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27 April 1974

Arthur G Credland Esq Epping Forest Museum Rangers Road Chingford London E4

Dear Mr Credland

Thank you for your letter of 19 April and for the interesting extract from the Transactions of the Society of Arts, 1820, 37, 161-7 and Plate 30, about James Monk's drenching apparatus for gunpowder mills.

From photographs taken after explosions here it is evident that our mills were fitted with drenchers but of a tilting platform design.

With kind regards

Yours sincerely

M McLaren Head of Library Services TRANSACTIONS OF THE SUCIETY OF ARTS

Val 37 (1820) p161-7

MECHANICS.

161

N° XXII.

GUNPOWDER MILL.

The SILVER MEDAL of the Society and TWENTY GUINEAS were voted this Session to Mr. JAMES MONK, of Tonbridge, for a Method of Diminishing the Hazard both to the Workmen and Machinery in case of an Explosion taking place during the Grinding and Mixture of the Materials for GUNPOWDER.—A Model of the Apparatus is placed in the Society's Repository, and the following communications have been received on the subject.

SIR;

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Marybone-park, March 11, 1819.

HEREWITH I trouble you for our manager, Mr. James Monk, with the drawing, model, and description of a machine, invented, I have not the slightest doubt, by himself, for lessening the effects of explosions in double gunpowder-mills, and which, as I have truly stated in the certificate, has several times proved its efficiency.

As my partners and myself have been most desirous that the invention should have publicity, in some measure to lessen the risk to the workmen employed in such manufactories, we have presumed to recommend to

VOL. XXXVII.

Mr. Monk to offer it to the Society for the Encouragement of Arts, Manufactures, and Commerce; and should the Society concur with us in the utility of the invention, some mark of its approbation will, we trust, be shewn to its inventor.

I am, Sir,

A. Aikin, Esq. Secretary, &c. &c. &c. &c. &c.

JAMES BURTON,

for BURTON, CHILDREN, & BURTON.

CERTIFICATES.

SIR;

Marybone-park, March 11, 1819.

I DO hereby certify that the machine, of which a model and drawing accompanies this, was invented (to the best of my knowledge), and put up by Mr. James Monk, the manager, at the gunpowder-mills of Messrs. Burton, Children, and Burton, near Tunbridge, about three years since (to each of four *double* mills there). That since that time occasional explosions have taken place, which before generally took effect on the powder under both pairs of Stones; but since that time, by the effect of instantaneously wetting the powder under the contrary pair of stones, to those where the explosion had taken place, a double disaster has been prevented. And I am convinced it has much lessened the personal risk of the workmen employed.

I am, Sir,

A. Aikin, Esq. Secretary, &c. &c. &c. &c. &c.

JAMES BURTON,

of the firm of BURTON, CHILDREN, and Co.

British Museum, March 9th, 1819.

I HEREBY certify, both from my inspection of your ingenious invention for preventing explosion during the manufacturing of gunpowder, and from my knowledge that accidents have frequently been avoided since it was adopted in the Tunbridge mills, that it is fully adequate to answer the purpose for which it is intended, and is, as far as I can judge, a valuable contrivance for the preservation of the workmen's lives, and the security of the adjoining mills.

I am, Sir,

&c. &c. &c.

To Mr. Monk,

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&c. &c.

John Geo. Children,

one of the Proprietors of the Tunbridge Mills.

Tunbridge, March 12, 1819.

I FULLY concur in the assertions of my two partners relative to the entire invention of our manager, Mr. James Monk, at our gunpowder-mills, and I also state to have observed the preservation of one mill after the explosion of that adjoining, when there could be no doubt that the safety of the mill-man, who was at the time in the mill which did not explode, was owing to the fall of water on the charge of powder having been quicker than the embers of fire from the mill exploded.

WILLIAM FORD BURTON.

Partner BURTON and Co.

References to the Engraving of Mr. MONK's Gunpowdermill, Plate XXX.

Fig. 1. a a compound lever formed of two iron bars, the extremities of which terminate above the bedstones of the pair of mills A B, here represented.

b a bolt securing the adjacent ends of the two lever bars, but allowing them to move so as to form a very obtuse angle, when a power acting from below upwards, is applied to either of the ends a of the lever, as shown by the dotted lines.

c c two oblong holes in the lever bars, through which two screws are put, which being received into the two uprights d d, constitute the two fixed fulcrums of the lever.

e e two uprights, with an eye in each to receive and steady the ends of the lever; the eyes being long enough to allow the bars to take the position indicated by the dotted lines.

ff two iron rods screwed fast, one at each end of the lever, and suspending the two blowers gg. These blowers are made of thin sheet iron, in the form of hollow threesided pyramids, and are rivetted to the suspending rods : they are placed as near the tops of the upright stone shafts as possible, and as close to the wheels as the timber will allow.

h h two copper chains attached by one end to the lever bars, and by the other supporting two copper values (*i* figs. 4, 5, 6), in the form of inverted cylindrical cups, about four inches high.

k k two oval tubs capable of holding about six gallons of water, having a circular hole l (figs. 2, 4, 5, 6) at the bottom, about six inches in diameter. Surrounding this hole

164

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is a wooden block fig. 3 (m fig. 2), screwed to the bottom of the tub, and having a circular groove or channel capable of admitting freely the bottom of the value i.

n n two small spring catches fastened to two uprights, and shown more at large fig. 7. The lever bars are laid on the top of these catches, so that when the ends of the lever rise, that part of the lever which is on the catch moves downward, as shown by the dotted lines, till it slips over the end of the catch; and thus the lever is prevented from resuming its horizontal position, till released from the catch.

In order to fit that part of the apparatus above described for action, bring the lever to a horizontal position, place the value i in the circular channel, at the bottom of the tub k so as to cover the hole; fill the channel with mercury, and then fill the tub with water. Hence it is evident that the water is prevented by the mercury from escaping out of the tub, so long as the valve remains in its place. Now, if an explosion happen either in the mill A, or the mill B, the blower g hanging over the bedstone, will be thrown up, and the lever will in consequence be brought into the position indicated by the dotted line, and will be retained there by the spring-catches n n. At the same time the valves i i will be drawn up out of the mercury, and the water in both the tubs will pour down on their respective bedstones, extinguishing in one the enflamed powder, and in the other preventing it from taking fire.

In a certain stage of the grinding, the materials of the powder are apt to clot, and adhere to the runners; parts of the bedstone are thus left bare, and the runner and bedstone coming into contact, an accidental spark may be elicited, and an explosion ensue. To prevent this most usual cause of accidents, Mr. Monk fixes to the axle of the wheel a scraper formed of a curved piece of wood o o, shod with copper (fig. 8), which being placed behind, and

165

almost touching each of the runners, scrapes off the powder as it collects, and thus keeps the bedstone always covered.

The other parts of the mill present no variation from the usual construction.

p the great wheel.

q q two vertical bevel-wheels fixed on the axis of the great wheel.

r r two horizontal bevel-wheels working in q q, and turning the vertical shafts s s.

t t two horizontal wheels fixed to the upper part of the vertical shafts, and driving the wheels uu. To the shafts of these latter wheels are fixed the runners v v, which traverse on the bedstone w w.

x x the curbs surrounding the bedstone to prevent the powder from falling off.

The mill A presents a view, and the mill B, a section of the bedstone and curb.

Fig. 2 an inside view of the tub k.

Fig. 3 a plan of the block in which the channel is made for receiving the valve.

Fig. 4 a section of the tub and valve.

Fig. 5 shows the position of the apparatus when the valve is closed.

Fig. 6 shows the position of the apparatus after an explosion has taken place, the valve being raised up out of the channel, and the water pouring down on the bedstone.

Fig. 9 shows the manner in which the scraper is connected with the common axis of the runners.

Fig. 10 a bird's-eye view of the bedstone surrounded by the curb; with the runners and the scrapers fixed to the common axis round which they revolve.

Fig. 11 a section showing the valve and the channel filled with mercury, in which the valve lies when the mill is at work.

166

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This invention, which has hitherto been confined to a single manufacturing establishment, appears already to have saved eight mills, and probably several lives.

Nº XXIII.

GAS-METER.

The GOLD ISIS MEDAL of the Society was this Session voted to Mr. JOHN MALAM of Westminster, for an IMPROVED GAS-METER.—A Model of the Machine is placed in the Society's Repository, and the following communication has been received on the subject.

As soon as coal-gas came to be extensively applied to the purposes of street illumination and to domestic use as a substitute for lamps and candles, it became an object of great importance to the proprietors and managers of the different gas-works to ascertain with accuracy the quantity of gas expended in proportion to the number of jets or burners made use of.

The essential conditions of any apparatus for this purpose are, that the pressure on the gas while passing through the measurer shall at all times be uniform; and that it shall register truly when that pressure is very small, and when the current of gas-is very feeble.

The first gas-meter was constructed by Mr. Clegg, and is secured to the inventor by a patent. It consists essentially of a cylinder divided into cells, inclosed and re-

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167

