

end of its shaft; the pinion D meshing into the pinion E, upon the long shaft, F, which extends the whole length of the frame, and thus controls the motion of the drawing rolls, e, in all of the heads.

As wool of short staple requires more twist than that of which the staple is long, a machine, in order to be practically useful, must be adjustable in this respect, and in the machine here described this adjustment is secured in the most complete and simple manner. The long shaft, F, is driven by a pair of cone pulleys, g g, fig. 1, so that the speed of the shaft, and consequently the speed of that rotation of the rolls, e, which twists the roving, may be varied at will. The speed of the feed rolls is also regulated by a pair of cone pulleys, h h, fig. 1, and thus drawing the twist between the feed and draft rolls, can be adjusted with the greatest ease and precision while the machine is in operation; and when once arranged for the kind of wool used and of the thread desired it remains fixed, requiring no further care of the operator. The spinning twist is regulated by changing gears in the usual manner. The machine now running at Utica is tended by the usual help of a cotton spinning frame, and operates in the most perfectly satisfactory manner in every respect.

In this description we have presented the essential features of the invention, omitting several details, but the practical objections have all been considered and obviated. For instance, to prevent the yarn in case of a break from winding around the feed rolls, a metallic shield is placed in front of them, fitting them closely, and having a hole for the passage of the yarn.

And to prevent the end of a broken thread from flying in contact with those near it, a fender is placed in front of the rolls. This fender is made to turn down in sections, one of which is shown in fig. 1 thus turned down. The distance between the back and front rolls is also adjustable, to accommodate the machine to wool of different lengths of staple, this adjustment being effected while the machine is in motion. In short, the machine was invented by a practical man, and has satisfied intelligent and disinterested manufacturers that it must come into general use, and effect a revolution in the mode of spinning wool. The frame shown in fig. 1 has spindles on only one side, but the design is to make the frames double, with spindles on both sides.

Patents for this important invention have been secured in the United States and in the principal countries of Europe, the American patent bearing date May 8, 1860.

Further information in relation to it may be obtained by addressing George W. Wiggins, at Watertown, N. Y.

LETTER FROM OUR WASHINGTON HOUSE.

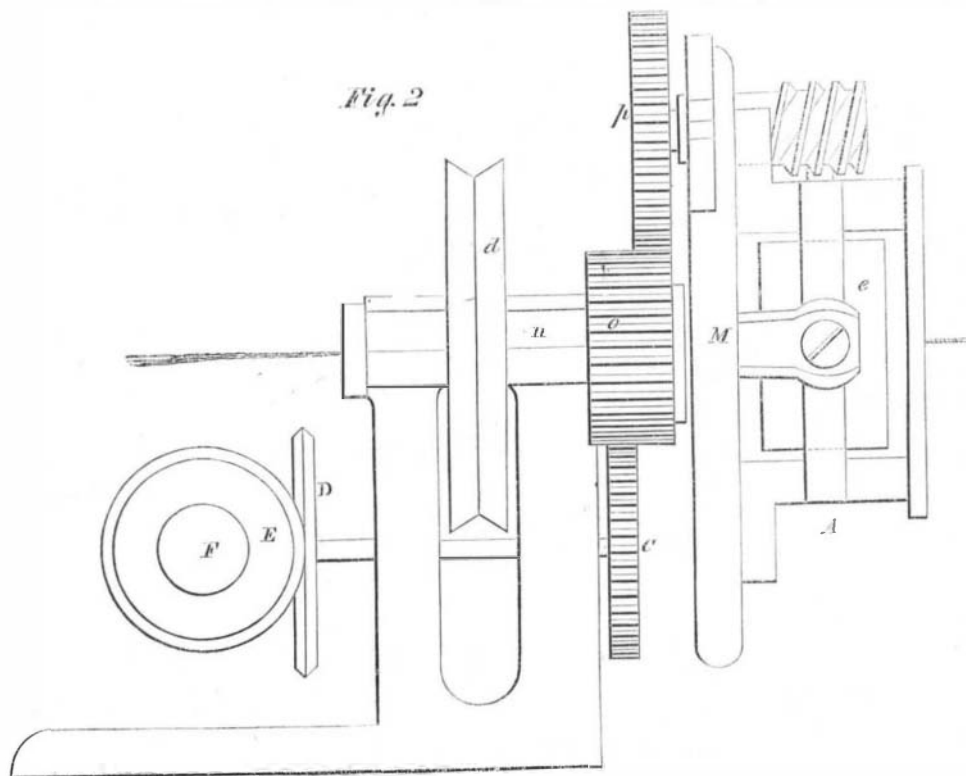
WASHINGTON, June 19, 1861.

You have recently noticed with favor the appointment of John L. Hayes to the office of Chief Clerk of the Patent Office. He is regarded as a gentleman of marked ability, and has received a legal education. He has, moreover, acquired some familiarity with the workings of the Patent Office, by some years' practice before that bureau in the capacity of attorney.

The labor of systematizing the printing of the Letters Patent, as required under the new law, goes steadily on, but some weeks must yet elapse before the printed copies can be made ready for prompt delivery week by week. The entire weekly issues from the 5th of March to the 4th of June, inclusive, are now in the hands of the printer. The first will probably be ready for delivery shortly after the 1st of July. We have seen some of the proofsheets, and find them to present a very creditable appearance. The

exchange of accurately printed copies of patents for the "scratched" and interlined and oftentimes incorrect manuscript copies which have been formerly provided, will be hailed with joy by all who are accustomed to consult or use such documents.

Knowing the importance to your numerous readers of the prompt and regular publication in your columns of the claims of patents granted, we continue to urge forward their dispatch as promptly as possible. When the printing office shall have systematized its portion of the labor, the Patent Office will not be behind-hand; but with the issues of thirteen weeks in the printer's hands at once, confusion and delay are unavoidable. It is the intention to have the printed copies ready before the close of the week in which the patents are issued; and when this is done, there will



be no difficulty in your having the claims in time for prompt publication, as heretofore.

One highly beneficial feature of the new system will be the demand for accuracy and artistic skill in the preparation of drawings, and correctness and perspicuity in the preparation of specifications. The eighth section of the new patent law, approved March 2, 1861, gives authority to the Commissioner to "require all papers filed in the Patent Office, if not correctly, legibly and clearly written, to be printed at the cost of the parties filing such papers;" and we are assured that this, as well as the twentieth section of the new "rules and directions" (relating to drawings), will be rigidly enforced as soon as the officials having the matter in charge shall be able to do so. "Large bodies move slowly," and reforms in such an institution as the United States Patent Office cannot be perfected in a day, much as their necessity may be felt. Certain it is that the public have long enough been subjected to the injury and inconvenience of patents granted under the seal of the United States, which are based upon faulty drawings and specifications, and the sooner this great evil is ended the better it will be for all parties.

Letters Patent of the United States have just been awarded to Willis E. Moore, of Crawfordsville, Ind., for an improvement in cartridges for large guns, the object being to so construct the metallic casing of the cartridge that it will be automatically discharged from the gun simultaneously with the flight of the ball.

The cartridge is used in the same manner as the ordinary bag cartridge, and only differs from it in being metal cased and in the form of a cone, with two weak points in its sides. It is inserted at the muzzle, point first, so that the apex of the cone comes against the breech, having around it an air chamber in the rear of the ball and cartridge. When the charge explodes, the gases, passing through the weak points in the casing into the air chamber, instantly expel the casing from the gun after the ball.

Practical test of the invention proves that it effectually accomplishes the object in view, and obviates

the necessity of swabbing. It will therefore prove a valuable improvement.

Mr. Moore recently visited this city for the purpose of laying his invention before the government, and received a permit from the Ordnance Bureau to experiment with it at West Point.

Variable Springs in Wisconsin.

Messrs. Editors:—In answer to a former communication, you remark in a late number that you cannot answer my queries in regard to the rising of water in our lead mines during the prevalence of southerly winds, without knowing the geological character of this country. I will, without further delay, offer a very brief and simple theory of my own, to account for this apparently mysterious "rising of the waters."

From a careful consideration of the subject, this increased flow of the water from sources below the earth's surface, and cut off from a free communication with the external air, is brought about by the diminished pressure of the atmosphere during warm southerly winds; whilst the elastic force of the common air or other elastic gases which are in contact with the subterranean sources of our springs, does not change simultaneously with the changes constantly taking place above the earth's surface.

Consequently when a part of the atmospheric load, as indicated by a barometer, is suddenly removed from the boiling fountain, the air pressure underground being the same, an increased flow of the waters for a limited time is the inevitable result.

W. N. R.
Lancaster, Wis., June 10.

Lambertville Contributions.

Messrs. Editors:—The ever welcome SCIENTIFIC AMERICAN came duly to hand, and was not long in telling its readers that you favored our town with a special notice in regard to the patriotic contributions. I have been courtmarshaled for incorrect reporting in that case. I meant to say, and am certain I did say, that our citizens had subscribed one thousand dollars per month. Your paper made it read one hundred dollars. It is a matter of little account to the public; but as a point of history, facts, &c., it is an odds of 9 to 1, which is quite an item to poor folks. I care more about it from the fact that very much of the good patriotism has been produced by the energy of our ladies.

T.
Lambertville, N. J., June 6, 1861.

The Flag.

Messrs. Editors:—In the SCIENTIFIC AMERICAN, No. 18, you give the proportions of the American flag, which differs materially from that authorized by the government, which is as follows:—The garrison flag is the national flag; it is made of bunting, thirty-six feet fly and twenty feet hoist, in thirteen stripes of equal breadth, alternately red and white, beginning with the red. In the upper quarter, next the staff, the Union, composed of a number of white stars, equal to the number of States, on a blue field, one-third the length of the flag, extending to the lower edge of the fourth red stripe from the top. The storm flag is twenty feet by ten feet; the recruiting flag, nine feet nine inches by four feet four inches. "U. S. Army Regulations," page 456.

HENRY A. COOK.
Newport, R. I., June 10, 1861.

A SOUTHERN merchant wrote lately to a large firm in New York, requesting a list of the names of those who supported and sympathized with the "movement against the South." The New Yorker replied by sending through Adams & Co.'s Express, a copy of the "City Directory."

Experiments with Ordnance—Effects of Projectiles on Iron Plates.

Some very interesting experiments, going to show the effects of projectiles upon iron plates, were made on the 7th inst. at the proving grounds near Pittsburg. The *Chronicle* states that a 12-pounder gun was loaded with a charge of six pounds of powder and a 12-pound ball, and discharged at a plate of iron, furnished from the works of Mr. Shoenberger, nearly five inches in thickness, and about two feet square. The plate was made up of six distinct plates, all bolted together, and manufactured from excellent iron. The effect of the shot was almost incredible. The distance between the gun and target was not measured, but was probably nearly 100 yards. At this distance the 12 pound shot penetrated three plates of the Shoenberger plate, dished the whole mass several inches, and partially broke through the remaining three plates. The ball was crushed to fragments, and the front hemisphere evidently half fused. The same effect on the ball followed each shot. The second plate tested was solid, and four inches thick, of best Juniata iron. The ball penetrated about 1½ inches, and dished the plate less than in the preceding experiment. The third experiment was with a 2-inch plate, which the ball so nearly broke through that a light hammer would have removed the fragment. The plates, in all the experiments were simply set on edge, with no other support than was sufficient to keep them in that position. The 6-pounder was proved by two charges of solid shot and 1½ pounds of powder.

While the experiments were going on, a gang of men had removed the columbiads from the cars, and set the entire lot (ten in number) in order for proving. Two of these guns were trained by the same gunner, with the same lack of means, on a fourth plate of iron, solid, about 18 inches wide, 3 feet long, and nearly 5 inches thick. The guns were loaded with 12 pounds of powder, solid, strapped shot, and wad. The cartridges were carefully picked, fuses affixed, and the lot touched off together, the heavy reports following in rapid succession. A cloud of smoke covers the muzzles, and a shower of sand the bank where the balls strike, and when these clear away, one or two heavy trees are found to have been knocked down. The lower half of the iron plate is half imbedded in the bank, with the half fused portion of the ball beneath it. The upper portion of the plates showed an indentation of about two inches, and a fracture completely through, further up the hill. The result of all the firing proves that at short range no ordinary or practicable iron sheathing would resist the power of columbiad shot. The second shot was fired with 15 pounds of powder and a shell, the guns were cleaned and inspected, and the day's work was done. In firing the columbiads, the breach was sunk in a slight excavation, in order to level the bore, yet such was the force of recoil that several of the guns jumped backward five or six feet. The work of inspecting and proving the guns on behalf of the government is now in the hands of Captain McNutt, who has been stationed for some time at the Alleghany Arsenal.

Steam Privateering Fleet.

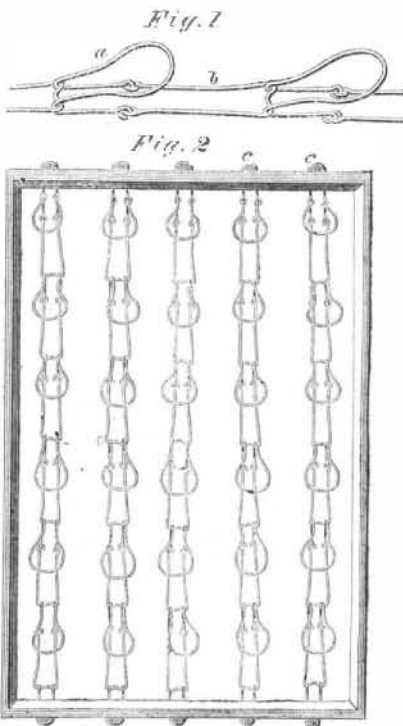
While the press adverts in glowing terms to the immense blockading fleet equipping at the North, they seem to forget that the South has, at the present time, the materials of an immense privateer fleet, capable of committing serious depredations on our commerce, and seizing American vessels in the Gulf and the Caribbean Sea. A combination of this fleet of armed vessels on any one point where but few United States vessels are employed in a blockade, might result in the capture of the latter. We have prepared a table of the names of the vessels now at the South, under the control of the rebel government. Many of these vessels were formerly engaged in the Texas, Havana and Key West trade. The legitimate owners of six or seven of the steamers reside in New York, but the rebels have confiscated and appropriated them to their own use. The following is the list:—

| Vessels. | Tons. | Vessels. | Tons. |
|------------------------|-------|-----------------------|--------|
| Atlantic..... | 623 | Suwanee..... | 494 |
| America..... | 372 | Star of the West..... | 1,172 |
| Gen. Miramon..... | 296 | Tennessee..... | 1,149 |
| Galveston..... | 945 | Texas..... | 1,125 |
| Habana*..... | 499 | W. G. Hewes..... | 1,100 |
| Mexico..... | 1,059 | W. H. Webb*..... | 500 |
| Maguola..... | 843 | Matagorda..... | 425 |
| Marquis de Habana..... | 688 | Calhoun*..... | 525 |
| Total tonnage..... | | | 11,815 |

*Now armed and cruising in the Gulf of Mexico.

COOK'S ELASTIC SPRING BED BOTTOM.

One of the wonderful discoveries of this century is the fact that so hard a metal as steel makes the very softest chair, sofa or bed. Since the introduction of spiral springs in the manufacture of seats and beds, several plans have been proposed for using the same material in either lighter or cheaper form, and one of the most novel of these is represented in the accompanying engraving.



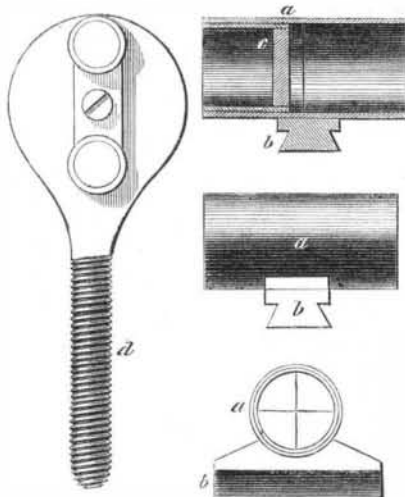
A series of chains, formed of the bent loops, *a*, and connecting links, *b*, in the manner plainly shown in fig. 1, are stretched across a rectangular frame from end to end, as represented in fig. 2. The chains are stretched to a proper tension by wedges, *c*, at their ends; and they are so arranged that all of the loops will be inclined in the same direction, as shown.

It seems to us that this is one of the best plans for a bed bottom that has been invented. It is light, cheap, simple and easily made.

The patent for this invention was obtained through the Scientific American Patent Agency, May 21, 1861, and further information in relation to it may be had by addressing the inventor, W. C. Cook, at Appleton, Wis.

VALLANCE'S TELESCOPIC SIGHT FOR RIFLES.

Any person who has practiced firing rifles at long range, is aware that one of the principal difficulties in obtaining accurate aim is the impossibility of seeing a distant object of small size through the sights. It has long been common to employ telescopes on



heavy rifles intended for very long range, but as ordinarily constructed they are cumbersome and inconvenient, and we have often wondered why some ingenious inventor did not arrange the lenses on the rifle barrel without any connecting tube. We now find in the *Mechanics' Magazine* the following description of this very arrangement. It seems to us that it would be better to surround the back sight as well as the fore

sight with a short tube; though if the plan here represented makes a clear and powerful glass it is more simple and therefore better:

The invention consists in combining with a rifle or other fire-arm, or with a piece of ordnance, a telescope on the Galilean principle, and having cross wires or other suitable sighting points near the object glass of the telescope. The arrangement the patentee prefers is this:—He employs as a foresight a tube or frame containing cross wires, and immediately behind the wires he places a convex lens. For the back sight of the telescope or plate or disc is employed, having a small perforation in it through which the sight is taken, and so arranges the plate or disc that the perforation can be adjusted in position to give the requisite elevation for different ranges. Near or on this perforated disk a concave lens is placed, so as in combination with the lens of the foresight to form a Galilean telescope. On looking through the perforated disk the cross wires of the foresight will be clearly seen, and their point of intersection may be made to cover any object which appears in the field of view of the telescope.

The annexed engraving illustrates the foregoing:—*a* is a short tube attached to the muzzle of the rifle; *b* is a dovetail attached to the tube, and which entering a corresponding notch in the muzzle of the barrel sustains and holds the tube in its proper position; *c* is a magnifying lens, the focal length of the lens should be for a long Enfield rifle 45 inches; cross wires are placed in the tube immediately in front of the lens, or in place of these cross wires the ordinary sight may be employed. The tube, *a*, in this case not carrying the cross wires, but being arranged so that the lens may come immediately behind or before the foresight of the rifle. *d* is the back or elevating sight of the rifle, this is screwed into the stock and caused to project a greater or less distance from the stock according as the range at which it is desired to shoot is long or short; the stem of the sight being graduated it is easy (by turning it in one or other direction) to bring it to the elevation required for any given length of range. There is a small perforation in it, through which the sight is taken in aiming. This hole is made as small as it can be made to allow a sufficient amount of light to pass to the eye. Immediately behind this aperture a concave lens is placed, of the power requisite to produce clear vision for the rifle shown. A No. 4 spectacle lens for short sight is suitable: the same will also do well for a long Enfield rifle. In the arrangement shown, the back or elevating sight is shown fitted with two lenses; they are mounted on arms which turn about a center, so that one or other of the lenses, as desired, can be brought opposite the aperture. The object of thus employing two lenses is, that they may be made of somewhat different focal lengths, and then the person using the piece will select the lens which he finds best suited to his sight. Sights similarly constructed are suitable for other fire-arms and for ordnance.

Care for Soldiers.

In the Crimea, the troops which resisted privations and fatigue most successfully, were those commanded by colonels who were careful of their soldiers. For example: of two regiments which left the camp of St. Omer at the same time, arrived together in the Crimea (in the month of October, 1855), encamped side by side, having submitted to the same atmospheric vicissitudes and performed like service, one of them had preserved, on the 1st of April, 1855, 2,224 soldiers, out of a force of 2,676 men; whilst the other, with a force of 2,327 men, had left to it only 1,239. This account includes those who died from disease, and not from wounds received in battle. In the navy the commander of a vessel watches over the composition of the food of the crew, and moreover, respects scrupulously the hour for breakfast and that for dinner; never is it delayed, anticipated or interrupted.

It is desirable that the same scruples should pervade the army, and that these wise measures for the preservation of health should never be infringed without a clear and absolute necessity. Rewards are given to colonels of cavalry in whose squadrons is preserved the greatest number of horses, which results in an excellent and profitable emulation. Similar results, but still more important and happy, would be experienced, if like rewards were bestowed upon the colonels whose battalions were distinguished for the healthy condition of the men.

BLESSINGS OF SECESSION.—A correspondent, writing from Texas, says:—

Owing to the present national difficulties, Northern travel, as a matter of course, has fallen off, and it leaves some of our principal hotels in rather an embarrassed state. The hotels in this city have been supported almost entirely by Northern custom; now that prop fails them, their prosperity ceases. The Island City House, the finest in the city, is about to succumb to the hard times; the Tremont House, a fine hotel, will soon follow. The Strand, the principal business street of this city, which, at this time of the year has been usually lively, now looks deserted and lonely. Business in this city is perfectly stagnated. Merchants are disheartened, and most of them are closing out their stocks at an immense sacrifice. There is no sale for any thing but corn, bacon, and flour, and these are held by speculators at enormously high prices.

PREPARATIONS FOR A CAMPAIGN.—The Acting Quartermaster-General has ordered the construction of one thousand wagons for the use of the army, to be equally divided among ten different manufacturers.