We have been told that some of the Committee were not qualified for their business, and that only five minutes were allowed to each competitor to explain his invention. There appears to be something wrong, but where the fault lies we are unable to determine.—Ed.

[For the Scientific American.]

Railroad Inventions.

There appears to be a great mania for self-acting brakes, worked by the momentum of the cars, &c., and I beg to give all those gentlemen of the Brake Party a little advice; that is—they will never succeed in their plans as at present directed; for the moment you attach a complicated apparatus to railroad machinery, you are destined to fail; besides, the sudden coalition and rebounding of a train of cars will not produce power sufficient to be of any effect, without the introduction of yet more complicated machinery that will condemn itself at once. The best self-acting brake is a sober trustworthy man, with powerful but common and simple double brakes; let railroad companies pay for good men in all their departments—practical men of common sense—and you will not hear of those terrible accidents any more. But as long as railroads and steamboats are controlled by men with more tongue than brains, and more brass than knowledge, these accidents will continue to occur.

As for the self-acting brake, I helped to apply the same principle several years ago, but finding no benefit derived from it, I let the matter drop; in fact, to obtain leverage enough, the car must have an action, or space between each, of at least two or three feet, which would cause a continual oscillation, or jerking, as the couplings came into action or otherwise, and of course would cause most dangerous spaces between the platform, to say nothing of a disagreeable motion to the passengers,—as cars, to ride easy, should be firmly and closely attached to each other and to the engine, so as to render them, comparatively, one solid body, allowing no room for jerks;—then, and not till then, will passengers be freed from those disagreeable bumps or jerks when the train starts or stops. Yours, &c.,

John J. Jones, Supt. of A. R. R.

The Same Subject.

Messrs. Editors—In the Scientific American of the 13th inst., I find a description of White's Patent Equalizing or Self-adjusting Truck, and as you state that to you it appears to be a good improvement, and one that will conduce greatly to the safety of railroad travelling, I wish to point out what, in my opinion, is an objectionable feature of the invention, and which might lead to throwing the locomotive off the track, instead of tending to keep it on,—I allude to the eccentric cup or movable centre, which, if it required to be moved much to make the driving wheels track, would cause the truck to run to one side, and consequently tend to mount the rail, thereby causing the result it is meant to avoid. I call it anything but a scientific remedy for the driving wheels not tracking. There is but one correct position for the centre-plate or saddle, and that is exactly in the centre-line of the engine, and also in the centre-line of the truck, the position fore and aft may be varied with safety, as it frequently is by placing the centre-plate forward the centre of the truck, thus giving the controlling influence to the hind wheels of the truck, but it is not safe to move it sideways.

Being a railroad man I take pleasure in improvements conducing to the safety of engineers and the travelling community. With respect to carrying the weight on the centre of the truck, it is a good but not a new plan, as I will proceed to show:—some ten or more years ago, I cannot state the time exactly, I built a locomotive, which was then named the 'Owasco,' which was put upon the Buffalo and Attica Railroad, and has been in use ever since, and is now on the Buffalo and Rochester Railroad; this locomotive has a centre-cup plate, of cast-iron, chilled, and the centre-pin or saddle which is attached to the boiler is also of cast-iron chilled on the end, the truck carrying the weight on the centre, and the cup bearing allowing the truck to accommodate itself to inequalities in the road, and as far as I can learn, it has never broken a spring either upon the truck or driving wheels, and is said to be the best engine on the road for keeping the track. I do not claim to be the inventor, as I believe the invention was made by Eastwick & Harrison, formerly of Philadelphia, Pa. Yours, &c.,

W. S. Hudson.

Paterson, N. J.. Nov. 6, 1852.

[We are happy to receive communications from practical men, upon all subjects, and in order to benefit all classes we are pleased to insert their communications, whether as criticisms on inventions or as suggestions to their improvements, providing they are penned in a proper style and dictated by correct motives. —[Ed.

An Immense Iron Structure.

The Oswego Starch Company have recently had an immense iron frame put in their building, which is probably the largest structure of the kind to be found in the country. The main posts and beams of the factory, which have decayed, have been taken out and replaced by this huge iron frame, which is formed of hollow iron columns, upon which are cast-iron beams with wrought-iron trusses. This frame, which has its foundation on the rock, is five stories high, and weighs 300,000 pounds.

The Oswego Starch Factory is now the largest establishment of the kind in the United States. The factory and buildings cover one and a-half acres of ground, and are lighted by between 75 and 100 sky-lights. The buildings contain 600,000 pounds of machinery, among which are three cast iron kettles holding 1,000 gallons each; eight little pumps capable of discharging 80,000 gallons of starch an hour; five rotary and force pumps capable of discharging 5,000 gallons of water a minute; over one mile in length of water pipe; 200 vats used in the manufacture of starch, holding 800,000 gallons, and four pair of cast-iron rollers, weighing 10,000 pounds each.

This establishment gives employment to 100 men, and consumes annually from 175,000 to 200,000 bushels of corn, 800 tons anthracite coal, and from 600,000 to 800,000 feet of lumber in the manufacture of boxes and other purposes, and makes 10,000 pounds of starch a day. The machinery is propelled by four water wheels, combining 80-horse power.

Great Land Sale.

The great sale of land at San Antonio was to take place on the 8th inst. The Ledger of the 20th ult. says:—"Fifteen thousand acres of land within the town precincts will be exposed at auction. It may surprise many at a distance how we own such valuable property. Over one hundred years ago, by legal enactment, the town proper secured an area of about forty thousand acres. The late Supreme Court quieted the title to this tract by vesting in the city. The survey ranges the lots from a single acre to one hundred, according to the position of the land. The terms of the sale are particularly favorable, being one-fifth cash, and fifty years' credit on the balance, with the payment of eight per cent. interest. The inducements for investments are overpowering.