

1849, gives it as his deliberate opinion that the best remedy for boiler explosions is making the steamboat masters and other owners of exploded boilers liable for damages, and he recommends that property of such owners be held as a lien to respond to damages to plaintiffs, and that members of corporations be held jointly and severally liable. Whatever may be said of the justice of such legal enactments as the ex Commissioner then recommended, there seems to be little doubt that the effect would be salutary, inasmuch as it would cause steam users to look a little closer into the principles that underlie proper construction and preservation at full initial strength of their steam generators. It would thus promote a community of interests and tend to diffuse correct technical knowledge of the subject, and prevent its concentration among professional experts at whose mercy steam users, as a rule, are now compelled to move.

It appears from the local press of Detroit that the boiler inspection and engineers' license ordinance, as originally drawn and vetoed by the mayor, is about to be modified and another effort made to secure its adoption. The suggestions of the mayor relative to inspections will be adopted, at least in part, and provision made for appeal. The local engineers' association, it is claimed, approve the proposition to license them. They are to be divided into three classes: the license fees to be scaled so that they will pay the salaries of an inspector and an assistant.

Wagner's *Jahresbericht* warns against the use of copperas for the prevention of incrustation in boilers, as the acidity of most of the copperas products causes very destructive action of the boiler iron. The use of copperas was some time ago recommended by certain parties, who also patented it, and it has been tried in several works. At the time of its first coming out, a great many parties and authorities in this branch strongly opposed its use, but nevertheless many victims had to pay dearly for the experience they have now acquired. Things of this kind occur too often for our times, and inventions of doubtful merit are too often accepted as valuable additions to industrial purposes. They should be examined, not only by practical, but also by scientific authorities. Practice is a good thing, but theory combined with practice is far better, not only for the pockets of manufacturers, but also for the advancement of industry in general.

A portable steam boiler exploded at Decatur, Ills., on the 28th of July, causing a loss of \$1,200 to L. F. Webb; nobody killed.

The locomotive of a freight train on the Chicago and North Western Railroad exploded on the 31st of July, about 14 miles from Milwaukee. A brakeman was killed and the engineer and fireman were severely injured. Five cars were demolished and the rails were torn up for some distance.

Since the explosion of the still at the Woolner Distillery on the 30th of July, Ignatius Woolner, Henry Cashin, Charles Hebner, John Kirkland, William Reif, Henry Goetz, William and Fritz Fehl, William Rice, August Stetler, and Theobald Seiler have died from the effect of injuries received, making twelve persons who have died. Thomas Lawless and William Fehl will probably die, in which case but four will remain out of the eighteen who were injured by the explosion. Nearly all the victims inhaled the escaping steam, and their sufferings have been intense.

The verdict of the coroner's jury is that the explosion was caused by an unnecessary pressure of steam in the still.

At nine o'clock on the evening of August 1, the boiler of French & Son's paper mill, at Carrollton Village, Ohio, exploded, demolishing the boiler house and the bleaching house. The explosion was terrific and threw fragments to a great distance in every direction. The loss is about \$3,000. No person was injured.

The boiler in Smith, Grant & Co.'s coal and lumber yard, at Pawtucket, R. I., exploded August 2. Bernard McCudden, the engineer, was blown a distance of forty feet, and instantly killed. He was forty years old, and unmarried.

Improved Hectograph.

The principle upon which the process depends is this, that a superficial tanning of the gelatin, in the gelatin-glycerin pad, makes the surface, wherever tanned or rendered insoluble, capable of taking fatty inks, while the rest of the surface rejects it. In practice then it is only necessary to have a perfectly level hectographic pad, to write the copy with ordinary nutgall ink, to which a little extra tannin and extract of logwood has been added, and to transfer the writing in the ordinary manner upon the hectographic surface. Wherever the writing appears, the surface becomes tanned, and on now applying a roller with printer's ink, the written characters alone take the latter. The pad is to be inked after each impression. It is said that 300 to 400 sharp copies can be made upon dry paper. The only material necessary, besides the hectograph, is a slab, or zinc plate, for spreading out the printer's ink, a small printer's roller with handle, and a roll of wood or paper or rubber for pressing the paper against the pad.

A Naphtha Locomotive.

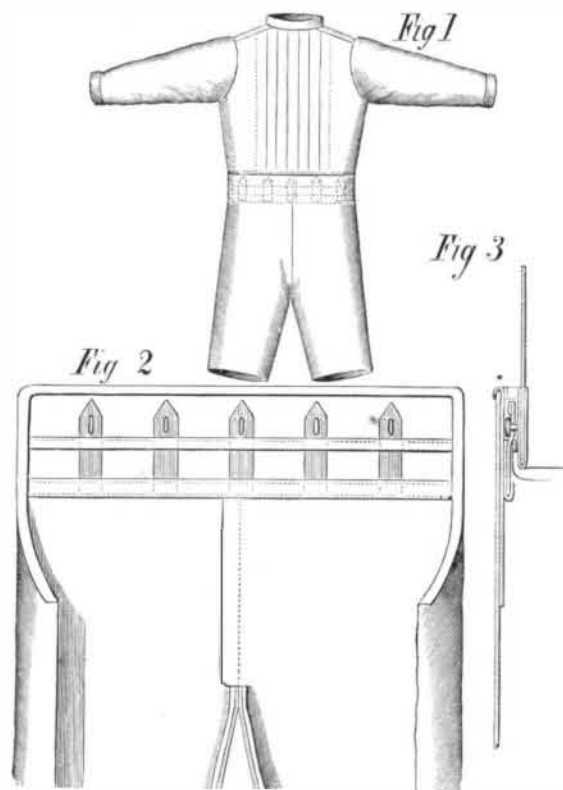
During the month of June a number of experiments on the consumption of naphtha were made on the Tamboff Saratoff line by the engineer, M. Poretzky. The following points were established: (1.) Steam was got up from cold water to a pressure of 100 lb. on the square inch in two

hours, and by burning 4 poods—or 144 lb.—of naphtha. Usually in the same locomotive, with coals aided with wood, three and a half hours are required, and 26 poods of coals and wood—936 lb. (2.) The apparatus can be kept in use forty-eight hours without stoppage for cleaning, after which only two hours are required to clean out. (3.) In running 1,500 versts it was only required to stop the locomotive twenty minutes for fuel, and the driver and stoker have almost nothing to do, except to stop and start, the apparatus simply requiring opening more or less of the fuel. (4.) The flame is so well thrown over the whole of the fire box that after running 40,000 versts it is considered only one-half remount is necessary as opposed to coals. (5.) While it was found possible to evaporate 13½ lb. of water with 1 lb. of naphtha, the absolute result with new men and on the whole runs was 9 lb., or about two and a half times more than the coals used.

ATTACHMENT FOR PANTS.

The engraving shows a novel device for fastening pants to waists or vests, so that the buttonholes will not tear out nor the buttons be torn off when the wearer stoops or bends over. The invention is intended more particularly for use on children's garments, and will no doubt be welcomed and appreciated by those who are obliged to keep children's clothes in order.

The invention consists in a series of elastic strips with buttonholes at the upper end, attached at their lower ends to a band fastened inside of the pants. These parts are arranged so that the upper ends of the strips will be below the upper edges of the pants.



IMPROVED ATTACHMENT FOR PANTS.

Fig. 1 shows the pants attached to the waist; Fig. 2 is a view of the inner side showing the arrangement of the fastening, and Fig. 3 is a vertical section of a portion of the pants and waist. By reference to Fig. 2 it will be seen that the elastic strips are attached by their lower ends to a band fastened to the inner surface of the waist of the pants, and a band passes over the middle of the strips and is stitched between them, forming guides for the strips and sustaining the waist of the pants.

With this improvement the wearer can easily bend in all directions without fear of bursting off buttons or of injuring the garment, and it improves the fit and general appearance of the clothes.

This invention was recently patented by Mary R. Barhydt, of Burlington, Iowa, who should be addressed for further information.

A Minnesota Meteor.

A comet-like meteor, which appeared to pass close to the earth without striking or exploding, was seen in Eastern Minnesota, about 8:30 P.M. July 25. An observer at St. Paul, Mr. T. D. Simonton, says: "The meteor came from the south-eastern heavens, below the star Altair, some 15° or 20° above the horizon. It was exceedingly brilliant, with a well-defined head, as large or larger than the planet Venus at her brightest, and seemed to move about as fast as a rocket at a square's distance does just before it explodes. There was to me a sense of retardation in its movement, just as there is in a case of a rocket; but this was probably only apparent, because it looked so much like a bright rocket ready to explode, and because, in fact, I was expecting to see it explode every instant. Its direction was toward the north-west, toward which it crept as a fiery serpent, disappearing some 10° above the horizon. I use the word 'crept' because its movement was in no sense the darting motion of the ordinary meteor, but a deliberate, majestic course, giving one a great sense of the power with which it

moved through at least 100° of the heavens. At its highest point I should think it was about 30° above the horizon. My estimate of the time the meteor was visible is from six to eight seconds, certainly not ten seconds. The tail was probably 10° in length."

A REMARKABLE CASE OF RETARDED DEVELOPMENT.

BY PROF. C. V. RILEY.

Early in the summer I received a statement from Professor I. D. Graham, of the Kansas State Agricultural College, at Manhattan, to the effect that he had hatched out some young locusts from eggs which had remained latent since the fall of 1876. While the occurrence did not strike me as impossible, it was, nevertheless, so remarkable that I entered into correspondence with him with a view of getting absolute proof of the accuracy of his statements. The young locusts which he sent me for identification proved to be *Caloptenus spretus*, or the destructive Rocky Mountain locust, and all the facts connected with them are so well attested that there is no doubt in my mind as to their trustworthiness.

About the 15th of September, 1876, the Chemical Laboratory Building of the Kansas State Agricultural College was completed, and the grounds immediately surrounding it were graded.

In the process of grading the bits of stone, mortar, and the clay which remained after the excavations and work of building had been completed, were used. The eggs of *Caloptenus spretus* were found in large numbers, and when the college grounds were graded, many of them were buried. The specimens in question were buried to a depth of about 10 inches, and remained in that condition until the third week in May, 1881, when some workmen, who were regrading the grounds, discovered them. As they looked quite fresh after their long burial, Mr. Graham concluded to try the experiment of hatching them out. He placed them under favorable conditions, and in due time was rewarded by the appearance of an active brood of young locusts, of which he forwarded samples to me.

When discovered in May, these eggs were surrounded by black earth. This earth was enveloped in closely packed clay, which, in turn, was covered with "spalls," mortar, and other building rubbish. In 1876, when the grading was finished, a plank walk was laid alongside of the building and above the buried eggs. This walk had never been removed since that time until in May, 1881, when the eggs were found.

In view of all the facts in the case Mr. Graham believes that the walk so shaded the ground that the sun's influence did not penetrate very deeply into the earth at this point, and also that the peculiar composition of the earth surrounding the eggs, would keep them cool, moist, and in an almost air-tight place, all of which are conditions favorable for preservation.

However this may be, the fact that the eggs did remain in the ground unhatched for nearly four and a half years seemed undeniable, as also the further fact that the young when hatched were as active and voracious as their remote parents had been. The question arises as to how much longer eggs so situated might have remained undeveloped and sound, and it opens up a most interesting field for experiment.

It is not my purpose to discuss here the general influence of temperature in accelerating or retarding animal development, nor the many curious cases of retarded development among insects that are totally independent of temperature. Semper, in his recent work on Animal Life, has an excellent chapter on the influence of temperature, especially as to the optimum required for the favorable development of different species. As a rule a rising temperature stimulates and accelerates growth and development, and a falling temperature retards or torpifies, and this holds true with the eggs of *Caloptenus spretus*, as I have shown in experiments recorded in my ninth report on the insects of Missouri, and in the first report of the Entomological Commission. But there are many strange exceptions, as in the heat coma of tropical animals, the summer dormancy of certain lepidopterous larvæ, and the retarded development of individuals placed in the very same conditions under which others normally develop. There is, therefore, much mystery yet connected with the subject which offers a most inviting field for experiment, not only as to the other influences affecting retardation, but as to the length of time development, as under the influence of continued cold, can be kept latent without loss of vitality. The case here recorded is consequently most interesting, for it is evident that the eggs were not buried deep enough to be entirely free from the changes in the temperature of the earth at different seasons.

Washington, D. C., August 1, 1881.

Spiders Obstruct the Telegraph.

One of the chief hinderances to telegraphing in Japan is the grounding of the current by spider lines. The trees bordering the highways swarm with spiders, which spin their webs everywhere between the earth, wires, posts, insulators, and trees. When the spider webs are covered with heavy dew they become good conductors and run the messages to earth. The only way to remove the difficulty is by employing men to sweep the wires with brushes of bamboo; but as the spiders are more numerous and persistent than the brush users the difficulty remains always a serious one.