boots and shoes may be blackened and polished far more expediently han it can be done by hand.

12,708.—Water Wheel.—W. Whitney Manchester, N. H. I claim, in combination with the peculiarly shaped floats, F, the inverted conical centre, E, and hoop, G, to w ich the floats are fastened, In combination with the concave disk or basin around the wheel, I claim the stationary guides, L and shutes, M, to direct the water on to the wheel, substantially as described.

I claim the cylindricalg ate, N, arra ged between the curb and the wheel, and fitted to traverse circularly around the wheel, and open and close the shutes or apertures which supply water to the wheel.

42,709.—Machines for making Horse-shoe Nails.—Jame White, Cleveland, Ohio, and John Malden, Youngs 42,709.—Machines for making Horse-shoe Nails.—James White, Cleveland, Ohio, and John Malden, Youngstown, Ohio:

We claim, first, The herein-described devices for cutting off the blank and shaping the head at one operation.

Second, We claim the herein-described devices for throwing the blank forward into the lip, b, in the manner specified.

Third, We claim the herein-described devices for holding the nail, while it is being drawn into Shape, and releasing the same.

Fourth, We claim the vibrating arms, M, N, O, P, S, T, in combination with the wheel, B, operating as and for the purpose specified.

tion with the wheel, B, operating as and for the purpose specified.

42.710.—Car Coupling.—Geo. E. Wood, Providence, R. I. I claim the pivoted pin, C, in combination with the fastening. D, arranged within the drawhead, A, to operate in connection with a link or shackle, B, substantially as and for the purpose set forth.

[This invention relates to an improved car coupling, of that class which connect or couple themselves, and are commonly termed "self-couplings." The invention consists in the employment or use of a pivoted pin in connection with a fastening arranged within a draw-head, in such a manner that the link or shackle in entering the draw-head will engage itself with the pin, and the latter adjust itself a proper relative position, with the fastening so as to be retained by the latter, the pin being very readily released so as to free the link or shackle whenever it is required to disconnect the coupling.

-Wagon Brake.-James F. Woods, 2d, Cohocton,

N. Y.: application of the straight lever, D, with its right angle arm, d, the same being pivoted to the wagon reach, and operating it the arc of a circle, in the manner as described, for the purpose herein s.t forth.

herein sit forth.

42,712.—Jug-top.—Homer Wright, Pittsburgh, Pa.:
I claim forming the body section of a tin jug-top, with the margin or rim, A, figures 3 and b, of one solid piece of sheet tin, without seam, all for the purpose herein substantially set forth.

42,713.—Printing and Ornamenting Textile Fabrics.—
Alexandre Adrien Despreaux, Paris, France:
I claim, as a new article of manufacture, fabrics with metallic threads interwoven therein, printed or ornamented in the manner substantially as herein before set forth.

42,714.—Mode of applying Lubricating Substances.—

42,714.—Mode of applying Lubricating Substances.— James Dougall, Stirlingshire, Scotland. Antedated

May 3, 1864:
May 3, 1864:
I claim the method herein above-described of applying lubricating matters, the same consisting in using in axle boxes, for railway carriages, &c., hay or straw, or both combined, substantially as herein above described

above described.

42,715.—Bread-cutter. —James Oxley, Sheffield, England.
Patented in England, October 30, 1862:
I claim, first, The general constructions, arrangements and cominations or apparatus for cutting, Shleing, chopping or mineing bread and other substances, substantially as herein described and illustrated by the drawings.
Second, The combination of a knife-blade with a lever and inclined slotted bracket, so disposed as to give a downward draw-cut for the purposes herein before desc ibed.
Third, The combi ation of a knife with two links or levers, so disposed as to give a downward draw-cut for the purposes herein oefore described.

posed as to give a downward draw-out for the purposes herein before described. Fourth, The combination of an adjustable guage with a lever working or cutting blade, substantially in the manner and for the purpose herein-before described.

Fifth, The application and use of the bar or rib, 0, or its equivalent, combined with the knife, C, for separating or clearing the slices when cut, substantially as herein before described.

Sixth, The application and use of an apparatus, constructed substantially as herein before described, for holding the substance to be cut firmly, and moving it forward, step by step, at right angles to the knife.

cut firmly, and moving it forward, step by step, at right angles to the knife.

42,716.—Centrifugal Disks, revolving in Air and Water.

—T. W. Rammell, London, England. Patented in England, Nov. 6, 1860:

I claim, first, The arrangement in centrifugal disks, as above described, of the sepamte radial passages or ducts, b b b, formed by the straight ribs, a a a, attached to the central shaft, A A', and extending to the circumference; the said ducts ha ving their respective sectional areas uniform, or nearly uniform, throughout, and equal, or nearly equal, to the areas of the corresponding openings which admit the air or fluid at the center.

Second, In combination with the foregoing, I also claim the arrangement of the secondary ribs, d d d, extending from the circumference towards the center, and forming the secondary ducts, b'b' b', as above described, by means of which the centrifugal force of the refulid at the circumference.

Third, I also claim the improved disk, as above described, with or without a pressure chamber, in combination with the air-tight collars, the disk, and communicating by suitable tubes or pipes with any reservoir of air, water, or other fluid; all arranged in the nanner and for the pdropses above described.

42,717.—Gas Producer or Furnace.—Chas. W. Siemens,

42,717.—Gas Producer or Furnace.—Chas. W. Siemens, London, England, and Frederick Siemens, Berlin, Prussia. Patented in England, Jan. 22, 1861: We claim the gas producer, constructed in manner and so as to operate substantially as described.

operate substantially as described.

42,718.—Manufacture of Gun Barrels.—Jas. Thompson,
Bilston, England:
I claim the manufacture of fre-arms, or ordnance, of iron, steel, or
other desired metal, without weld or joint of any kind, and hollow, substantially in the manner and by the means herein before
described.

described.

42,719.—Safety Doors for Churches.—Alex. H. Wagner, Detroit, Mich.:

I claim the combination of a door, A, opening inward, with a frame, B, hung on hinges and opening outward, substantially in the manner shown and described.

Also, the application to the frame, B, and door, A, constructed as described, of a lever, D, or its equivalent, so that, by a slight touch of said lever, the frame is liversted and allowed to swing open. (The object of this invention is to construct the doors of a church

or other public building, so that the same, in ordinary cases, open in-wardly, the same as doors of the usual construction; but, in case of a fire, or other accident whereby the assembly in the building is compelled to break up in great haste, by a slight touch of a lever, or other suitable contrivance, the door is ma e to swing outward with an increased area, and the obstruction offered by said door to the egress o the people from the building is considerably decreased.]

42,720.—Surface Condenser.—J. J. W. Watson, Paris,

and W. H. Smith, Nantes, France:
We claim the use in steam condensers of tubes, or other vessels, filed with wire gauge or its equivalent, substantially in the manner and for the purpose specified.

42,721.—Appa atus for inhaling Gas.—Simeon W. Albee, Charlestown, N. H., assignor to himself and Henry Hodson, Charlestown, Mass.:

I claim the combination of the elastic, inflatable mouth cushion, C, with the mouth-tube or conduit, B, and its valve-case, A, provided with valves or a valve apparatus as described.

And I also claim the combination and arrangement of the two valves, valves-seats, and valve-stem together, and with the valve-case, and a mouth tube, arranged as described.

—Hydrostatic Balance. — Julius O. Baudissin, signor to himself and S. Vangraafeiland, St. 42.722.

42,722.—Hydrostatu assignor to himself and S. Vangraal chanu, St. Louis, Mo.

I claim, first, The hermetical but elastic closing of my water-box by means of gutta percha straps secured to the frame, A. platform, E. and guide-rod, B. by metallic or other rings, fe, and square pices, dd, as set forth.

d d', as set forth.
Second, The guide-rod, B, and balancing rods, g g, as set forth.
Third, The regulating screws, g and x, as set forth.
Fourth, The gutta-percha bag, G, on top of the indicator, as set forth, all in the manner and for the purpose as specified above.

723.—Washing Machine.—Elliot Dickerman, assignor to Metropolitan Washing Machine Company, Middle-field, Conn.
land, in combination with the operative parts of a washing mae, the plunger staft, A, top piece, D, and adjustable piece, E, as nged and applied & to shorten the cord, C, by the lowering of the stable piece, E, and to lengthen it by elevating it to the top piece, sherein specified.

D, as herein specified.

42,724.—Coal-mining Apparatus.—G. E. Donisthorpe, W. Firth and R. Ridley, Leeds, England. Patented in England. Nov. 26, 1861.

We claim, first, The combined arrangement of mechanism herein explained, with reference to figures I and 2, of the drawings, whereby picks with lever handles are actuated by compressed air engines mounted on and carried by the same carriage as the picks.

And, secondly. We claim the combined arrangement of mechanism herein explained, with reference to figures 4 and 5 of the drawings, whereby cutters are connected with and moved to and fro by the piston-rods of air engines mounted on carriages as herein described.

42,725.—Wheat-cleaning Machine.—John Gaw (assignot to himself and Henry P. Chandler). Ellicott's Mills

Md.:

I claim the combination of the benter cylinder, J, constructed with openings at top and bottom for the passage of an upward current of air, with the bell-shaped fumel, K, for concentrating the draught and directing the air current, as described.

draught and directing the air current, as described.

42,726.—Buckle-fastening.—Charles Goodyear, Jr., & Leonard A. Sprague (assignors to Charles Goodyear), New York City:

We claim the forming of a lever buckle in such manner that the same may be secured to leather straps or other articles by a direct hinge joint attachment, i.e., without the intermediary of a connecting strap, as set forth, with a hinge connectionlon the face of the strap, applied as shown and described, so as not to interfere with the faxibility of the strap.

We also claim the method of securing or fastening lever buckles to straps and other articles by means of staples or their equivalent clamping or clinching devices, when the said staples or their equivalent clamping or clinching devices, when the said staples or their equivalent clamping or clinching devices constitute one of the elements of a hinge.

42,727.—Manufacture of Sugar.—Frederick W. Gossling (assignor to himself, Henry F. Briggs & Lyman Brudley), Buffalo, N. Y.: I claim as a new article of manufacture alsugar produced from corn and beets.

corn and beets.

42,728.—Process of treating Indian Corn and Beet Root to produce Sugar and Sirup.—Frederick W. Gossling (assignor to himself, H. F. Briggs & L. Bradley), Buffallo, N. Y.:

I claim first, The process of making sugar from corn and beets, substantially as herein described.

Second, The process of making corn sirup from corn in each successive step thereof preparatory to its conversion into sugar, substantially as herein described.

Third, The process of making beet sirup from beets in each successive step thereof, substantially as herein described.

42,729.—Tag Hook.—John Hawks (assignor to Henry Hawks), Brooklyn, N. Y.:
I claim the metallic hook attachment for tags and labels, consisting of the spiral or screw-formed portion receiving the straight or nearly straight part, as and for the purpose specified.

nearly straight part, as and for the purpose specified.

42,730.—Combination of Cradle and Chair.—Alonzo
H! Xs (assignor to himself and Henry Lewis),
Flushing, N. Y:
I claim, first, A cradle swinging on a frame or standard, in combination with a chair rocking upon stationary feet or legs, whereby the relative position of the cradle and chair may remain unchanged, so that a connection can be made between the chair and cradle, substantially as specified.

Second, I claim the combination of the table, e, on the arm, d, with the swinging cradle, substantially as specified.

Third, I claim the rocking chair on the legs or feet, f, in combination with the spring, I, extending from such legs, f, to the staple on the back, as specified.

42,731.—Machine for making Bolts and Rivets.—James Howden, Glasgow, Scotland, assignor to Wm. & John Galloway, Manchester, England. Patented in England Feb. 28, 1859:

1.claim, first. The combination of two or more revolving die-tables having a vertical axis with a single lever for actuating the heading rams, when the parts are constructed and arranged as and for the purposes herein specified.

Second, In combination with the aforesaid die-tables, heading rams and lever, I claim the bell crank levers, Y, operated in the manner and for the purposes described.

Third, The combination of the oscillating cutting levers, P, eccentric, O, and shaft, K, when constructed and operated as described.

(This invention cannot be well explained without flustration, it and

[This invention cannot be well explained without illustration, it appears to be a very ingenious and effective machine.]

42,732.—Oil Box for Railroad Cars.—Edwin F. Hurlbut & Ransom S. Potter (assignors to themselves and Nathaniel S. Bouton), Chicago, Ill.:
We claim, first, Casting or fastening a door or lid into a frame, substantially as shown and for the purposes described.

Second, The combination of the loose lugs or ears, letter D, with the oil box, substantially as shown and for the purposes described.

42,733.—Portable Wet Grain Elevator.—Daniel W. Kellogg & James W. McKee (assignors to A. B. Nimbs & John C. Clifford,) Buffalo, N. Y.:

I claim, first, The oscillating [aws, F, for the purpose of supporting and operating the elevating leg therein, substantially as described.

Second, Extending and operating the elevating buckets below the foot of the leg so that they may easily fill with wet grain and pass up the leg without clogging when combused with the raising, lowering and supporting tackle, H. H., and adjusting rod, I, substantially as set forth.

Third The combination of the converge T. with a postable elevation.

the reg with and supporting tackle, H H', and adjusting 100, A, set forth.

Third, The combination of the conveyor, T, with a portable elevator, substantially as described.

Fourth, The combination of the blower, M, and cleaning apparatus, L, with a portable elevating machine, substantially as set forth.

42,734.—Manufacture of Elevator Buckets.—A. B. Nimbs (assignor to himself and J. C. Clifford), Buffalo, N. Y.:

I claim an elevator bucket with its strengthening band, constructed and formed from one sheet or piece of metal, substantially as herein described.

42,735. Clamp for stopping Leaks in Hose Pipes.—C. Rubsam (assignor to himself and Charles P. Hall), Newark, N. J.:

I claim as an improved article of manufacture, a leak-clamp for hose pipes composed of the canvas or fabric, A, with attached metallic strips, B, and clamping screws, b, made and operating as herein shown and described.

[This invention consists of a clamp consisting of two or more pieces of metal which are fastened to the opposite ends of a piece of canvas or leather, or other suitable flexible material, and provided with lugs and screws or with other suitable means whereby the ends of the canvas or other flexible material can be drawn together in such a manner that in case of a leak occurring in &

readily attached and drawn up tight and the leak can be stopped in a few minutes without taking up the hose.]

42,736.—Hoop Skirt.—Leopold Sanders, New York City, assignor to Thomas B. De Forest, Birmingham, England:

I claim a hoop skirt in which the overlapped ends of the hoops are secured to tapes, A' and A'', or their equivalent, which slide freely around said hoops, substantially in the manner and for the purpose set forth.

[This invention consists in attaching the ends of the hoops to two tapes at the front of the skirt, said tapes being placed adjoining each other, or side by side, and each having every alternate hoop permanently attached to it, while the intermediate hoops are allowed to slide freely througb.]

42,737.—Cultivator.—Samuel A. Tombs (assignor to himself and Samuel N. Purse), Ashley, Mo.: I claim a cultivator frame constructed of the curved bar, A, united at its rear by the curved cross-bar, b, and provided with the stationary standards and cultivator teeth, a, and pivoted standards or handles, d, the whole constructed and arranged substantially as herein set forth.

DESIGNS.

1,939.—Slipper Pattern.—Edward K. Butler, of Boston, Mass.

1,940.—Clock Case.—Elias Ingraham, Bristol, Conn.

1,941 to 1,943.—Carpet Pattern.—Elemir J. Ney, (assignor to the Lowell Manufacturing Company), Lowell, Mass. (Three cases.)

44.—Trade-mark.—William Robotham (assignor to himself and Walter Greacon), Newark, N. J.

[The Re-issues belonging to the list of this date will appear in next week's list.]

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the pat entee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of \$2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two gooddrawings are all that are required to accompany the petition, specification and oath, except the Government fee

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CEALED PROPOSALS WILL BE RECEIVED AT
Othis Office until 12 o'clock, M., on Monday the 16th of May inst, for
furnishing by contract, at the Depot of Army Clothing and Equipage
in this city,—

Canteens.
Drums Inft. Drums Common Ten Spades Mess Pans. Camp Kettles. Camp Colors. Regimental Colors. National Colors. Infantry Trowsers. Uniform Hats.

Eamples or specifications for which can be seen at this office. Bidders will state the quantity they wish to furnish, and how soon they can complete the delivery of the quantity they bid for. They will submit, with their proposals, a sample of the article they propose to furnish.

furnish.

A proper guara ty must accompany all proposals for the faithful performance of a contract.

The United States reserves the right to reject any part or the whole of the bids as may be deemed for the interest of the service.

Proposals should be endorsed "Proposals for furnishing (here insert the articles bid for") and addressed to

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MACHINE SHOP AND FOUNDRY AT OWEGO FOR SALE.—Every facility for doing a large and prosperous business. Railroad and canal privileges unsurpassed. The establishment is well provided with tools, extensive room, plenty of work, very low rent, and long lease. The proprietor is out of health. Address JOHN MCCOLLUM, 40 Eldridge street, New York; or W. H. Bell, Owego, Tioga county, N. Y.

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TO GAS FITTERS AND MANUFACTURERS OF GAS FIXTURES.—The entire light, or any part thereof, of my Patent Socket, for Pontable Pendants, Table Lights, &c., is for sale cheap. For description see page 324 of the present number of the SCIENTIFIC AMERICAN. Acidress JOS. TODD, Post-office Box 273, Madison, Ind.

TO CAPITALISTS THAT DESIRE TO START SOME manufacturing business in the West, may find it to their advantage to examine our water power on the Turkeyriver, at Elkador, Clayton county, Iowa. We will sell or lease one-half of the power and some land on the East bank of the river, opposite a large flouring mill. We are twenty miles from the M ssissippiriver at McGregor. and sixteen miles from Clayton. There will be plenty of water, and we can get eleven feet head. Building material of the best kind near by. Address as above to LEVI A. BEARDSLEY or S. V. DAYIS.

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essee. Philadelphia, April 27, 1864.

WANTED—A Situation by a person who has an experience of 25 years in the management and construction of Railway Machinery and Marine Engines; has had entire charge of the Machinery Department of several important Railroads; also that of a line of Steamers; can produce the most satisfactory references as to character and ability. Letters addressed to "Machinery," care of C. W. COPELAND, Consulting Engineer, No. 122 Broadway New York, will meet with prompt attention.

ORDNANCE OFFICE.

WAR DEPARTMENT.
WASHINGTON, May 1, 1864
LED PROPOSALS will be received at this office until Monds
d day of May, 1864, for the delivery at the following arsena
ry Accountements, United States Cavalry pattern, as here
pecified

tue za day or May, 1851. for the delivery at the following arsenals, Cavalry Accountrements, United States Cavalry pattern, as hereinafter specified.

At the New York Arsenal, 25,000 sets.
At the St. Louis Arsenal, 50,000 sets.
At the Frankfort Arsenal, 10,000 sets.
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These Accountrements are to be made in strict conformity with the regulation pattern, which can be seen at the above named places. Each set is to consist of one Sabre-belt and plate complete; one Carbine-sling with swivel complete; one Sabre-knot; one Carbine Carbine-sling with swivel complete; one Sabre-knot; one Carbine Carbine-sling with swivel complete; one Sabre-knot; one Pistolic Carbine-condition of the Carbine Carbine-sling set revolver, and one p-pouch with cone pick. All of which are to be made of the best materials and workmanship. The Sabre-belt, Sabre-knot, and Carbine-sling are to be of Buil Leather Blacked, and the Carbine-boxes, Belt-holster, and Cappouch of Pure Oak Tanned Leather.

It is to be distinctly understood that this Department is to have the privilege of inspecting the work done under any contract it may award, in all stages of its progress; especially, to examine the stock before cutting. They are to be subject to the final inspection at the Arsenal, where delivered, before being received by the Government. Mone are to be accepted or paid for but such as are approved upon inspection.

Leliveries must be made in lots of not less than one-tenth (I-10th)

Deliveries must be made in lots of not less than one-tenth (1-10th) re week of the whole number contracted for; the first delivery to re made on the 20th day of June. Failure to make deliveries at a specified time will subject the conactor to a forfeiture of the number he may fail to deliver at that

ractor to a forfeiture of the number he may fail to deliver at that time.

The Accourtements must be boxed in the usual manner; the boxes to be charged cost, to be determined by the inspector.

Bidders will state explicitly the Arsenal, or Arsenals, where they propose to deliver, and the number of sets they propose to deliver at each place, if for more than one.

No bids will be considered from parties other than regular manufacturers, and such as are known to this Department to be fully competent to execute in their own shops the work proposed for. Should any party obtaining a contract offer Accourtements other than those made in his own shops, they will be rejected, and the contract endered null and void.

Bidders will enclose with their bids the written acknowledgments of their sureties over their own signatures.

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Upon the award being made, successful bidders will be notified, and turnished with forms of contract and bonds.

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a screw as a pivot to turn on. The brace does not fit the screw, but has a slot in it so that the strain comes upon the upper end. B. and there is also a spring washer under the head of the screw which keeps the brace close up to the handle so that it cannot slip when about to be used. The wrench as thus made is a very convenient one, and was patented on Jan. 5th, 1864, through the Scientific American Patent Agency, by H. Sharp, and assigned to Brown



DUBUISSEN'S HARROW AND CLOD-CRUSHER.

ing, and is so arranged that when it is desired to use the clod-crusher alone, the harrow can be turned up over the latter, and thus add its weight to the work: this will generally be found sufficient, but if more pressure is required stones can be added as desired. The harrow is furnished with a handle, C, in in the rear, so that as occasion demands it can be raised to clear the teeth from weeds and grass that have clogged them. This machine will be found a very useful one for the purpose, and may be used as shown for either harrowing or clod-crushing, in combination or separately.

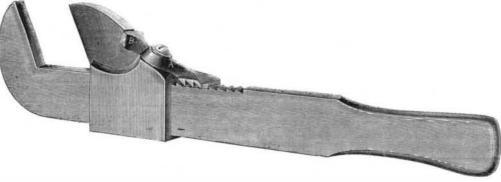
The invention was patented through the Scientific American Patent Agency on June 30th, 1863, by Geo. W. Dubuissen, of Jerusalem South, Queens county, N. Y. For further information address the inventor at that place, or R. H. Allen & Co., 189 Water street, New York.

Improved Wrench.

formation address J. M. Brown, 388 Broadway, New York.

Damages of the Sheffield Disaster to be Paid.

The Northern and Eastern counties correspondent of the London Engineer, of April 22d, says:-"The Sheffield Waterworks Company held a rather gloomy meeting on Monday. The directors intend to admit the liability of the company, and in order to meet the claims upon them, they propose to ask Parliament for powers to raise £400,000, and to issue a special commission to assess the compensation due to the sufferers by the flood. The chairman briefly referred to the overwhelming calamity that had come upon the company since their last meeting, and stated, on the part of the directors, that they were desirous of satisfying, to the fullest possible extent, consistent with justice, all the claims that could be brought against them. The report recommended that no dividend should be declared. Mr. M'Turk moved that The wrench herewith illustrated is one that will the usual dividend of five per cent., which had been recommend itself as a very complete and useful tool. earned previous to Dec. 31st, should be declared. The



SHARP'S ADJUSTABLE WRENCH.

strong in the direction of the greatest strain. It is made light and thin so as to go into a narrow opening, and the body is increased in width so as to compensate for the reduction previously mentioned. The one before us is made of malleable iron, but they can be made of wrought-iron as well. The eugraving explains itself so clearly that further comment is almost needless. The reader will see that the brace, A, has a grooved foot that fits into corresponding projections on the handle. The center of the brace is fitted with | dends of the company, and that 'no dividend' meant

It can be set most readily to any size, and is very law clerk read a clause from the opinion of counsel setting forth that shareholders were liable to the extent of their shares, but not further; and as regarded the question of a dividend, the attorney-general, and other eminent barristers, who had given the opinion, added that the company would act very injudiciously if they divided any sum at present. It was urged in the course of conversation, by those favorable to the declaration of a dividend, that many widows and orphans were dependent upon the annual divi-

to them the extreme of distress and privation; but it was felt that under present circumstances, however great the individual hardships might be and would be in many cases, it would not be right to declare a dividend in the face of the application that is to be made to Parliament. The motion was withdrawn by Mr. M'Turk, and the report of the directors was adopted."

Effect of Vibrations on Iron Girders.

In the London Artizan we find a full report of an elaborate series of experiments undertaken by William Fairbairn, LLD., F.R.S., to ascertain the effect of vibrations on iron girders when subjected to only a portion of the breaking strain. A beam, 16 inches in depth with a clear span of 20 feet, was so arranged that the weight could be let down upon it suddenly, and then caused to vibrate. The experiments commenced March 21, 1860, and continued to Jan. 9, 1862; the changes in the load amounting to upwards of 3,000,000.

Mr. Fairbairn concludes that iron girders in railroad bridges and other places where they are subjected to sudden changes of load and to vibrations. cannot be loaded with safety to one-third of the breaking strain, but that with one-fourth of the breaking strain they will last for hundreds of years.

Scientific American,

FOR 1864!

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