Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOLUME IX.] NEW-YORK APRIL 1, 1854. [NUMBER 29.

THE SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY,
At 128 Fulton street, N. Y. (Sun Buildings.)
BY MUNN & CO.

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Economy in Working Railroad Trains.

"Herapath's Journal," (Eng.) says:—"Mr. Waddington adopts a plan for saving working expenses, which it would be well in other railway managers to follow, inasmuch as it brings the enterprise of private individuals to bear on the management of a railway.

Mr. Waddington gives his superintendent of locomotives a per centage of the gains he (the superintendent) effects by economy in the working of the trains, and the locomotive superintendent contracts with the engine drivers to do the work at a certain rate of expense. It is truly wonderful how much fuel, &c., an intelligent engine driver can save by careful and clever management. By regulating the fires to the work to be done, the time of commencing and completing the several sections of the work, &c., a man of experience and good common sense can save an incredible amount of fuel. The engine driver undertakes the contract of running a train, finding his stoker and the fuel. He prefers employing his own stoker, because the difference in the ability of stokers to economize is great.

The operation of such arrangements is to direct by the most powerful of all human motives of action, self-interest, the minds of engine men, and those under him, to the important matter of economizing fuel and other materials used in the running of a train. Instead of wasting fuel on the road by burning more than is necessary, allowing bits to tumble on the road as the engine proceeds, and by the hundred other ordinary means of wasting, the engine driver and his assistants are made keenly alive to getting the largest amount of work out of the consumption of a given quantity of material, to keeping it from wasting, and otherwise effecting economy. The benefit in every point of view is enormous. Not only is a direct, immediate, and large saving obtained, but by this means we are developing the inventive and cautionary faculties of a number of able, though uneducated men, and enlisting in the railway service only such men as are efficient to perform their work satisfactorily. We understand that a saving of nearly half the ordinary consumption of coke is by no means extraordinary."

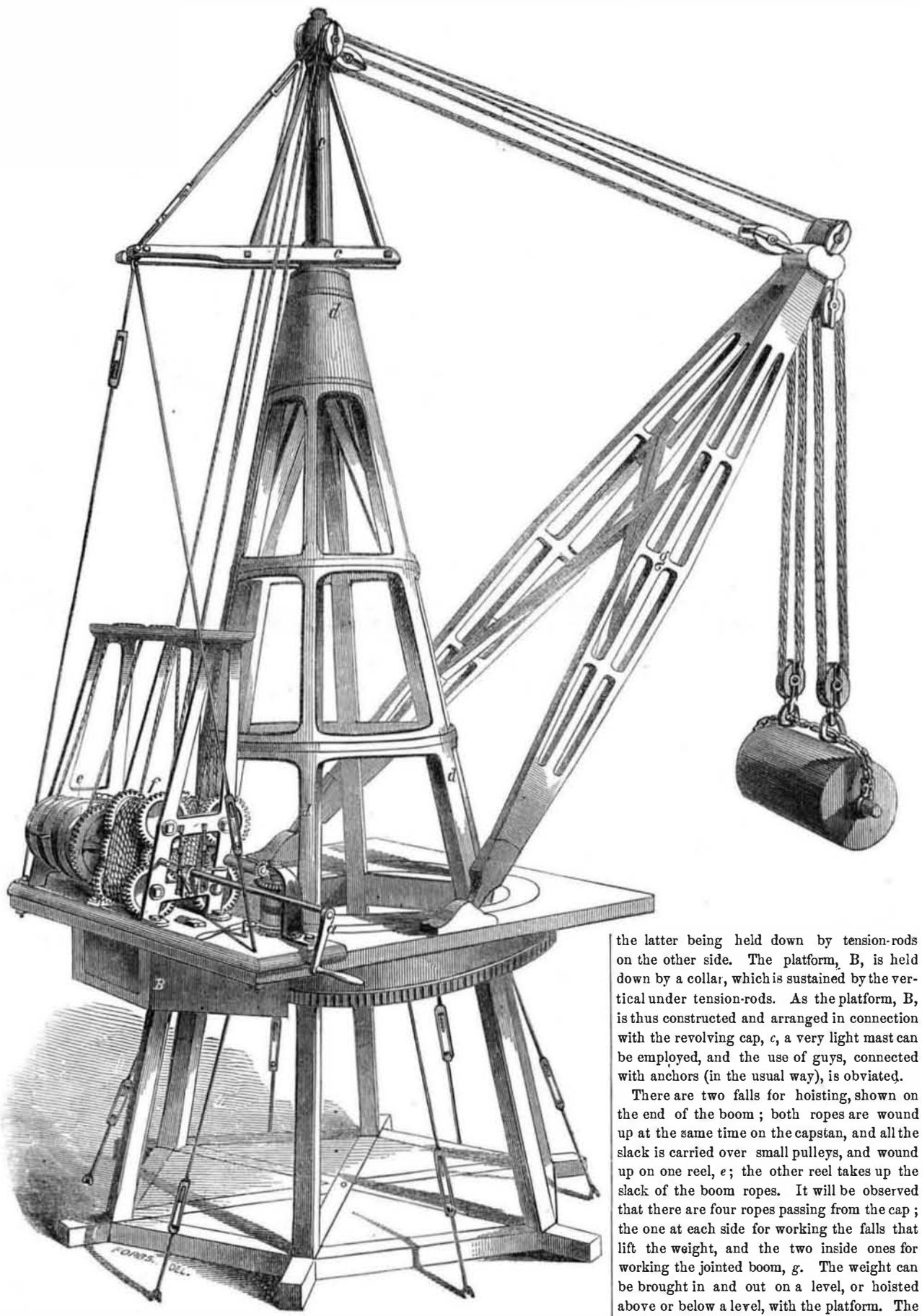
Fire Escapes.

Means of escape from houses on fire have recently been adopted by the police of London.—They have stout canvass sheets prepared, which are stretched beneath the house on fire, and into which the persons in the building throw themselves and are caught. The canvass escape has been tried, and has given the greatest satisfaction as to its utility and safety. Persons who could not be persuaded to descend a fire ladder, have leaped into the canvass without hesitation.

The Fast Voyage.

The new clipper ship "Lightning," (Capt. Forbes,) built by Donald McKay, for a Liverpool house, made the passage from Boston to Liverpool, which former place she left on the 19th February—in 13 days time. She run from Boston to Eagle Island Light in the short space of ten days.

HOLMES' PATENT DERRICK.



The annexed engraving is a perspective view of the improved Derrick of John B. Holmes, 71 Gold street, this city, for which a patent was granted on the 21st of last February.

The main part consists of an upright frame, *d*, placed on a revolving platform, B, on which is fixed a boom, *g*, with two arms, the jointed heels of which are secured in the platform between the central upright frame and the horizontal capstans. On the top of the frame is a revolving cap, *c*, with the mast secured on it. *f* are double capstans; and *e* are reels for taking up the slack of the ropes; *a* is the crank for working the whole machinery. This derrick can be worked by hand, horse, or steam power. A pinion gears into the large wheel of platform B, and moves it round as desired; it can be thrown out of gear when required. The boom, *g*, can be elevated along with the weight to be raised, or it can be held stationary when the weight is being lifted, or it can be raised and the weight held at any position—neither raised nor lowered. One capstan is for working the boom, *g*, and the other for working the lifting block and tackle. The boom is suspended from the top of the revolving cap, the latter being held down by tension-rods on the other side. The platform, B, is held down by a collar, which is sustained by the vertical under tension-rods. As the platform, B, is thus constructed and arranged in connection with the revolving cap, *c*, a very light mast can be employed, and the use of guys, connected with anchors (in the usual way), is obviated.

There are two falls for hoisting, shown on the end of the boom; both ropes are wound up at the same time on the capstan, and all the slack is carried over small pulleys, and wound up on one reel, *e*; the other reel takes up the slack of the boom ropes. It will be observed that there are four ropes passing from the cap; the one at each side for working the falls that lift the weight, and the two inside ones for working the jointed boom, *g*. The weight can be brought in and out on a level, or hoisted above or below a level, with the platform. The cap and boom can be carried round the circle together, and by placing the working machinery, capstans, &c., opposite to the weight to be hoisted, they form a counterbalance to that weight on the platform. Two coils of rope will be observed on the two horizontal capstans; these capstans, being worked by the main shaft of *a*, are capable of being thrown in and out of gear with that shaft, to work either capstan and reel, singly or altogether, as required. They are also geared for a fast or slow motion, for light and heavy hoisting. It will be observed that by elevating the boom, the

circle described by the hoisting lever can either be increased or diminished—a very important arrangement. It is the most perfect derrick we have seen, and will no doubt come into general use, as its principle can be applied to the common mason's derrick as well as any other.

More information may be obtained from Mr. Holmes, either by letter or calling upon him at his shop, where a working model can be seen at all times.

Commissioner of Patent's Report for 1853.

We hereby publish the Report of the Commissioner of Patents, for the last year, in advance of its regular publication by Congress,

In connection with this let us say that we are indebted for this report to the Polytechnic Journal, and we have no doubt but it was obtained surreptitiously. We have the *highest* authority for making this assertion. A copy of this report in proof sheets was put into our hands a month ago, by a person who had no business with such a document, and some of its particulars—in a few days afterwards—appeared in one of our daily papers. We might have published it then, but although we like and endeavor to get such news as early as any paper, we cannot become parties to any dishonorable transaction, and we consider and have so said, that the publication of any document obtained surreptitiously, is a gross immorality—dishonorable and disgraceful in every sense. These are our sentiments in conducting a periodical devoted to improvements in the arts and the elevation of our race. Had the document not been already made public, we assure our readers that it would not have appeared in our columns at present.

UNITED STATES PATENT OFFICE, Jan. 1854.

SIR: Agreeably to the 14th section of the act approved 3d March, 1837, entitled "An act in addition to the act to promote the progress of scienence and useful arts," I have the honor to submit herewith my annual report.

The following statement will show the receipts and expenditures of the Office during the past year:

No. 1. Moneys received at the Patent Office during the year 1853, ...	$121,527 45
No. 2. Expenditures from the Patent Fund during the year 1853, ...	$132,869 83
Excess of expenditures over receipts, ...	$11,342 38

No. 3.

STATEMENT OF THE PATENT FUNDS.

Amount of the credit of the Patent Fund, Jan. 1st, 1853,	$40,292 38
Deduct from this:	
The excess of expenditures during the year 1853, viz. .	11,342 38
Leaving in the treasury, 1st January, 1854, ...	$28,950 00

In addition to the amount already paid for fitting up the rooms in the new building, there are several bills outstanding, amounting to about $3,500, which will diminish by that amount the sum above reported as being still in the treasury.

A contract has also been made to pay $10,800 for the iron frames for the lower tier of cases necessary to be placed in the large hall in the east wing of the Patent Office. The finishing of those cases, and procuring an equal number of cases of wood for the upper tier, and other necessary fixtures for that hall, are estimated to swell this last-mentioned sum to $30,000, which would more than absorb the entire amount in the treasury to the credit of the Patent Fund.

There are, besides, at least 2,300 applications which have been rejected by the Office, in which the amounts liable to be withdrawn have not yet been demanded. In each of these the applicant is entitled to withdraw two-thirds of the fee paid by him, making at least $46,000 of additional liability subject to be called for at any time.

From the above statement it will be seen that the Office has already incurred liabilities which it is unable to meet. A justification for the course pursued will, it is hoped be found in the great necessity of the case.

Congress had made no provision for these expenses. The convenience of those connected with the Patent Office required the furniture which has been procured; and the condition of the models, which are to occupy the large hall in the east wing, imperatively demand that this hall should be fitted for their reception at the earliest day practicable. Had the matter been postponed till Congress should make the necessary appropriation, much time might elapse before the bill for that purpose would become a law. Sixty days notice must then have been given before the contract could be made, and several months more for the contractors to complete the works, so that the hall might not be ready to be occupied for a year to come. Under these circumstances, it was thought expedient to take the responsibility of contracting to pay these expenses from the Patent Fund, and trust to Congress to refund the amount so far as it should be found necessary. Should these reasons be deemed sufficient to justify the course pursued, it is respectfully suggested that immediate measures be taken to refund the amount paid by the Patent Office for furniture, to meet the amount that will be due when the iron cases are delivered, and also to furnish the means for immediately providing the other furniture for the large hall.—This will be ready in a few weeks for the reception of the cases. The iron cases are to be here by the first day of February next, and the other fixtures can also be soon completed, if contracts for that purpose be made at once.—If all this is done, the Patent Office will have a little over $40,000 in its treasury, which, considering the liability for withdrawals above stated, is not much more than should be found there.

Appended hereto will be found a list of all the patents that have been granted during the year, together with an alphabetical list of the patentees, with their places of residence; also, a list of all the patents which, during the same period, have become public property.

The whole number of patents issued during the year is 958, including 24 reissues, 3 additional improvements, 12 extensions, and 75 designs.

The whole number which have expired is 375.

If the amount of $11,923 35, which has been paid for furniture, as above stated, were to be refunded, it would bring the expenditures slightly below the receipts. The excess of receipts over expenditures would have been about the same as usual but for two circumstances.—First, an undue proportion of the amount expended for agricultural purposes stands charged to the last year's account, in consequence of those expenses being paid from parts of two separate appropriations. Our fiscal year begins on the first of January instead of the first of July, and it has so happened that most of the payments have been crowded into the closing portion of the last fiscal year, and into the first six months of this Secondly, the number and compensation of the clerks in this Office have been considerably increased, mainly in consequence of the act of the last session of Congress, classifying the clerks in the different departments.

The large accumulation of the Patent Office fund occurred principally prior to the establishment of the system of examinations. On the first of January 1837, it amounted to upwards of $300,000. Since that time the average amount of receipts over expenditures has not exceeded $10,000 per annum.

The labor and expense of making examinations is every year increasing as the field for examination is constantly and rapidly widening. The Office is not justified in allowing a patent to issue until fully satisfied, as far as it has the means of becoming so, that the same invention has not been patented in this or any foreign country, nor been described in any printed publication, nor even been discovered in the United States. The models and portfolios of the Patent Office, and all printed publications in the library are, therefore, to be constantly examined, and, as these rapidly increase, the labor is augmented somewhat in the same proportion.

To give some idea of the amount of this labor, and of the rapidity of its increase, it may be stated that there are now in the office very nearly 25,000 models, and about the same number of drawings in the portfolios. The number received within the last nine years is a little upwards of 17,000, and the number filed within the past year nearly 3,000.

The number of volumes in our library at this time is about 5,750: in 1847 it was only 1,850.

There have been 1,550 added during the past year; most of these are works which require to be frequently referred to by the examiners in the course of the year.

From these facts it can be understood how the labor of examination is constantly increasing, and how the examinations of applications which once required but one examiner can now be scarcely performed by eighteen.

The number of Patents issued during the past year is considerably less than during the year previous. This is principally to be attributed to the fact that the changes and vacancies which occurred near the close of 1852 and in the early part of 1853, as well in the office of commissioner as in those of some of the examiners, left the Office less efficient than it would otherwise have been.

The number of Patents issued during the last six months of the year is 583, against 375 issued during the first six months. With the present force, and their constantly increasing experience, it will be practicable to issue 1,200 Patents during the ensuing year.

The arrearages had augmented from 155 on the first of January, 1852, to 481 on the first of January, 1853. They constantly and rapidly cotinued to increase till the first of July, since which time they have been gradually diminishing. On that day the act of the last session of Congress took effect, which gave the Patent Office eight clerks of the second class.—As their duties are not precribed by law, it was deemed expedient to detail one of their number to act as a second assistant examiner, in each of the six examiners' rooms. The experiment has fully answered the purpose intended, and will require to be made permanent. Even that augmentation of force will not be sufficient to keep the business of the Office in that state of forwardness which the wants of the country require, and additional arrangements should be made, if it is intended that applications shall be acted upon promptly as soon as made.

One of the objects sought to be accomplished by the appointment of this additional force, is to have a number of suitable persons in training, and ready to fill any vacancies in the corps of examiners proper, that may at any time occur. These vacancies not unfrequently result from resignations, caused by the fact that a person well qualified for an examiner finds a more profitable employment elsewhere than in the Patent Office. One remedy for this would be to increase the compensation of the examiners: another, to prepare for filling the vacancies when they occur. The latter of these has been to some extent resorted to; the former, if deemed desirable, will require the further action of Congress.

The Patent Office should command the highest order of talent. There is no person, whatever be his abilities or his attainments, who would not find, as an examiner, full exercise for all his talents. A practical sound sense is nowhere more important. All learning connected with the arts and sciences finds here an ample field for exercise; and even questions of law, that tax to their utmost the abilities of the most learned jurists, frequently present themselves for the decision of the Office, and should be rightfully decided by the examiner.

The compensation of the lowest class of examiners should be such as to command abilities that, with proper training, would grace the highest; and the compensation of all should be sufficient to induce each one in this employment to content himself with making it a business for life, as the information he is daily acquiring is constantly increasing his usefulness.

From the fact that the Office during the last six months has been constantly gaining upon the work before it, there may be thought no necessity for an augmeutation of its force. But the exertions of the past six months have rather overtasked some of the examiners; and as the number of applications is annually increasing, it will be very difficult to overcome the heavy arrearage still standing against us.—When that is effected, much of the force of the Office might be very advantageously employed in digesting and indexing the books of reference belonging to the Office.

From the present number and rapid increase of our models, drawings, and books of reference as above shown, it is evident that the only way of preventing the Office from being overwhelmed with its increasing labors, is by systematizing and arranging every thing.

The increased space, of which we have an early promise, will enable us to do this with regard to the models and drawings; but with regard to the books of reference the case is more difficult. Many of these are wholly without indices. In other cases works containing from fifty to a hundred volumes have only a separate index to each volume. A reasonable amount of time appropriated to consolidating these indices, and to digesting and arranging the works in the library, would be undoubted economy; and by promptly reducing all new works to the same system of order and arrangement, augmentation will not tend to produce confusion, or even sensibly to increase the labor of examination.

Any increase of force will absolutely require increase of room for its accommodation. But for this difficulty a further number would before this time have been detailed on this duty, sufficient to have disposed of the greater portion of the present amount of arrearages, so that an application could have been acted upon within a few days after it was filed. The inability to do this is one of the greatest grievances of which inventors have to complain, and should be soon removed.

In fact, the present accommodations are altogether insufficient for the present force: one set of examiners, consisting of the principal and his two assistants, have to occupy a single room. Applicants and their agents must constantly have more or less intercourse with these examiners: the models of cases under examination are thus to some extent exposed to the observation of those who may make an improper use of such an opportunity. There should be the means of preserving greater secrecy than is now possible. Each set of examiners should be provided with two rooms, into one of which, containing the models of cases under examination, no one except a sworn officer should ever be permitted to enter.

The limited space assigned to the models in the Office has long occasioned serious inconvenience, and been the cause of just complaint by inventors. The crowded condition of those models not only prevents a proper arrangement, but necessarily exposes them to constant danger of injury and destruction. A large portion of them are consequently in a crippled condition, very discreditable to the Office, and detracting much from its usefulness.

So far as the patented models are concerned, this difficulty will be remedied as soon as the large hall in the east wing is ready for their reception. The space they now occupy will be barely sufficient, when divided into suitable rooms, for the proper accomodation of the library, the examiners, and the machinist.

[Remainder next week.]

What is Flying?

MESSRS. EDITORS.—It cannot be demonstrated by the known laws of mechanics that birds can fly, yet birds do fly. Therefore birds are in possession of a power unknown to mechanicians.

Will some of the readers of the "Scientific American" prove the fallacy of the syllogism by demonstrating that birds can fly by the known laws of mechanics.

The sailing of eagles, vultures, &c., is alluded to, which are noticed to move through the air, without any apparent exertion, or motion of the wings, for a length of time sufficient for the resistance of the air to have entirely overcome their impetus, and to have arrested their motion, or the force of gravity to have brought them to the earth, yet their motion is not retarded, and they are seen to have ascended higher than when first observed. J. B.C.

Jackson, Tenn., March, 1854.