New Inventions.

Friction Matches.

We havelately received a number of letters requesting information relating to the composition employed in making friction matches. The following is an answer to such inquirers, and all others to whom it may be useful.

The first lucifer or friction matches used were prepared with sulphur, chlorate of potash and gum. The ends of these, when dipped into a bottle containing asbestos moistened with sulphuric acid, took fire at once. Such matches have been superseded by the more simple locofoco matches, which ignite by friction without the aid of an acid. These matches are first dipped into molten sulphur cooled, then coated with a composition of 16 parts, by weight, of gum arabic, 9 of phosphorus, 14 of niter, and 16 of fine peroxyd of manganese, and a little sulphuret of antimony. These ingredients are worked up with water to form a thick paste, into which the matches are dipped, and then dried. Smalt and cinnabar are employed to color the ends of the matches. Those matches which ignite with a small crackling noise, are prepared with the chlorate of potash. It is a dangerous substance to use in their preparation. When it is employed care must be exercised that the gum paste in which it is mixed with the phosphorus, does not exceed 104° Fah. These matches are dried in a dry and warm (but not hot) room.

On October 24th, 1836, Alonzo D. Philips, of Springfield, Mass., obtained a patent for manufacturing locofoco matches with a preparation of chalk, phosphorus, and glue. An ounce of glue is dissolved in warm water; to this is added four ounces of fine pulverized chalk, and stirred until it forms into thick paste. One ounce of phosphorus is then added, and the whole kept a little warm and well stirred until the whole are well incorporated together. Into this the ends of the matches—which have been previously coated with sulphur and dried—are dipped, and then laid in rows on slips of paper cut wide enough to lap over the ends of the matches.

Covering Railroads.

A correspondent writing to us from Fire Island, points out the benefits of enclosing a railroad its whole length, like a long shed. He asserts that the whole expense of enclosing our northern railroads would have been saved this last winter alone, by such a protection of the track from the snow. He says :—

"By housing the road, the ties and the rails would be preserved, and a part of the expense thus saved, and in the long run I have not doubt it would result in a profit to the concern, and will eventually be put in practice. Railroads are a great invention, but as they are now built and conducted I consider them in a state of barbarism. I look ahead with a good deal of anxiety to the time when they will all be covered, and thus made more comfortable and profitable."

These ideas of our correspondent are well worthy of attention. At present, with such an amount of smoke as is emitted from our locomotives however, a covered railroad is out of the question, except by using a tier of huge inclined ventilators along the whole roof.

During winter, in the northern States, covered railways would pay, no doubt, and prove very comfortable; but we certainly should want the roofs taken off during warm weather. The covering of the Grand Trunk Railway in Canada was proposed by Wm. Lyon McKenzie about two years ago, and for that country, where the snow is generally deep in winter, some such plan is certainly required.

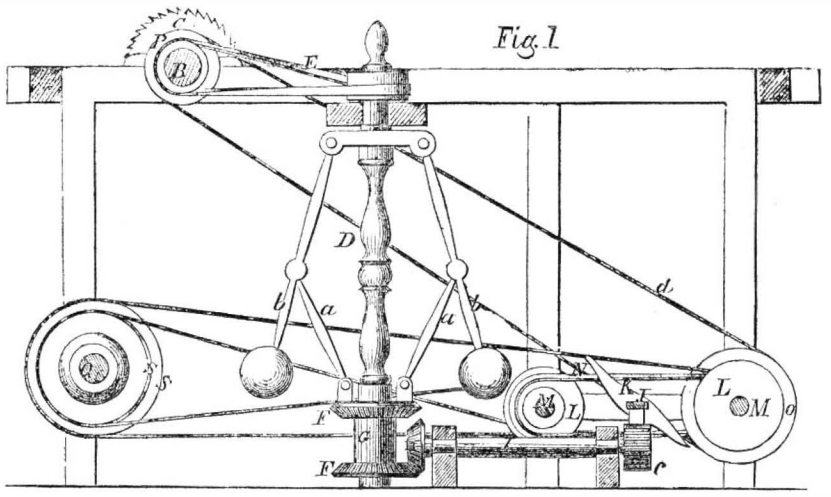
Pressure of Steam in Boilers.

Mr. Anderson, the Inspector of Machinery in the Arsenal at Woolwich, Eng., has issued a pamphlet giving directions to engineers and firemen in the management of steam boilers. He commences by stating that the pressure within a boiler is greater than is generally supposed. With a pressure of 50 lbs. per square inch, it amounts to 7200 lbs. on every foot of surface exposed to the steam, amounting frequently to many thousands of tuns in the boiler, thus accounting for the enormous havoc made by explosions. The joints are weaker than the solid parts; good boiler plate will withstand from 56,000 lbs. to 60,000 lbs. per square inch of sectional area; the joints will give way at about 34,000 lbs., which shows the importance of seeing that the rivets and other fastenings are always in sound condition. Explosions are divided into four classes, and the causes of each explained, from want of strength, deficiency of water, heating of plates, and the variety of other circumstances. On the duty and economy of fuel, the steam generating power of Welsh coal is given as 9 1-2, anthracite 9, and Newcastle coal 8. The following are a few hints on general boiler management :—See that the supply of feed water is uniform and regular; let no steam blow off at the safety-valve; heat passing from the boiler is a dead loss; see that there are no crevices to let cold air into the flues but through the fires; take care that every ounce of fuel does its duty; have the steam always up to the required pressure by the hour of starting; and remember you are entrusted with valuable property, and that a little carelessness may involve immense damage, and the destruction of human life.

These instructions are sensible and correct, and may be extended to "all whom they may concern."

IMPROVED AUTOMATIC GOVERNOR FOR SAW MILLS.

Fig. 1



New Saw Mill Governor.

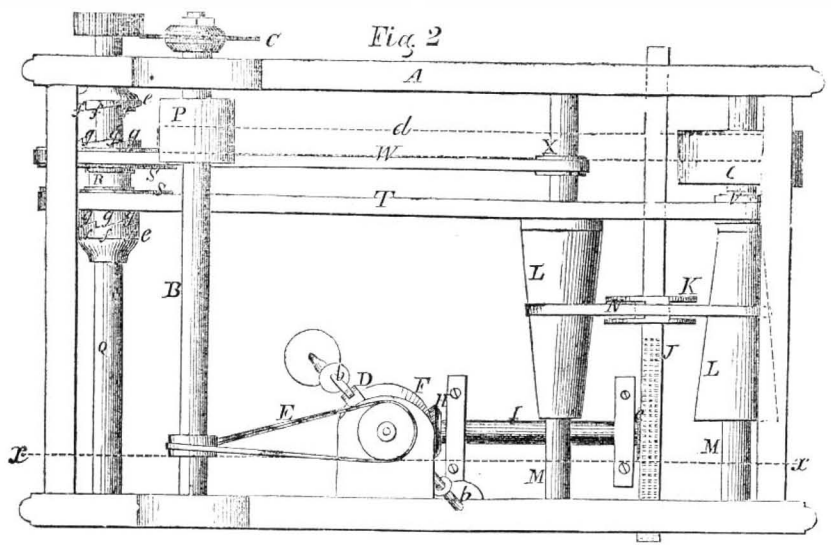
Logs, as they come from the forest to the saw mill, are generally larger at one end than the other. If the butt end of the log is first presented to the saw, more power will be required than when the smaller end is being cut—and *vice versa*. Again, when circular saws are used, they are liable sometimes to bind, or choke up, and there is danger of breakage to the machinery.

The object of the present improvement is to equalize or govern the power, in such a manner that the force brought into requisition shall be just equivalent to the work to be done; so that, for example, if the saw is cutting from the large to the small end of the log, the power will correspondently diminish; or if the saw is cutting from the small towards the large end, the power will accordingly increase—a steady movement in the speed of the saw being thus always maintained.

Another feature of the improvement consists in its adaptation to the stoppage of the sawing machinery when the saw chokes; but the stoppage does not take place unless the efforts of the governing apparatus to clear away the impediment by letting on more power, prove ineffectual.

Referring to the cuts, fig. 1 is a side sectional elevation, and fig. 2 a top view A is the frame, B a saw shaft placed on the upper part of frame, C a circular saw, D a ball governor of usual construction, driven from the saw shaft, B, by belt E. The lower part of the governor shaft has two bevel gear wheels, F F, upon it, which are connected to arms, *a a*, attached to the

Fig. 2



ball arms, *b b*. The bevel wheels, F F, are attached to the upper and lower ends of a collar, G, which slides on the governor shaft. H is a bevel pinion at the end of a horizontal shaft I. The pinion, H, is placed between the two bevel wheels, F F, and gears into either of them according as the collar, G, is raised or lowered by the action of the balls of the governor. On the opposite end of the shaft, I, there is a pinion, *c*, which gears into a rack bar, J, having an arm, K, attached to it, the ends of said arm being slotted. L L are two cones, the shafts, M M, of which are parallel with each other. One cone is placed in a reverse position to the other, as clearly shown in fig. 2. The rack bar, J, is placed between the two cones, L L, and slides in proper bearings on the framing, A. N is a belt, which passes around the two cones, L L, the belt fitting in the ends of the slotted arm, K. On the shaft, M, of the outer cone, L, there is attached a pulley, O, which has a belt, *d*, passing around it, said belt also passing around a a pulley, P, on the saw shaft, B. Q is a shaft at the lower part of one end of the framing, A. This shaft, Q, has a collar, R, placed loosely upon it, and at each end of the collar a pulley, S, is attached. One of these pulleys has a belt, T, passing around it, said belt also passing around a pulley, V, on the shaft. M, of the outer cone, L. The other pulley, S, has a cross belt, W, passing around it, said belt also passing around a pulley, X, on the shaft of the inner cone, L. The collar, R, on the shaft, Q, is placed between two hubs or bosses, *e e*, attached to said shaft. The inner surfaces of these hubs or bosses have ratchet teeth or inclined projections, *f*, upon them, and the outer sides of the pulleys, S, have also corresponding teeth or projections, *g*, upon them, see fig. 2. The hubs or bosses, *e e*, are placed at such a distance apart that when the teeth or projections, *g*, of one pulley are in gear with the teeth or projections, *f*, of one hub or boss, the teeth or projections, *g*, of the opposite pulley will be out of gear with the teeth or projections on the opposite hub or boss—see fig. 2. The shaft, Q, as it rotates, gives motion to the saw mill carriage by means of a rack and pinion. The carriage is of the usual construction. The feed motion is given the shaft, Q, by the cross belt, W, passing around pulley, X, of the inner cone shaft, M, and the gigging motion of the shaft, Q, is given by the belt, T, passing around pulley, V, of the outer cone shaft, M. As the saw shaft, B, rotates, motion is given the governor, D, by the belt, E, and motion is given the cones, L L, by the belt, *d*; and motion is given the carriage on which the log is placed by the shaft, Q, as previously stated, motion being given the shaft, Q, by the belt, T. When the butt or thick end of the log is being sawed, the saw has considerable work to perform, and consequently the carriage moves moderarely along, and gradually increases in speed as the thickness of the log diminishes, in consequence of the arm, K, moving the belt, N, along on the cones, L L, the arm, K, being operated by means of the rack bar, J, and pinion, *c*. If the saw, C, binds, and rotates very slowly in consequence, the collar, G, on the governor shaft will be depressed, and the upper wheel, F, will gear into the pinion, H, and a reverse motion will be given the arm, K, so that the belt, N, will cause the inner cone to rotate slower than the outer one, and diminish the feed, and if the saw still continues to bind so as to bring it down to less than its required number of revolutions, the arm, K, will cast the belt, N, off on a loose pulley at the large end of the inner cone, L and the feed will then be stopped until the carriage is gigged back and the saw relieved.

The above invention is extremely simple, and is self-acting; the log is fed to the saw as fast as the saw can cut, the feed of the log increasing as the log diminishes in thickness, or according as the work of the saw diminishes. Mr. Henry C. Green, of Clarence, Wis., is the inventor of the foregoing improvement. His patent bears date December 18, 1855. Address the patentee for further information.

Great Destruction of Steamboats.

The accounts from St. Louis and Cincinnati describing the destruction of so many steamboats during the recent breaking up of the ice-bound Ohio and Mississippi rivers, have filled us with deep regret. The loss of steamboats at Cincinnati was considerable—four being destroyed. But it was nothing at all in comparison with the immense destruction of steamboats at St. Louis. On the 26th ult. the river commenced to break up at 2 o'clock, P. M., and soon carried thirteen boats down on the sand bars below the city, where they were cut to pieces by the huge blocks of floating ice. At 7 o'clock in the evening, the river having risen still higher, ten other boats were torn from their fastenings along the levee and crushed to pieces. Respecting this great calamity, the St. Louis *Democrat* says :—

"Frequently as St. Louis has experienced great reverses of fortune by fire, and flood, and pestilence, and marvelous as has been its rise after each reverse, we must yet consider this as one of the most disastrous that has befallen it. All the business interests of the city were looking forward to the opening of navigation, with a confidence and cheer rarely felt before; and now, just at the moment when all our rivers would have been covered with merchandize, a large part of the vessels that were to have freighted it have been blotted out in a single day."

Criticism on the Steamship Persia.

The *Nautical Magazine* condemns the model of the *Persia*. It says:—"If the *Persia* drew 18 feet of water, (instead of 24,) with the same amount of displacement, the resistance consequent upon pressure would not only be greatly relieved, but that 6 feet might be taken from her depth, which would have reduced the weight of the ship and rendered her motions less sluggish, because the great bulk of the weight thus removed, would have been taken from the ends, which are always heavier than other parts of the vessel of equal surface."