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## Contents :

(Illustrated articles are marked with an asterisk.) (Illustrated articles are marked with an asterisk.)

* Bell's Patent Stcam Genera- European Raillway Tariffs.










## EXPIRING SUBSCRIPTIONs.

The present number closes the volume, and in accordance with our usual custom, we discontinue the paper upon expiration of the time for which the subscription was paid. We expect to keep all our old subscribers, and to add largely to our list on the new volume.

## NO. 1 ADVERTISERS.

Parties who intend toadvertise on the outside page of the first number of the new volume, should send their advertisements without delay. The terms are seventy-five cents per line for each insertion. To enable advertisers to calculate how much they must remit, we will state that, independent of the head line, about seven words will make a line of agate type. It will be safe to estimate but four words for the head line.

Engravings will be inserted with advertisements at $\$ 1$ a line for the back page and 75 cents a line on the inside. The rates for ordinary advertisements in the inside, 40 cents a line.

## BRING OUT YOUR INVENTIONS.

The enlargement of the Scientific American, commencing with the next issue, will enable us to insert in each issue a much larger number of engravings than our limited space has heretofore admitted. We have increased our force of designers on wood, so that orders for engraving of new inventions and machines can be filled more promptly than heretofore.
There is no way in which any new invention can be so extensively and advantageously brought to the attention of the public as by having good engravings of it published, with a description, in the Scientific american. Thousands who have tried it can testify to this fact.
To patentees, and those who wish to have their inventions illustrated in this Journal, the foliowing general directions will be their guide :-
In preparing engravings for publication in the Scientietc Anericis, the use of a model from which to make the design, is preferred. If it is inconvenlent, however, to send a model, a well-exewited
photograph, taken from a machine or model, will usually answer the purpose. The Letters Patent should be sent with a statement of the advantages claimed for the invention. After the order is reccived the engraving will be prepared and published, and the model, patent, and engraving returned by express. For fupther information address Publishers of this paper.

## IMPORTANT SUGGESTIONS.

The enlargement of the Scientific American will enable us to publish all the patent claims in each regular issue, and obviate the necossity of the extra claim sheet, which we have lately been obliged to ascl.
Oher inportant improvenents are to be niade which will remder the papre more attractive than any publication of its class heretofore published. Subscribers. whose time expire with this issue, should renew their subscription at once, so as to be sure of all the numbers.

We shall endeavor to print enough of the few first numbers to supply all demands, but the great rate at which new subscribers are coming in renders it difficult for the Publishers to determine the extent of the edition to print at first.
the value of a scientific and mechanical JOURNAL.

Before the advent of railroads and the establishment of the telegraph, when travelers went from point to point by the stage-coach or by private conveyance, information was as slow and uncertain in transmission as passengers. The knowledge gathered by one man, under circumstances and by experiences not common, but liable to all, was his own personal property to be transmitted to his children, or mayhap to die with him. There were secrets in every trade and profession (there are too many now), and he who obtained the lore gained from the niggardly teacher, expericnce, was compelled to pay a price wrung from his golden years and laborious sinews.
To a certain extent this is true now, but knowledge is like the water poured into an overflowing bucket. He who has not capacity to hold, or capability to use, must let it go from him, although when it has only moistened his lips, it fills and satisfies others. Mystery in mechanics has had its day. The cabalistic formule of the chemists have been interpreted, and all who choose, may walk the road of knowledge, gleaning here and gathering there; in fact, stopping at stations by the way, and drawing from magazines filled with the experiences of ages and enriched with the experiments of those who have but just preceded them.
These magazines of valuable information for the scientist and mechanic, are the journals devoted to scientific and mechanical subjects. In these the stray and floating particles of knowledge are gathered, sifted, and presented in their real character. If some of them are but froth on the sea of knowledge, they are dissipated in the rays of true science if real and valuable, they are divested of the bar nacles of prejudice, egotism, persiflage, and trash, and shown as they really are.
This work of sifting, choosing, and preparing is the proper business of the journalist-the editor of a scientific paper. He saves the seeker after knowl edge from the dreary labor of searching records the impossible task of endless correspondence, and the continual inquiry after "some new thing." To the scientific student, the beginner in mechanics, the seeker after the hidden wisdom of nature's laws and the practical worker in accordance with those laws, the scientific and mechanical periodical is an ever-present friend and assistant. It saves him hours of hard thinking, days of fruitless labor, the shame and vexation of unaccomplished endeavor, and periods of weary waiting. It assists him in his attempts at discovery, unravels hard knots in his line of theory, gives bim valuable hints in his atror, and points to the right road. By knowing the
errors and failures of others, he is enabled to steer clear of obstacles, ur by understanding tho methods used by others, he is assisted in surmounting them. If a practical man, he is periodically informed of what is being done in his specialty, and thus kept from wasting his energies on labors already acconıplished, and is enabled to utilize the brains and labors of others. In short, a "live" mechanic must as certainly keep up with the times as a politician or a statesman. 'To do this there is but one course, and that is to read a journal which is devoted to the recording and elucidating of the truths neceesary for him to know.

## IMPROVED PIER AND WAREHOUSE SYSTEH FOR NEW YORK,

The pending legislative inquiry into the harbor accommodations of our great seaport cannot be considered premature. The character of its wharfage is a drag and a disgrace to the prosperity of a com mercial metropolis like this. Rude, primitive, rotten structures of $\log s$, crowded and choked, exposed and insecure, infested with thieves, and more or less embanked with ship-stranding mud, are not the sort of accommodations to which the commerce of the world should be invited. The want of proper space and apparatus prolongs the discharge and taking in of cargoes, often four-fold. The entire absence of wharf storage involves a constant waste of time and lexpense, and an aggravated obstruction of the streets, in transporting merchandise back and forth between the shipping and the warehouses. Warehouses scattered all over town, and interspersed among other buildings, hazardous in every degree, involve the frequent destruction of vast amouns of merchandise by fire. The ill-constructed water-front promotes instead of preventing the obstruction of the docks and channcls, and the detention of a pestilential sewerage. The whole system, wretched as it is, instead of being a profit, is a constant expense to the city treasury.
It is to be hoped that the labors of the legislative commission will not be completed without the adoption of a mature system of whatfage, uniform, and ad equate to meet the wants and remedy the evils now so. severely felt, together with a business-like plan for carrying the improvement into effect without creating inordinate monopolies, whether moneyed or municipal.
The comprehensive and convenient plan of wharf structares put forth by the projector of "The New York Pier and Warehouse Company " (Mr. G. Burrows Hyde), seems eminently worthy of consideration. It may be stated in a very few words. A continuous bulkhead of durable stone masonry is to define the water front, and act as a deffector for the discharges and deposits which now accumulate in the slips. Piers are to be built of prescribed dimen sions, according to the requirements of the channel and tides, resting upon great hollow pillars of iron, exhausted and driven down by pneumatic prcssure, and then filled with masonry or concrete under pressure, so as to form artificial stonc. The space be tween these pillars will allow a free flow of the tides and deposits, and will be sufficient also to admit of dredging. The pier will support a fire-proof warehouse of iron, five stories high : the first story, on the street level, being open on all sides as a wharf, yet covered from the weather, and capable of being securely closed at night by iron gates or roll ing shutters, and furnished with steam hoisting apparatus for the rapid discharge and loading of ves sels, and dispatch of carts. The second floor may be used, where necessary to avoid obstructing the pier, for the temporary deposit of goods awaiting stowage or removal; and the whole warehouse proper will afford secure storage for merchandise, on the spot, to any required extent, at the least of expense and inconvenience to parties or the public. The steam, always up in these warehouses for hoisting purposes, would also be available in connection with powerful stationary fire engines, for extinguishing fires among the shipping, which have been so calamitous in repeated instances. Wharf thieving and smuggling could also be effectually circumvent. ed. It is evident that the profits of warehcusing and wharfage on this plan would attract abundant capttal for the construction of the buildings, in accordance wibh proper legislative regulations, and
under a profitable water rent to the city. Thrown open on safe and liberal terms to the enterprise of all, in lots of some limited estent, and under supervision of government, a perfect system of piers and warehouses may be made a public benefit without becoming a public charge, a center of monopoly, or a source of corruption.
The trouble now-a-days with about every new project of a public chatacter, is, that the promoters start off with a gigantic stock operation; we have heard this objection raised to the New York Pier and Warehouse Company's scheme, which we hope is not true.

## volkman's, Selfholding Plow.

Our attention has recently been called to a novel self-holding plow which seems to possess much merit. The peculiarity of the plow is such that the share will keep in the furrow without being guided A boy old enough to drive a team is capable of man aging the implement; or rather the plow will take care of itself without the attention of the driver. The share and beam are similar in construction to the ordimary plow. The front end of the beam rests in a light carriage and is so arranged as to turn freely in every direction. When in use, the plowis set so that it points elightly toward the land side, the draft being from the opposite direction, which renders it impossible, with the arrangement for supporting it in position, to be thrown out of the furrow unless it strikes some obstruction, and then as soon as passed it resumesits former position. Any depth may be plowed by setting the implement the desired scale before starting.
If we are not mistaken Mr. Volkman's patent plow will come into quite general use. For further infor mation see advertisement in another column.

LTNN contains 220 manufactories, turning out an aggregate of not far from twelve million dollars' worth of boots and shoes, annually.
The Agricultural College of Massachusetts is to be opened for students on the first of September next. Five buildings are to be crected, including a chemical laboratory and a model barn, at a cost of $\$ \mathbf{6 5 , 0 0 0}$.
The exhaustion of the British coal-fields proceeds at the rate of nearly one hundred million tons per annum, or five times the present product of the American mines. On the other hand, the extent of the American coal-fields is more than twelve times that of the British.

An extensive system of adult schools has been in auguratel in France, under the auspices of the Minister of Public Instruction. Last winter, nearly 5000 such schools were opened, with 30,000 teach ers, and about 600,000 pupils of both sexes; nearly half of whom were unable to reacl.

Pittsbergir contains five hundred large manu iacturing establishments. It has fifty glass factories and sixteen potteries, forty-six iron founderies, thirty one rolling-mills, thirty-three machinery establish ments, and fifty-cight oii refineries; beside miscel laneous works of almost every variety; the whole turning out an ennual product worth $\$ 100,000,000$

The Public School System of Lower Canada, by a recent report,comprises 10 universities and profes sional institutions, with 818 students; 210 second ary institutions, as classical and industrial colleges and acalemies, with 28,613 students; 3 normal schools ; 4 special schools; and 3,479 primary schools, with 172,733 pupils. The total amount levied for the support of this system, in 1865, was nearly $\$ 600,000$.

Stbterranean Photography .-A firm in Cincinnati have obtained the exclusive right of taking views in the Mammoth Cave of Kentucky, for five years. The process successfully used in taking pic tures of the interior of the Great Pyramid is adopt ed, using the magnesium light. The dampness of the cave, the smoke arising in the consumption of large quantities of magnesium, the divergency of the artificial light, and the magnitude and proximity of the objects to be photographed, present a num ber of serious difficulties. Powerful reflectore are used to throw a flood of light upon the object, and the plate is allowed about twice the exposure required by the light of the sun.


ISSUED FROM THE U. S. PATENT OFFICE for the week ending dec. 11, 1866.
Reported officiallyfor the Sctentific American.

 may be bad gratis by addressing MUN
SIEMTIFIC AMRHICAN, Ne N York.
60,319. - Hame Fastening. - W. J. Alexander,
Manchester, Iowa.
Firrt. I claim the hame fastening cons ${ }^{\text {Biting }}$ of the catch plece, B, and the socket, C, with the spring contch, D, and notches, E,
respectively, and, anted to tho
as and for
and
 H, and spring. M, operating as describell
Third The pin, L, as and for the purpose described.
60,320.-Mandfacture of Brick or Building
Blocks.-Henry W. Angell, Waukesha, ilis I clainu a brick k cornopesed or lime, sand, manall stones, and gravel,
pr pared and molded ln the maner descrilee. $60,321 .-$ Saw. - James E. Atwook, Trenton, N. J. I claim the teeth, H H, when inse rted and secured in the man
ner hereln descr.bee and for the purposes set forth. 60,322 .-Machine for Rolling Metal.-Hugh Baines, Manchester, England.

 Sreond, Incombination with the ebove, the move mable table, 7 ,
arraņed and operating substantially as and for the purpose
specifled.
60,323. - Brick Machine. - William C. Bartol
Huntingdon, Pa .
 thally to the mauner hiceln bhown and described.
 and described, for the purpose of raising and lowering the



 60,324.- Batting and Wadding.-Samuel Baxen-
dale, Boston, Mass
I claim t, ebation, or wading composed of a layer of fibrous
matirial attachea by any adhesive subscaucs to opposite sides of material at achea, by any adhesive eubsauc to opposite sides
a shite or paper, as hertin descrived, tice same being a new article 60325 -
$0,325 .-$ Road Scraper.-J. B. Beall and B. F
Grime, Westerville, Ohio



 scribed, with a reversible ecraper.
Pass, Ill.


 60,327- A PPARATO
B. Beebe and 'T. For Lloyd, Albauy Grain.-J B. Beebe and T. F. Lloyd, Albauy, N. Y

described, We claim the drop pipe, 1 , in combination with the en-





60,328.-Soas.-S. J. Beeler, Wales, Ill.
I claim the use of the tngredients hereln named tit the propor-
Holis and mauner substantially as set forth, for the nanuracure soap.
,3i9.-Cast-iron Chain Pulley.-James Bird
New York City

as and for the purpose above Masine.-M. Brand and C. P
Hoffmann, Chicago, Ill.
 with the machme.
60,331. - Fence Gate. - W. W. Bratt, Otta wa, Ill.
First, I claim the two rollers, $G$ G, on which the gate slldes
sidewise, The gaide board, K , fitting in the circular grooves of
Thild. The gide, 1 , nt the lower end of the swlnglne post, $\mathbf{B}$.
Fourth, The part, t , of the gate, H, back of the rollers, , o,
ly
0032, Pla Ma
dison N Y dison, $N$. Y.




60.333.-Tweer.-T. E. Brinley, Louisville, Ky.

 60,334.-Grate for Stove.-Albert Brown, Troy $\mathrm{N} . \mathrm{Y}$.



 60,335.-Propelling Horse.-John H. Brown, New York City.
 60,336.-Spring Toy.-John H. Brown, New York City.

 sprigg can veaccommodated to the welght of the chlla occupy
ing tbe to thir Supporting the toy on a fulcrum, a, at its back end, sub-
stantally as and for the purpose described. 60,337.-Mode of Attaching Handles to Boir-
ers and other Vessels.-John H. Brown,
ERS AND OTHER
 s ruct ct d and operating substantlally as and for the purpose de
scribed.
60,338 .-Feeding Device for Carding Enaives. -George Bruce, Corydon, Ind.


 60,339.-Combined Table and Bedstead.-Sanford S. Burr, Dedham, Mass.


 Inthe manner and for t.ie purposes substantially as herein de-

 60,340.-Mode of Fastening and Unfastening

Drop Doors in Coal Cars.-William Burt,
Marquette, Mich.
 and
parpoee ett forth.
60,341.-Rotary Cutting Machine.-James J.
Butler, Cincinnati, Ohio.
 substantial. Yas described. driving tue mandrels, to which tee cutcer or knifeils attached

63,342.-Tap Borer.-Silas S. Crocker (assignor
to himself and D. R. Crocker), Maquoketa, Iowa.
 60,343.-Tool for Setting Jewels in Watches.
-A. C. Crosby, Union, Pa .

60,344.-Measuring Liquids.-George W. Devoe, New York, city.
I Clain, First. The suzpension and arran gement of the weighted



60,345.-Feathering Paddle Wheel.-John V.
Minsmore (assignor to himself and M. Harris), Milford, Mass.





60,346.-Grading Instrdaent.-Samuel L. Donnell, Spring Creek, Tenn.
I clatm the bubbie block, $D$, mounted apon 2 collar, , , swiveled
upon the tand. $A$, or its equivalent, in combination with the $s$ al


 diestribed. The combination with the sights of the pabble block of the trum or setscrew $8, R$, and fixed pointer, U. a pranged sub

60,347.- Ротato Digger.-M. T. Drake, Pleasant


