too dull, the muzzle is dry, or the milk is lessened, or rumination is irregular, or there is a fondness for remote corners of the field or yard—little things, we admit, but wonderfully significant when taken in connection with the prevalence of the disease in the neighborhood. All this time the breathing remains undisturbed.

After a while, the deposit advances sufficiently far to diminish the respiratory surface, and then, as a natural consequence, the animal is compelled to breath more quickly: and be it observed that the frequency of the respirations will be in proportion to the amount of obstruction. From the irritation and oppression the pulse becomes now excited, the digestive functions are impaired, the blood in the lungs is only partially purified, and general emaciation follows, until, at last, the animal is a living skeleton.

During the whole career of the affection, we find no sudden changes—everything is gradual, the breathing and pulse are gradually quickened, the body gradually wastes; in short, nothing like acute disease can be perceived, and one is unwittingly lead to wonder how it could have been confounded with inflammation for so long a time after its appearance.

Passing from these considerations to the question of liability, we discover that the subjects are very diverse. Animals in weak condition, milking cows, and fatting oxen, seem alike its victims; and, in one county or other, either of these classes is occasionally specially selected. The animal most secure is, without doubt, the one in the highest state of health. Working animals that have been well fed, and possess what is called hard condition, are the most exempt. On the other side, all those exposed to debilitating influences, whether referring to food in excess or defect, to disproportionate work or bad stable management, are in a condition favorable for the attack, should the specific cause reach their neighborhood.

An important question occurs as to the contagious nature of the malady. Much difference of opinion exists on this point; but, certainly, no exact evidence can be advanced to show that it can be transmitted from one person to another, in any way, not even by direct inoculation. Still, we would be understood as advocates for precaution; no good can result from allowing the contact of healthy and diseased subjects. So should the farmer act, as though every affection among his stock was infectious in its nature.

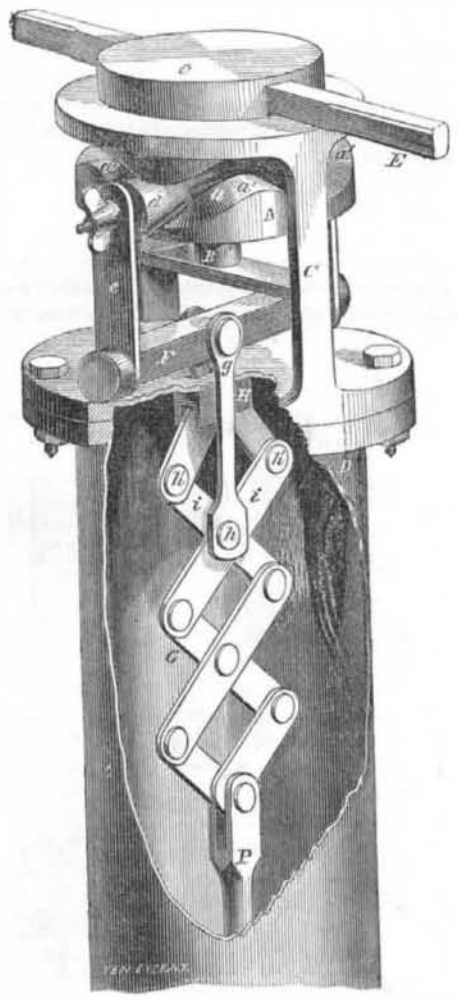
Treatment: On this point we must of necessity be concise. Confining ourselves to the consideration of the principles, and leaving the practice to the discrimination of the attendant, our conclusion as to the positive nature of the affection will decide our system. We have admitted the presence of a highly fibrinous blood, with a sluggish circulation through the lungs, as the principal evils. The indications obviously are, then, suggestive of measures calculated to dissolve and lessen the fibrin; and, to keep the blood in motion, any agents which, alone or in combination, will do this, recommend themselves. Ammonia in any of its active forms is among the best; it seems to have a particular power to keep the blood fluid, and combines the property of a stimulant. The use of this drug externally and internally we have found most successful; we do not suggest it as a universal cure, but we claim for it the importance belonging to it as an alkali and stimulant. Fancy may be allowed some play, and any plan which shall include the use of alkalines, stimulants and tonics, with counter-irritants externally, is, at least, founded on correct principles.

Prevention is proverbially to be sought before even cure; but, unhappily, we can only have recourse to generals in speaking of it as applied to this disease. At one time inoculation was thought to be as valuable as the vacine disease in its preventive influence. Among the Germans the belief even now obtains in its favor, but more extended experiments have demonstrated that pleuro-pneumonia cannot be transmitted by inoculation, nor any immunity obtained by the performance of the operation. As we have hinted, attention to the general health, the use of every measure calculated to promote good condition, will do much; beyond this it seems we possess no control over the attacks of the malady or the susceptibility of the system.

THE *Atlas* steamship, belonging to Messrs. Burns & McIver, of Liverpool (England), has all her interior iron-work, even to her tanks, coated with zinc.

IMPROVED PUMP MOTION.

The most common motion that is applied to the pistons of upright cylindrical pumps is a vertical reciprocating one—up and down alternately. The engraving illustrates an entirely different motion applied as the first effort, although the piston has the usual up-and-down action. The invention consists in the arrangement of a horizontally rotating cam disk in combination with a rising and descending yoke, and with a series of lazy-tongs (expanding and contracting cross levers), in such a manner that, by rotating the disk, a rapid reciprocating motion is imparted to the piston.



A represents a disk provided with a cam groove, *a*, and it is attached to a vertical shaft, B, which has its bearing in a frame, C, that is firmly secured to the top of the pump barrel, D. The shaft is rotated by the levers, E, and they are inserted into proper sockets, as represented. The cam groove, *a*, forms the guide for friction rollers, *d*, which are secured to the upper ends of arms, *e*, and project from the yoke, F. The shape of the cam groove is such that, on rotating the disk, the yoke is made to rise and descend several times during each revolution of the shaft. The cam groove has four projections, *a'* forming a uniform wave line, causing the friction rollers, *b b*, to rise and descend. Any number of such elevations and depressions may be employed to give such a number of strokes as may be required during each revolution. The yoke, F, connects by rods, *g*, at the side, with the second pair of links, *i*, of the lazy-tongs, G, through a pivot, *h*. The ends of the first links of the lazy-tongs pass through a bracket, H, and the ends of the lower links are embraced in the fork of the piston rod, P, and held with a pin, as shown in the open section of the pump barrel. By moving the yoke, F, up and down by the horizontal rotation of the plate, *c*, of shaft, B, the whole series of lazy-tongs are extended and contracted alternately, and this moves the piston rod, P, up and down in the barrel, and also the piston which is attached to the lower end of it.

It is believed by the inventor that pumps can be operated in this manner with much greater ease than by the common up-and-down lifting motion that is usually applied.

A patent was granted for this invention on June 12, 1860, and further information may be obtained by addressing the inventor, Edward Wade, of Norwich, Conn.

NATURAL PRODUCTS AND MANUFACTURES OF VIRGINIA.

MESSRS. EDITORS:—I ask a small space in your columns, as I am otherwise unable to answer the numerous inquiries of your readers in relation to the minerals of this State, since the publication of my note on "American Manganese" (page 338, Vol. II, SCIENTIFIC AMERICAN), and this letter, I propose, shall give such information as most of them seek.

I am as much surprised at the present manifestation of interest and inquiry in relation to our minerals and their development as I have been surprised that the most promising mineral, mining and manufacturing portion of this State or, in fact, this continent, has been so long neglected, and its great value and importance so little known. I will not pretend to give a geological description of Virginia. I will only say, in a few words, no State or no country in the world can be richer than this in the useful minerals, and particularly coal and iron. Even the great manufacturing State of Pennsylvania is behind us in natural resources. Your readers need no other proof of this than a reference to a map of this State or the country, with such geological knowledge as we must suppose most of your readers to possess. We see the great Appallachian chain of mountains rising from the lakes of the North and disappearing below the alluvial of the Gulf States. This great mineral range reaches its climax in the heart of Virginia, and her rivers, running from the summit of the Alleghanies, cut a geological section from the highest or latest formations down to the lowest and oldest. We may say all the strata of every geological formation lie opened like the leaves of a tablet, and the riches of the mineral kingdom lie temptingly exposed. Every mineral peculiar to this country must here exist. I cannot point out the many coal fields and mineral deposits; but I wish to call attention to one magnificent region where the mineral wealth of Virginia seems centered, and where all the lavish gifts of bountiful Nature are represented. See where the great Kanawha enters the Ohio; trace it up through those vast deposits of coal and salt. More fuel and oil and gas lie beneath the mountains that cast their vast shadows over its dark waters than would supply the world for hundreds of ages. But do not be satisfied with these small items; further up it cuts the mighty Alleghanies to their base, with all the lower ranges of accompanying mountains that rise like steps on either side. Here we have the coal, iron, limestone, lead, manganese and most of the minerals from the carbonaceous down to the lowest silurian. Above this, we enter the great limestone formation peculiar to the valley of Virginia, and which extends, with the same characteristics, from Tennessee to New York. But here it is higher than at any other point, and is surrounded by resources of natural wealth not found in such close proximity at any other spot known.

Where the Virginia and Tennessee Railroad crosses this river (here known as the New River) seem centered all the availabilities that the miner and manufacturer could desire. The river descends from the mountains of North Carolina and Virginia through inexhaustible deposits of iron, copper and lead. The iron ores are almost as plentiful and profuse as the common rocks, and are not now more noticed or valued. The copper has recently attracted much attention and has been extensively developed in quantity and quality beyond doubt or speculation. Lead has been mined in the neighboring county of Wythe for one hundred years, and still the "Old Wythe Lead Mines" are actively worked with a profit of over fifty per cent to the operators!

Limestone is the most plentiful rock and forms the bed of the river for some sixty miles, and the bed or grade of the railroad, crossing the river, between two and three hundred miles; altogether forming one of the richest agricultural regions in the world, I believe, without exception. A coal field of considerable extent crosses the river some ten miles below "Central," or the point of reference where the railroad crosses the river. It has been sufficiently developed to demonstrate its great practical value, and contains anthracite, semi-anthracite and bituminous coal. It is now used extensively on the line of the railroad and found to be pure and durable in character.

In the center of a rich agricultural district we find the richest mineral deposits—coal, iron ores and limestone.

—within a stone's throw of each other; not the lean ores of the coal field nor the impure ores used in many parts of this country, but rich brown hematite, and a coal that requires no carbonization for smelting purposes. Where else do we find so many facilities and natural advantages? Here too, we can obtain a vast and almost unlimited water-power, with a healthy location and a climate of the most delightful and grateful temperature, not so hot even as eastern Virginia nor so cold as the latitude of Philadelphia. Located in the midst of the richest mineral region, and surrounded by fertile, productive and extensive plantations and farms, in a congenial climate and blest with every advantage Nature can supply, we also find every inducement to attract enterprise and wealth, the best promises for remunerative investment and the greatest scope for practical acquirements, with an almost unlimited future for progressive industry and a certain and ample reward for every proper exertion.

The cotton of the South is very accessible, and the wool of the West can also be very easily obtained. Even the surrounding counties produce vast quantities of sheep. The finest upland pastures exist on the mountains of Virginia, and millions of cattle and sheep go to Baltimore and our own cities yearly. Then its advantages as a manufacturing locality are not greater than its facilities to the best markets in the world. The entire South and West, and even the North-east, as far as the waters of the Chesapeake, are open (by rail and river) to every class of manufactured goods, and almost all kinds of goods may be fabricated here, since the raw material and every natural facility exist in abundance. Capital, Enterprise, Experience and Industry may and will make Central the rival of Pittsburgh and Lowell. But this great inland site of a city-in-embryo scarcely deserves the name of village. Its gently-rising slopes are still covered by fields of waving grain and groves of sturdy trees.

A gigantic scheme has been suggested for the development of the mineral and manufacturing interests of Virginia The enterprise centers in Central This magnificent site may and should be made available, since the result of such a development would confer more benefit on a larger number of people than the consummation of any project now before the world No bonds are so strong as self-interest. The same policy that applies to Pennsylvania naturally applies to Virginia. It is the only plan to fully develop the border States—to make their people see clearly their own best interests—to prove to the South the value of all manufacturing processes, the wisdom of home protection and the true principles of political economy. It will open another great outlet to the trade of the boundless West and give a new impetus to the entire industry of the South.

Ten millions of dollars would open the great Kanawha to Central, and would complete a canal to the head of our present navigation; would bring steam from the Mississippi and the Ohio to this point, and thus, either canal navigation or railroad would connect with Richmond and the magnificent harbor of Norfolk—265 miles by canal and 220 by railroad would connect with the tide waters on the James Through these channels a great proportion of the trade of the western waters would pour, and the great undeveloped trade of the south-west parts of Virginia, North and South Carolina, Georgia, Tennessee and Alabama would buy and sell to the North through those channels. A short canal —only 65 miles—would be crowded as soon as completed with the trade of an unlimited interior—a manufacturing city without limit in extent or means might be thus built up—a great State might be fully developed—a people might be enriched and otherwise profited—an immense trade might be driven from new sources and through new channels—a vast harbor for the idle ships of the North would be opened—a new field for capital, enterprise and labor would be presented, and a fruitful source of gain and profit would thus be secured to all interested. It is time the capitalists of the North should turn their attention from the West to the South. The engineers and agents of France are now here, and if the field is left to them, "our bonds must break." It is their policy to weaken our ties, if they would profit.

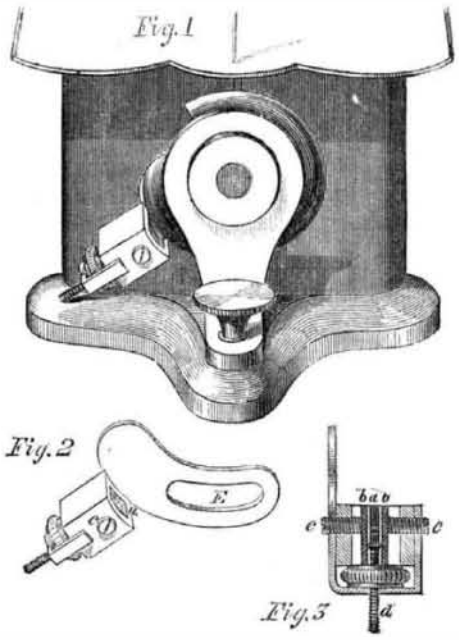
S HERRIES DEBOW.

Richmond, Va., July 14, 1860.

MORTONS' LOOP CHECK, ADAPTED FOR THE WHEELER & WILSON SEWING MACHINE.

We do not believe there is to be found in the whole world of mechanism a more ingenious contrivance than that for passing the lower spool of thread through the loop in the upper thread formed on the return of the needle in the Wheeler and Wilson's justly-celebrated sewing machine. In the first place, the form of the spool is such as to enable it to be passed through the loop and returned with a reciprocating motion of very small extent, thus permitting the motion to be slow though performed many times in a second. Then the loop is carried around the lower spool by a revolving hook, using the rotary motion which may receive a high velocity without shock or jar. It is well known that the greatest practical annoyance which has been encountered in using these admirable machines is in the adjustment and removal of the leather pad which holds the thread upon the looper until the proper point is reached for its release. The invention which we here illustrate is intended to obviate this difficulty.

It consists in the substitution of a fine hair-brush in place of the leather pad, and in the arrangement for its convenient and delicate adjustment, which the accompanying engravings illustrate. Fig. 1, in the annexed cut, represents the looper of Wheeler & Wilson's machine with the brush attached, and Figs. 2 and 3 are views of



the brush and its case detached from the machine. The fine, flat hair-brush, *a*, is placed between two iron plates, *b b*, the pressure of these plates against the hair varying the rigidity of the brush, and being regulated by the screws, *c c*, by which also the lateral position of the brush may be adjusted. The pressure of the brush against the looper is regulated by the screw, *d*, and the slot, E, permits the position of the brush case to be adjusted upon the machine.

This invention was patented, July 26, 1859, by J. W. Morton, of Hopkinton, R. I., and its comparative advantages are thus stated by the inventor:—

First: It is composed of hair which is permanently elastic, and never becomes hard.

Second: It never requires any oiling; therefore, there is never any danger of soiling the work through its agency.

Third: It can be more nicely adjusted than any other. There are three independent adjustments to this check, while no other has more than two. The lateral adjustment by means of set screws, which is peculiar to this loop check is very important, and even indispensable in very fine work. The others may happen to be right, but this can be set within the one-hundredth part of a hair's breadth of its true position.

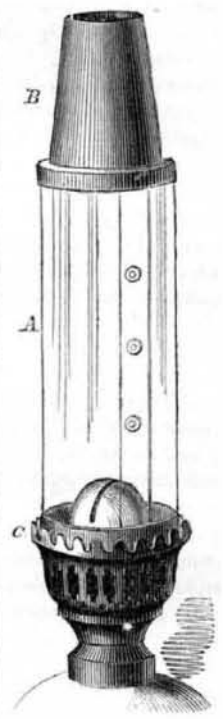
Fourth: It is remarkably durable. Perhaps no substance yet discovered will wear so long as fine hair, in contact with a smooth metallic surface.

Fifth: The perfection with which it works saves the time, the patience, and the temper of the operator.

Any further information in regard to this invention may be obtained by addressing Cottrell & Babcock, who manufacture the attachments at Westerly, R. I.

HUMPHREY'S MICA CHIMNEY FOR LAMPS.

To burn coal oil a chimney is indispensable on the lamp; and as this oil is coming into almost universal use where gas is not introduced, the demand for lamp chimneys is becoming enormous. All who have had experience with these articles are aware that they are usually made of very thin glass, to prevent being cracked by the heat, and are consequently fragile, and the source of constant annoyance and considerable expense by breakage. The invention which we here illustrate effectually remedies this difficulty.



The chimney is made of a thin plate of transparent mica, bent in the form of a cylinder, A, and riveted at the joining edges as shown. A metal cup, B, is fitted to the top to receive the shade, and a metal base, C, is secured to the bottom to support the chimney upon the lamp. It is for this combination that the patent is granted. Many will say this is a very small and trivial affair, on which to take a patent, but it is, notwithstanding its simplicity, one of the most useful and practicable inventions of the day.

The patent was procured through the Scientific American Patent Agency, July 17, 1860, and persons desiring further information in relation to it should address the inventor, J. Y. Humphrey, at No. 321, North Second-street, Philadelphia, Pa.

THE ECLIPSE.—The wonderful accuracy of astronomical observations and calculations was again shown by the occurrence of the solar eclipse on the 18th inst., at the exact instant which had been so long before predicted. As the little hand on the astronomical clock came to the fraction of a second which had been announced, the dark form of the moon, moving along on her appointed course, was seen to come in line between us and the edge of the sun. The morning here was clear and the eclipse was generally seen by our citizens, but the most accurate and valuable observations were made by the amateur astronomer, Mr. Rutherford, through his large equatorial telescope, which was used for taking ten photographs of the sun, showing as many phases of the eclipse, and a remarkable cluster of spots upon the sun's face. These have been published and are for sale by Rintoul & Rockwood, 839 Broadway, this city.

HEAVY FAILURES IN THE LEATHER TRADE.—A crisis has occured in the hide and leather trade of Great Britain, and some failures are announced; the list is headed by the large house of Stratfield, Lawrence & Mortimore, of London, with liabilities estimated at $5,000,000. This failure has produced a great sensation throughout London and the provinces, and a long list of other houses are reported to have succumbed, with liabilities amounting (so far as the facts are announced) to about one million dollars more! The entire leather business has thus been thrown into confusion and the value of English hides has fallen 30 and 40 per cent. The American houses in Liverpool in the hide trade are not compromised.

TOMATO CATSUP.—As the time is at hand for enjoying this favorite sauce, the following is a very good receipt for preparing it for future table use:—To a half bushel of skinned tomatoes, add one quart of good vinegar, one pound of salt, a quarter of a pound of black pepper, two ounces of African cayenne, a quarter of a pound of allspice, six good onions, one ounce of cloves, and two pounds of brown sugar. Boil this mass for three hours, constantly stirring it to keep it from burning. When cool, strain it through a fine seive or coarse cloth, and bottle it for use. Many persons omit the vinegar in this preparation.