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NEW SERIES.

Improved Screw and Tapping Machines.

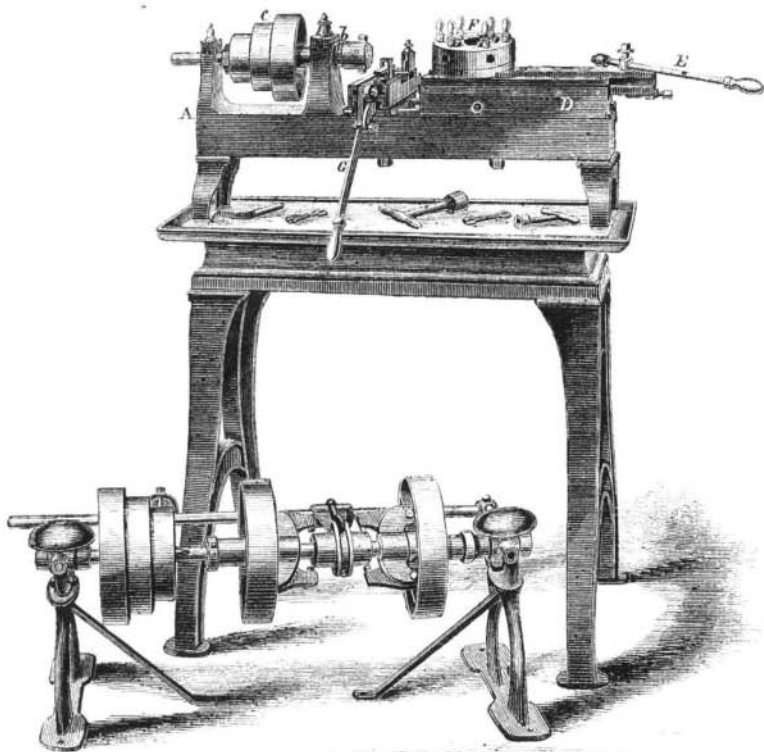
We wish that every mechanic in the country could see the machines from which the drawings for the accompanying engravings were made. They stand in our office, and in perfect accuracy of workmanship, are not merely a credit to the manufacturers, but are an honor to American mechanics. They are designed for cutting screws by steam or other power, one machine being constructed to cut the external threads on the screw, and the other for cutting the thread of the receiving or female screw.

SCREW MACHINE.

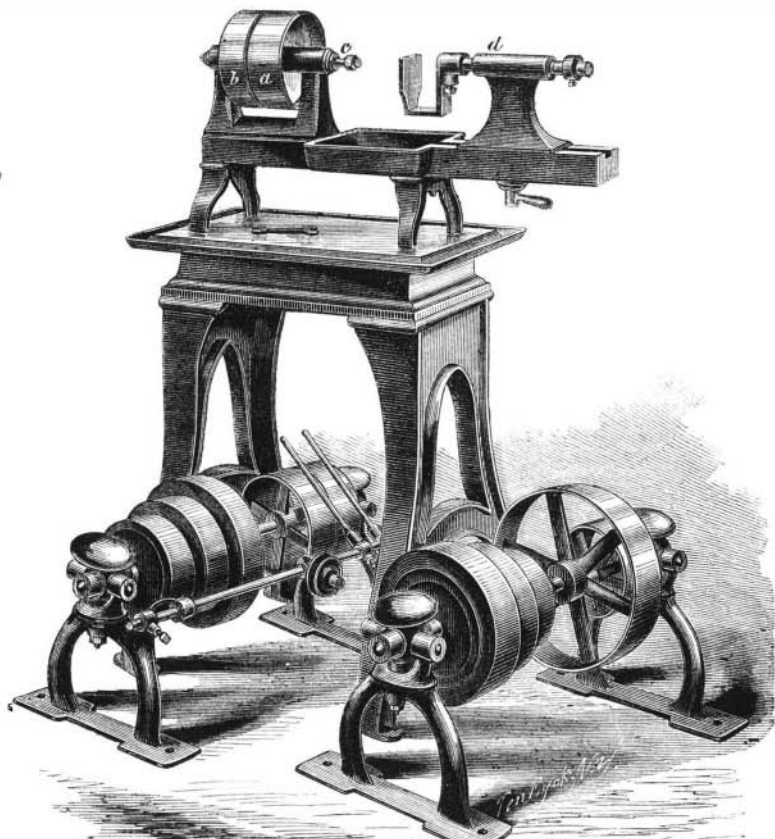
Want of uniformity in the screws used in connecting parts of machinery is a source of trouble and ex-

penditure by the screws in the side of the upright. The spindle has only one flange or collar, which is outside of the front box. Between this flange and the end of the box is a hardened steel washer. The cone pulley, c, is well fitted to the arbor and kept from turning by a spline. Back of the pulley is a nut by which the pulley can be forced forward and its hub kept up to the rear end of the front box. By this means the front journal can be readily kept tight, though considerable wear should take place. The rear box is made in two parts in the usual manner. Should the spindle heat by continued use, it will not bind endwise, nor will its expansion lengthwise affect the accuracy of work done on the machine. The spindle is

the edge of this head are six or seven holes radiating from the center, which serve to hold the mills, cutter and dies used in making the screws. The head is held very firmly in its place, while the cutters are operating, by a steel pin, which comes up through the piece on which the revolving head rests at the point nearest the line spindle. This pin is hardened and slides through a hardened steel bushing, and the upper end, which is tapered, enters into hardened bushings in the bottom of the head. These steel bushings are ground inside and out after hardening, and the pin is afterward ground into them, so that the point fits them all alike. This pin is withdrawn when the long hand lever is moved back by means of a short



BROWN AND SHARPE'S SCREW MACHINE.



BROWN AND SHARPE'S TAPPING MACHINE.

pense both to the manufacturer and operator, so that in many cases what was at first supposed to be the cheapest article, becomes in the end the most expensive. The difficulty in producing screws perfectly uniform and interchangeable has been principally owing to the imperfect machinery used; imperfect not only in workmanship but in construction, and especially wanting in devices to compensate for the wear which will unavoidably take place in the running parts.

The annexed cut represents a screw machine which in its general construction is not new, but it has some novelties which will be noticed in the following description. The bed, A, which is of cast iron, is quite heavy, and has at one end two uprights cast solid with it, into which are fitted bronze boxes to support the spindle. The front box, b, is made in four parts to close up for wear, the two middle pieces being forced in horizontally toward the center of the spin-

hollow and is provided with a hollow spring collet, in which shells of different sizes (which are cheaply made) are inserted, for holding the wire. The rear end of this collet is round, and fits the tapering hole in the end of the spindle. The front end is squared, and fits a hole in the chuck or collar, which screws on the end of the spindle. In this chuck are two screws bearing on opposite sides of the square end of the spring collet, by means of which the wire is centered, after which it can be moved, and still kept central, by loosening only one of the screws. At the other end of the bed of the machine, resting upon two V-shaped ways, is a rectangular piece, D, which can be fastened at any point by a bolt from underneath. Upon and attached to this is another piece, which is fitted to slide in a direction parallel to the bed, and is moved by a long hand lever, E. On the end of this sliding piece nearest the spindle a round head, F, is so arranged as to revolve horizontally. In

lever, of which the fulcrum is attached to the sliding piece, which supports the revolving head, one end being connected with the pin and the other striking an inclined plane in the lower piece, which is fastened to the bed. The extreme back motion of the long hand lever, E, brings a star wheel on the under side of the revolving head in contact with a dog projecting upward from the lower piece, which causes the head to revolve far enough to bring the next tool in a position ready to operate on the wire. When the hand lever is brought forward, the star wheel slips over the dog, the pin enters the hole in the head, being forced up by a spring acting on the rear end of the short lever, after which the cutter commences to operate. There is an arrangement whereby any wear in the center hole of the revolving head can be compensated for. On the other end of the sliding piece, projecting underneath it, is a screw which can be set to limit its motion. The tools in the working

head are each held by two screws, by loosening which they can be moved endwise to make the adjustments required for the different cuts on the work. Between the spindle and revolving head, and attached to the bed, is a slide rest, operated by a hand lever, G. It has two tool posts, one at the back, sliding in a groove parallel with the ways of the machine, and one in front, sliding in either one of two grooves, side by side, but at right angles with each other. The bottom of this rest is planed on the ways of the bed, and can be moved upon them to any position required. Two tools are used in these for cutting off, pointing, or grooving. The motions of both these tools are limited by set nuts upon a screw underneath the rest. The lathe bed has short legs and is set upon an iron table having a channel around the edge to catch the oil. The overhead work has two patent friction pulleys to reverse the motion of the arbor. Several sizes of these machines are made—the largest suitable for screws like the breech pin of the Springfield rifled musket, and the smallest for screws $\frac{1}{8}$ to $\frac{1}{2}$ -inch diameter, and for drilling gun cones. On the large machines a hand wheel, with rack and pinion, is used to operate the tool head.

The overhead pulleys, with the hangers in which they run, are represented in a reversed position on the floor beneath the machine.

These machines will be found very useful in any machine shop for making all kinds of set screws and studs at half the usual cost, and of perfectly uniform size. They have been introduced into the U. S. Armory at Springfield, and into many of the private gun manufactories throughout the country.

Gunmakers and others desiring further information can address the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.

TAPPING MACHINE.

All machinists have experienced the tediousness of cutting screw threads in nuts or other parts with a tap worked with an ordinary tap wrench. Various devices have been employed to facilitate this operation, especially when large numbers of holes of small diameter are to be threaded. The tap is sometimes fixed to the spindle of a lathe and motion given to it in either direction by means of a belt pulled by the hand of the workman, or in some cases, where the lathe has a reverse motion, by power. When the piece to be tapped is too large to admit of this method, a tap fixed in a bit stock is tolerably efficient. A machine has occasionally been used in which the tap is severed by means of a treacle. But most of the arrangements in common use are objectionable either on account of being too slow, want of accuracy in the work performed, or the expense occasioned by the frequent breaking of taps.

The machine shown in the annexed cut is intended to obviate these difficulties. In its general appearance it resembles an ordinary lathe, the two pulleys, *a* and *b*, in the head, are, however, independent of each other, one having an axle extending to the right and the other to the left. These axles pass through holes in the ends of the head stock, and are thus supported but left free to revolve. Through the axes of the axles of both pulleys a hole is bored in which an arbor is fitted so as to slide freely, and to one end, *c*, of this arbor a tap is secured. In the middle of the arbor a mortise is made in which is inserted a flat piece of steel about three inches long. This piece stands at right angles with the arbor, projecting an equal distance on both sides, and comes between the two pulleys when the arbor is in place. It acts as a dog by which the arbor is revolved. In the side of each of the two pulleys, between which this dog is placed, are two small studs. These are designed to catch the dog and thereby revolve the arbor, but the distance between the outer ends of these studs in the opposite pulleys is sufficient to leave the dog free from both, so that the arbor may be at rest when both pulleys are revolving. The pulleys are driven in opposite directions, and by pressing the piece to be operated upon against the end of the tap, the arbor is moved endwise, and engaged by means of the dog and clutch screws with one of the revolving pulleys. This gives motion to the tap, causing it to enter the hole in the work and cut the thread. A slight movement of the work in the opposite direction, reverses the tap by moving the arbor endwise sufficiently to disengage the dog and connect it with the other pulley. The foot or tail stock, *d*, carries an

arbor which slides freely, but is prevented from turning by a spline or feather. On one end of this arbor is a stop which can be adjusted to limit the end motion as desired, and on the other end any device required for sustaining the work can be placed. By setting the stop on this arbor the tap will cease to revolve at any desired point, so that holes with bottoms can be tapped with the same facility as others, care being observed to have the unlocking take place before the end of the tap touches the bottom of the hole. This arrangement entirely prevents the danger of breaking the tap, for, if the motion is not reversed by the operator as soon as the stop strikes, the continued motion of the tap withdraws the dog in the arbor from the clutches in the pulley. The taps are made from straight pieces of round steel wire and are held in the following manner. A straight hole is drilled in the end of the arbor about three inches deep, and of a little larger diameter than the wire from which the taps are made. At the outer end, this hole is tapered for half an inch in depth at an angle of 80°. A piece is then turned to fill this taper and to project slightly beyond the end of the arbor. This piece is bored the size of the tap wire and a slit is cut through one side to the hole in the center. It will be readily understood that if a wire, filling the hole in this tapering piece, is inserted in it, and the piece itself then forced into the tapering hole in the end of the arbor, the wire will be held firmly. This is effected by a screw cap fitting a thread cut on the end of the arbor and having a hole in the center to admit the tap. For tapping the small parts of guns, sewing machines and other light work, this machine is particularly useful, and it has been introduced into several of the principal armories in the country. It is manufactured by J. R. Brown & Sharpe, at Providence, R. I., to whom those interested can apply for further information.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

Military matters are progressing as rapidly as possible. General McClellan is pushing "on to Richmond" with rapid strides. At last accounts he was within twenty miles of that city, and it was expected by some that the enemy would make a stand at a point called Bottom Bridge, while others assert that Virginia will be evacuated as rapidly as possible. Gen. McClellan needs the active cooperation of the divisions of Gen. McDowell and Gen. Banks. We are of the opinion that injustice was done when these commands were taken away from him. This is our conviction, but we may be wrong. The responsibility of defeating the enemy in Virginia devolves chiefly upon him, and if for want of control over these two divisions he should be defeated the odium of failure would be unjustly charged to him.

Gen. Halleck is almost within speaking distance of Beauregard at Corinth, and is skirmishing with him daily. A great battle at that point is impending.

Some of our journals are loudly proclaiming that the war is nearly over. We should be happy to re-echo this pleasing idea, but we warn our readers against being too sanguine on this point. The rebellion will be crushed we have no doubt, but it is all nonsense to set the time when this will be brought about. It may be one month, it may be six, it may take twelve to crush it, but it must be done.

CAPTURE OF NORFOLK—DESTRUCTION OF THE "MERRIMAC" AND THE NAVY YARD.

One of the most important successes which has attended the operations of the Federal government in its efforts to suppress the rebellion is the surrender of the city of Norfolk and its occupation by our troops. This event took place on Saturday, the 11th inst. The President and Secretary of War had proceeded to Fortress Monroe, with a view, no doubt, to secure a more efficient cooperation of the naval fleet in Hampton Roads with the military operations of Gen. McClellan. After their arrival the iron-clad gunboat *Galena* proceeded up James river, toward Richmond, and the *Monitor*, *Navigatuck* and other vessels went toward Norfolk, with a view to shell out Sewell's Point, and, if possible, draw out the *Merrimac*, to engage her in conflict, but she refused to come out. The batteries on the Point were effectually shelled, and the President in person decided to land forces, for the purpose of moving upon Norfolk, and,

after a most careful reconnoissance, selected the spot for the landing. After the forces under Gen. Max Weber had proceeded some distance toward Norfolk he was joined by Gen. Wool, Secretary Chase, and Gens. Mansfield and Viele. Gen. Wool took every precaution to provide for all emergencies that might arise, by ordering up reinforcements. The entrenched camp of the enemy, some three miles in extent, was found deserted, and no serious obstacle presented itself to the advance of our forces. Upon reaching the immediate environs of the city a deputation of citizens was met, bearing a white flag, headed by the Mayor and a portion of the Common Council, who made a formal surrender of the place. Gen. Wool proceeded to the City Hall, where he was well received by the inhabitants, and announced to the people that he had taken military possession of the place and appointed Gen. Viele Military Governor. In his proclamation the Governor stated that "those who had left their homes under the anticipation of any acts of vandalism may be assured that the government allows no man the honor of serving in its armies who forgets the duties of a citizen in discharging that of a soldier, and no individual rights will be interfered with."

The huge iron-clad war steamer—the *Merrimac*—which has created so much stir the world over, and which was the terror of the bulls and bears of Wall street, has finally become extinct. She was blown up on the morning of the 11th, in order to prevent her from falling into our hands. The explosion is described as grand and terrific. It seemed like the shock of an earthquake.

Accompanying the report of the occupation of Norfolk was also the announcement that the Gosport Navy Yard was safe and untouched. We could not credit the report, yet it seemed to be official, and we hoped it might prove true. Information, however, is received, that all the workshops, ship houses, and splendid dry dock were destroyed, together with several vessels in the yard and on the stocks, nothing remained but the charred remains of what was once the most complete and best-equipped navy yard in the country. Gen. Wool, in his dispatch, says "I visited Craney Island, where I found 39 guns of large caliber, most of which were spiked; also a large number of shot and shell, with about 5,000 pounds of powder, all of which, with the buildings, were in good order. As far as I have been able to ascertain, we have taken about 200 cannon, including those at Sewall's Point batteries, with a large number of shot and shell, as well as many other articles of value stationed at the navy yard, Craney Island, Sewall's Point and other places."

OCCUPATION OF NEW ORLEANS.

The latest intelligence from New Orleans announces that the city is now fully occupied by the Federal forces under Major-Gen. Butler. He has taken the famous St. Charles Hotel for his headquarters, and has issued a sound and judicious proclamation, placing the city under martial law. Mayor Monroe and the aldermen of the city have been cast into prison as traitors. The General sent his proclamation to the various newspapers published in the city, but they all refused to print it. Therefore he took possession of the *True Delta* office and called in Northern printers, who worked it off speedily. The people are represented as very sour, but Gen. Butler plainly informs them that, while he will protect them in their rights of person and property, he will at the same time not submit to any thing like treason against the government, either in word or deed. No non-sense of that kind can be tolerated under the ample folds of the star-spangled banner.

INCIDENTS ON THE MISSISSIPPI.

The official reports of Commodore Farragut and Capt. Porter, concerning the engagement which resulted in the capture of New Orleans, proves it to have been one of the most brilliant naval victories on record, perhaps the most so, considering the great preparations which had been made on land and water to resist the advancing fleet. Capt. Bailey, who brought the official report of the surrender of Forts Philip and Jackson, states that just previous to the attack the commanders of the French and English men-of-war, which were lying in the river, asked and readily obtained the consent of Commodore Farragut to visit the forts—their object being to examine the means of defense. The officers reported to the Com-