MACHINERY FOR CHANGING MOTION.

In operating machinery, different motions are oftentimes required for separate parts, according to the work which is to be performed. The best devices for converting one motion into another to produce superior results have engaged the attention of most inventors and mechanics. On the 13th of last September, a patent was issued through our agency to Messrs. Broughton & Lindsay, of Malone, N. Y., for a device to convert rotary into reciprocating rectilineal motion, which is very simple and well adapted to operating the beds of printing-presses, planers (wood and iron), shingle and clapboard machines, sawmill beds, and those of other machines requiring an alternate backward and forward motion. Messrs. Broughton & Lindsay have been in our city during the present week, exhibiting a neat working model of their invention; and we take this occasion to make more public its nature and operation.

If we take the bed of a printing-press, planer, or other machine which requires to be moved back and forth alternately, and place a long rack on each side inside of the frame, and if we take a pinion or wheel rotating on an adjusting spindle, at one end, or at the middle, and make it gear into one rack at one side, it will move the frame or bed of the machine straightforward until the end of the rack is reached by the pinion. If, at this point, a dog on the rack takes into the pinion and throws it over to gear with the rack on the opposite side of the bed, the rotating pinion will at once cause the rack to move backwards, and so on, constantly and automatically, by these devices. This is the method of operation embraced in the devices referred to; but there are some other peculiar and excellent features connected with it.

The beds of machinery which are moved back and forth are generally heavy, and acquire considerable momentum when moving in any one direction, and without some counteracting agent this would cause a severe jar every time the motion was changed—the bed reversed. Such a counteracting agent is embraced in this apparatus. The spindle of the rotary pinion or wheel which gears into the racks, does not move back and forth, but is self-adjustable to bend obliquely from side to side, and to allow its journal at the top a slight side motion. Its journal box has two holes or bearings, with a slit capable of opening between them. Two long flat steel springs are stretched across the frame, and these hold the double journal box between them. When the bed or frame of the machine is moved to one end, a dog or shipper on the rack acts upon the pinion, and pushes its journal through the slit in the box, and thus it acts as a wedge to distend the springs, which absorb the momentum of the frame. And then when the journal springs into its second box, and its pinion is moved over and takes into the rack on the other side of the bed, the springs retract on the journal box, and the frame or bed at once commences to move backward, without a jar and without stopping to overcome the inertia, simply because of the action of the springs. The arrangement and devices to effect these objects are very simple and effective, and, by using a pinion and a wheel on the spindle, a slow forward movement and a quick backward movement may be given to the bed when deemed necessary. A change of motion can be effected at any part of the frame, according to the place where the shipper dogs are set. The apparatus is self-operating from a belt and pulley actuating the main spindle, from which all the different movements are carried out.

LATENT HEAT AND THE STEAM ENGINE.

A person wholly unacquainted with the steam engine, watching one in operation for a short time, sees the engineer do a very surprising thing, that is to open a stop-cock, and let the water (far hotter than ordinary boiling water) spirt out directly into his hand. In running a steam engine it is absolutely essential to observe frequently the depth of water in the boiler. For this purpose a series of stop-cocks are inserted into the end of the boiler, ranging a little above and below the level at which it is desired to keep the water; and the engineer by opening one of these stop-cocks and seeing whether steam or water escapes, learns whether the water level rises as high as the stop-cock. The water in the boiler being heated far above 212°, the point at which this liquor is converted into vapor under the pressure of the atmosphere alone, it is condensed into the liquid state by the pressure of the steam upon it in the tight and strong boiler, and when it escapes from this pressure into the open air, it bursts at once into steam; so that an ordinary observer would find it difficult to determine whether the gage-cock opened into water or into steam. An experienced engineer detects the difference of the two fluids to the eye, and in the sound they make in rushing out; but to verify his observation he usually adds the evidence of touch by putting his hand into the escaping jet. Now why is it that this water, far hotter than boiling water, does not scald his hand? If he should put his hand into either the steam or water in the boiler, it would take the skin off in half a minute. The reason is that, by expansion, a large portion of the sensible heat which is imparted freely to other bodies is converted into latent heat, which is retained by the vapor so that it does not affect either our senses or the thermometer: thus concealing itself from observation, it is called hidden or latent heat. If water could be confined in a boiler so strong that it could be heated to 1,200° and were permitted to escape into the air, it would immediately burst into steam and its temperature would be reduced to 212°—that is to say, about 1,000° of heat are absorbed and concealed in converting water into steam. The more vapors or gases are expanded, the more latent heat will they absorb, and it is owing to the sudden expansion of the steam from the pressure in the boiler that its sensible temperature is so reduced that it will not burn the engineer's hand as it issues through the gage-cock. Under ordinary circumstances the water in the boiler does not contain sufficient heat to convert it all into steam, and a portion of it consequently remains in the liquid form, in minute drops, imparting a part of its heat to the expanding vapor, and thus being itself cooled below the scalding point. It is by the greater moisture of the escaping jet that the engineer knows positively that his gage-cock opens below the level of the water.

In engines driven by condensed air, it is found that the condensing pump becomes warm, a portion of the latent heat in the rarefied air becoming sensible in the condensed air, and consequently escaping into the surrounding metal. On the other hand the engine in which the air is expanded is cooled by the air absorbing sensible heat and rendering it latent in the process of rarefaction. Efforts have been made to manufacture ice in this way. Match boxes were formerly made of a cylinder and piston in which the match was placed in the cylinder and kindled by suddenly condensing the air; the latent heat in the air, being made sensible, kindled the match.

THE GEOGRAPHY OF CONSUMPTION.—Consumption originates in all latitudes—from the equator, where the mean temperature is 80 degrees, with slight variations, to the higher portion of the temperate zone, where the mean temperature is 40 degrees, with sudden and violent changes. The opinion, long entertained, that it is peculiar to cold and humid climates, is founded on error. Far from this being the case, the tables of mortality warrant the conclusion that consumption is more prevalent in tropical than in temperate countries. Consumption is rare in the Arctic regions, in Siberia, Iceland, the Faroe Islands, the Orkneys, Shetlands, and Hebrides. And in confirmation of the opinion that it decreases with the decrease of temperature, it is shown, from extensive data, that in northern Europe it is most prevalent at the level of the sea, and that it decreases with increase of elevation to a certain point. It is uniformly more fatal in cities than in the country. Dr. Hall, of the *Journal of Health*, says to his consumptive friends:—"You want air, not physic; you want pure air, not medicated air, you want nutrition, such as plenty of meat and bread will give, and they alone; physic has no nutriment; gaspings for air cannot cure you; monkey capers in a gymnasium cannot cure you; and stimulants cannot cure you. If you want to get well, go in for *beef and out-door air*, and do not be deluded into the grave by advertisements and unreliable certifiers."

DRIED FRUIT—HOW TO PRESERVE IT.—Now is the time to preserve dried apples from becoming wormy next summer. The eggs of these worms, it is believed, are deposited in the fruit drying, and their vitality can be destroyed by heat without injuring the fruit, if placed in an oven just long enough to heat as hot as it will bear without scorching or cooking. Take it hot from the oven and pack it in linen bags, and hang it up in a dry place.

PROGRESS OF PHOTOGRAPHY.

At a late meeting of the American Photographic Society, held at their rooms in the Cooper Institute, Mr. William Campbell exhibited a camera shield with a slide at the back, covering two holes. By this arrangement, one aperture could remain open, so as to admit of a photograph being taken, after which new space could be brought to the focus for impression, and so on in a circle; then revolving backwards a second or inner circle of impressions could be made. The invention was deemed a clever completion of a hitherto-imperfect idea of improvement, for cheapness and rapidity.

Mr. S. D. Tillman read a short paper on photo-lithography, and presented twenty-five specimens of the art, as recently improved in this city. Mr. Tillman said it was known and admitted in America that practical results had been obtained in the art of engraving by means of light. The advantages of this art were, first, permanency—the basis of its color being carbon—second, fineness and facility of production. About 400 sheets can be readily obtained per day, and each might include from one to ten plates or designs. It was also cheap. The prominent objections to the ordinary photographic pictures were the want of uniformity in the tints, and their liability to fade. Various expedients had been proposed to remedy the first of these faults, but sufficient time had not elapsed to judge fully of the latest plans. Conditions of exposure might arise, to meet which the known remedies might fail; and therefore the question of the unchangeability of the photographic pictures might, for some time, continue undetermined. The photo-lithographic pictures united the two essentials—exactness and permanency. No manipulation of art could equal or approximate the delicate shadings of the pencil. Whenever extreme minuteness of detail was required in permanent tints, preference should be given to the photo-lithotype. It would show microscopic specimens with great beauty and delicacy, and also surgical operations which could be stamped on the instant, in relief superior to that which could be produced on photographic paper, because the negative being obtained from objects almost transparent, they could not be shown on such paper in tints of sufficiently strong contrast.

A letter was read from Mr. Joseph Dixon, of Jersey City, giving an account of a new method of counterfeiting, recently discovered. It seems that, a few years ago, he made some banks an offer to get up colored bills that would be proof against imitation, but his offers met with only indifferent notice. He now puts a shot into their camp in return, by which their weakness is made somewhat apparent, if his process of counterfeiting was reliable. The secret, he said, lay in first obtaining the engraving freed from the colors, which was done by the use of either the megoscope or magic lantern, throwing a large image of the bill on a large screen of white paper. A tracing was then made of all the engraved parts of the picture which, being on such an enlarged scale, could be drawn so perfect that the reduced picture would have precisely the same appearance as the original. A small negative could then be made, by which copies could be multiplied to any extent, and the protecting colors applied in the same manner as by the original engraver.

COLD FROM DAMP CLOTHES.—If the clothes which cover the body are damp, the moisture which they contain has a tendency to evaporate by the heat communicated to it by the body. The heat absorbed in the evaporation of the moisture contained in the clothes must be, in part, supplied by the body, and will have a tendency to reduce the temperature of the body in an undue degree, and thereby to produce cold. The effect of violent labor or exercise is to cause the body to generate heat much faster than it would do in a state of rest. Hence we see why, when the clothes have been rendered wet by rain or perspiration, the taking of cold may be prevented by keeping the body in a state of exercise or labor till the clothes can be changed or till they dry on the person; for in this case the heat carried off by the moisture in evaporating is amply supplied by the redundant heat generated by labor or exercise.

SEWING MACHINES IN SCHOOLS.—We are informed that the Wheeler & Wilson sewing machine, advertised in another column, is being introduced into schools for girls. This is a practical mode of education—one that deserves attention.

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