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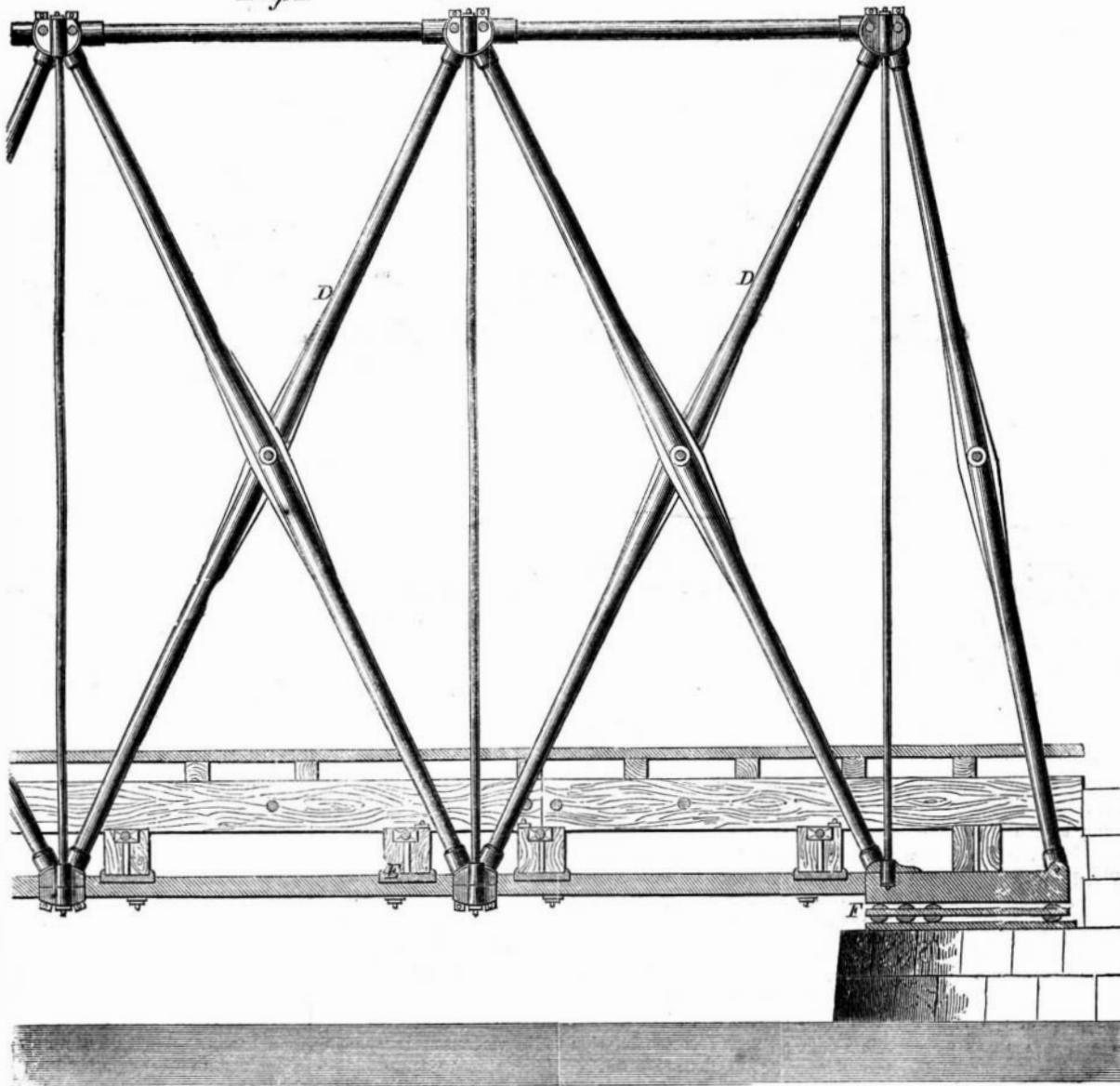
## Improved Patent Truss Bridge.

The rapid increase of our inland transportation, as well as the necessity of guarding against accidents which result in the loss of life and property, has clearly demonstrated the importance of employing materials of the most tenacious and durable character in the construction of bridges on railroads and over other places. It can no longer be considerations of economy that will induce practical railroad

such disasters, a close watch must be kept over the bridge, all of which must be added to the annual cost of maintaining the structure. It is often the case, when a bridge is thus destroyed, that the cost of removal is greatly increased, and in many instances exceeds the cost of an iron bridge, entailing also a heavy loss to the railroad company for extra transportation of freight and passengers, and loss of business while renewing the bridge. Such accidents have

The success of all iron bridges must necessarily depend upon the form of construction, as well as a proper distribution of materials; consequently the injurious effects of sudden jars and concussions must be provided for. Experience has taught mechanics that the most economical mode of applying material in all iron structures, is to employ wrought-iron to resist tension, torsion, or transverse strain; and cast-iron to oppose compression. These principles

Fig. 1



JONES'S PATENT TRUSS BRIDGE.

men to adopt wood instead of iron for structures of the kind under discussion, when it is known that the average durability of uncovered wooden bridges in this country has been from about five to seven years; and their first cost from one-third to four-fifths of that of iron bridges. It is true that if wooden bridges are sided, covered in, and kept thoroughly painted, their durability will be greatly increased, but even with these additions they are still more liable to sudden destruction from fires, accidental or designed, and are also exposed to danger from high winds, or other elemental disturbances; to prevent

a tendency to drive business to other roads in the immediate neighborhood. For a practical demonstration of the above facts, we have only to refer to the books and bridge accounts of roads running at the West. Data based upon experience shows that there is a saving of iron over wood of from six to seven hundred per cent, at the end of fifty years, on the cost of the bridges alone.

With regard to the durability of iron bridges, fifty years is a comparatively short life, when we take into consideration that we have accounts of bridges that have stood for hundreds of years.

have been strictly adhered to in J.L. Jones's Iron Truss Bridge, herewith illustrated. This bridge has a truss frame, similar to the "Howe Truss" in its principles and mode of construction; but it has many original and valuable mechanical arrangements in its details, which render it peculiarly applicable to the service required of it, avoiding the injurious effects of jar and concussion. The bridge can be erected on any masonry where ordinary wooden bridges have been in use, without incurring the expense of altering the bridge seat. A bridge on this plan was erected on the St. Louis and Iron Mountain Railroad, 30 miles

south of St. Louis, Mo., in July, 1861. This structure is 140 feet in the span, and has withstood a test pressure of 140 tons, deflecting but  $1\frac{1}{2}$  inches under this weight; the iron being removed, the bridge assumed its proper shape. After having been in use two years without costing one dollar for repairs or adjustment of any kind, the Board of Directors, in their annual report, made favorable mention of its good qualities, and conclude their report by recommending the bridge to all railroad corporations using such structures.

The mechanical arrangement of the details of this bridge are excellent, and provide against all possible derangements; those which arise from the natural variations of temperature in winter and summer, and from the wear and tear of passing travel. The roadway or track is laid upon a series of wrought-iron stringers; these stringers are of peculiar shape at each end, and may be seen by referring to the cut, Fig. 3. The bridge is built in several sections, each one of which can be transported separately to the point of erection; and the vertical disturbance caused by the deflection of the roadway is provided for in the following manner: The stringers, previously mentioned, are off-set at their ends, and have square shoulders, which interlock and maintain a connection throughout the whole span, at the same time admitting of vertical motion to provide for this, the cap (Fig. 3) is rounded away, as shown at C, in Fig. 4, so that while the main point—the strength of the stringer—is preserved, their free movement is unimpaired. At the top the ends of the braces, A', abut against the cylindrical block, shown in an enlarged form at Fig. 2; this constitutes a ball-joint, as it were, on which all the braces work freely without binding. When it is necessary, from any cause, to take up lost motion, or to alter the spring of the arch, plates can be inserted, as at a, in Fig. 2. Figs. 5 and 6 are illustrations of the braces which connect the diagonal braces, D, in Fig. 1; the diagram explains itself; strong bolts, b, pass through these tubes, and add materially to the efficiency and strength of the bridge; constituting, as they do, a series of transverse ties of great rigidity. The casting is rendered light and yet strong by the rib inside. The bottom stringers of the roadway are provided with struts or saddles, E (see Fig. 1), which span each one at regular distances, so that they cannot buckle under pressure; the floor beams are bolted to these saddles by the usual methods. The main diagonal braces, D, are of cast-iron, and the form of them clearly shown in Fig. 1; where the manner of connecting them to the other separate parts of the bridge is also illustrated. All the cast-iron tubes about this bridge have been subjected to a pressure of 50 tons. None of the pieces in the bridge exceed 21 feet in length, or weigh over 1,000 pounds. In Fig. 1, the means of providing against longitudinal expansion and contraction are clearly shown at F. The spring in the arch of the bridge, technically known as "camber," can be altered at will, and the whole structure is represented by the inventor as having given great satisfaction wherever introduced. A number of testimonials have been shown respecting the estimation it is held in by those competent to criticise its merits.

Two patents have been issued to Jonathan L. Jones, of St. Louis, Mo., for this invention; they bear date Nov. 6, 1860, and August 4, 1863. Fur-

ther information can be had by addressing Jones & Westlake, St. Louis, Mo.

#### A Congress of German Workingmen.

A congress of the working men of Germany was recently assembled at Frankfort, to take into consideration their duties to themselves and to the state. It consisted of one hundred and twenty delegates, from eighty-four associations, comprising thirty-six thousand workmen, whose number is constantly increasing. Their proceedings were marked by great dignity of demeanor, and a thorough conviction of the necessity and importance of progress. They have been divided for some time past—indeed, ever since the termination of the revolution—into two sections; the one known as the moderates, the other as the radicals; and as these refused all compromises with each other, they have greatly weak-

liberty they seek. But the passage of the resolutions shows to what an extent the laboring classes of the Continent suffer under disabilities. They seem to be bound hand and foot in the relations of life, by the institutions, the customs and the laws which have grown up, without amendment, during centuries. In their houses, in their trades, in their traffic with each other, in the simple rights of locomotion, they are not free; but meet everywhere with obstacles which embarrass their movements, restrain their industry, lessen its rewards and diminish their enjoyments.

The workingmen of the United States scarcely know or appreciate the blessings which they owe to our free institutions. Compared with the same class in the Old World their condition is indescribably superior. The simple fact that the government, and all the proceedings of the government, and of the institutions dependent upon the government, no less than its spirit, are controlled by the great principle of the essential equality of man, gives them an advantage which it is impossible to over-estimate. It opens all avenues of life to them, enables them to make the best of their capacities, to prosecute whatever ends they please, and to participate in every result of civilized existence. Whatever of usefulness, whatever of dignity, whatever of enjoyment belongs to the social state, it is within the power of every man among us, be his origin or lot ever so humble, to secure by honest exertion.

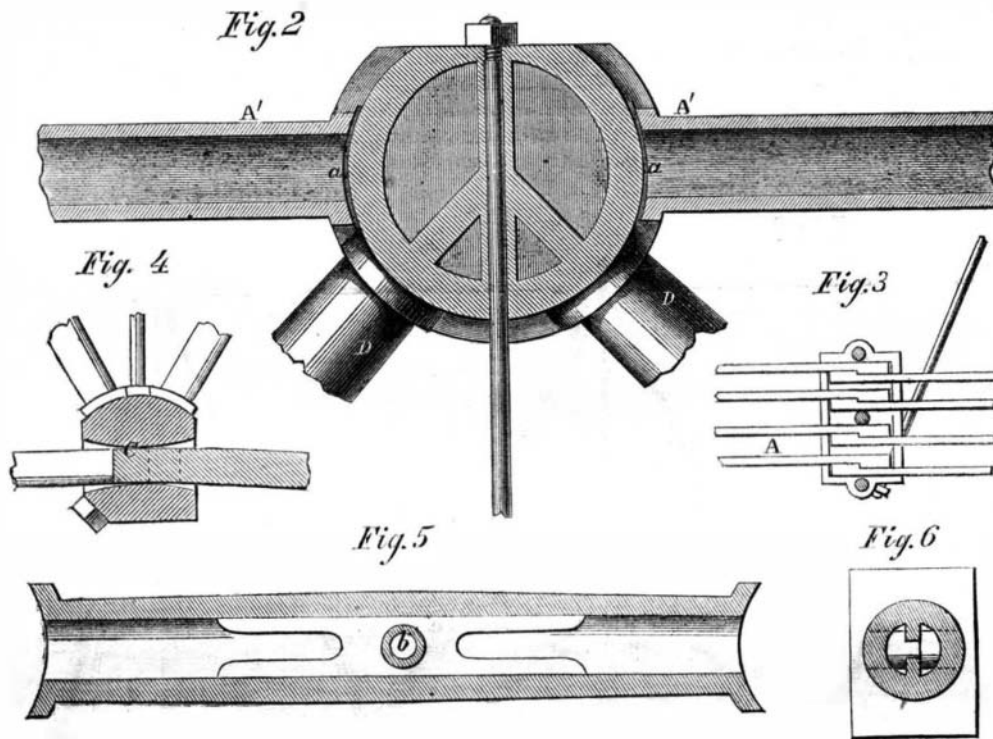
No class is, then, more deeply interested in sustaining that Union which is the source of our free institutions, than the mechanics and workingmen who here enjoy the privileges they guaran-

tee. Those who, under false political leaders, are led at any time to disloyalty and disorder, are not only criminally unjust to their fellow-men, but are their own worst enemies. If the doctrines of the rebellion could prevail on this continent labor would sink to the lowest value, and the workingmen would be reduced to the character of slaves, to a proud, selfish and inhuman aristocracy, such as have held four millions of human beings in the most miserable servitude. This war of ours, brought on by this cruel class of men, is not a contest for nationality merely, but for the preservation of liberal government and the security of a society in which all are equal, exempt from bondage, and rendered capable of an indefinite progress.—*Evening Post.*

#### New Balloon Experiment.

A meeting composed of members of the French National Institute, of various scientific societies, of railway directors, bankers and directors of the press, was held recently at the manufactory of M. Nadar, to hear his explanation of a new balloon. M. Nadar explained to the assembly his theory of aerial locomotion by the substitution of a screw and of inclined planes for the present system of air balloons. M. Nadar concluded by appealing to the company to assist him in making his system known, and in reducing it to practice. M. de la Landelle, who is connected with Nadar in the construction of the balloon, confirmed his colleague's statement, and set in motion several models of machines constructed by M. de Ponton d'Annecourri, who is likewise a partner in the affair. These balloons were raised automatically, lifting graduated weights so perfectly as in all appearance to demonstrate the accuracy of the theory.

It is announced that an Anglo-French company is formed to provide the amount necessary for the con-



#### IMPROVED TRUSS BRIDGE.

ened their power, and enabled their mutual enemies to profit by their differences. After the political catastrophes of 1849, when the progressives took the lead, two causes retarded the rapidity of the movement, one of which was an apparent incapacity on the part of the masses to choose proper representatives in their assemblies; and the other, the want of agreement among the leaders as to the principles which were to govern in the domain of pure politics and political economy.

At Frankfort, the first act of the assembly was to declare its objects to be to further the moral, social, and political improvement of the working classes; to express a warm approbation of the party of progress, and all others who aimed at the advancement of humanity.

1. The necessity of perfecting their knowledge in all directions, but especially of political economy, morals, history and technology, so as to improve and ennoble their characters by developing their minds and talents.

2. A recommendation to the various societies composing their organization, to cultivate "those higher amusements and tastes which would repress all habits of debauchery."

3. Absolute freedom of trade and profession, and a modification of the laws of domicile and marriage, which are now felt to be a grievous burden.

4. The determination to establish savings banks; mutual societies to aid the sick, the unemployed and the old; and also institutions having for their object the extension and use of credit and the purchase of materials.

These resolutions are highly approved by the German liberal press; and a leading Belgian journal, in commenting upon them, says that men who think in so noble a manner are worthy of enjoying the

struction of a gigantic balloon, capable of containing eighty persons in a car two stories high, which will contain provisions and other necessaries, including, it is said, a printing press. The diameter of the balloon is to be equal to three-fourths the height of the towers of Notre Dame. Twelve thousand yards of white silk have been supplied by a Lyons manufacturer, at 7f. the yard. This monster balloon is to be inaugurated next month at the races of Baden Baden. Subscribers for the trip have already set down their names. It is to last eight days and eight nights. After having made a trip across the channel and another to the Mediterranean, the company at whose expense the balloon is to be constructed, will exhibit it in London, Paris and New York. The produce of the exhibition is to be employed in the construction of a definite aerial locomotive. M. J. Godard, the celebrated aeronaut, has suggested an improvement to M. Nadar in the addition of a second balloon under the large one, which may serve as a reservoir for the preservation of a supply of gas, by which means the journey through the air may be prolonged.

#### THE FAIR OF THE AMERICAN INSTITUTE.

The Academy continues to present attractions to sight-seers, and crowds of persons visit the hall, day and evening, to witness the ingenuity and enterprise of our manufacturers and inventors. Since our last article the appearance of the Exhibition has not been materially changed, but a little more order and regularity is visible in the disposition of the different articles. The ladies continue to gather in crowds around the washing and sewing machines, deeply interested in the efforts of ingenious men to lighten the labors of housekeeping. The superb braiding, or embroidery, now so fashionable, which is done by the sewing machines, appears to great advantage; and as another evidence of the versatility and wide range of usefulness which these indispensable machines possess. Another novel feature in sewing machines has lately been introduced by Messrs. Wheeler & Wilson, it is

#### A BUTTON-HOLE MACHINE.

After much time, and at a great expense, a machine for sewing button-holes has at length been produced. The work done by it is remarkably beautiful in appearance, and much stronger and more durable than hand-made button-holes.

We are not sufficiently versed in the art and mystery of needlework to describe the sort of stitch taken by the machine; but externally the character of it seems to be much the same as that on all button-holes, while for elegance and strength it far exceeds the old method of doing such work. One thousand button-holes can be made per day on this machine—a sufficient attestation of its value to manufacturers and others. We did not learn that it was the intention to furnish such machines for family use; but gathered from the attendant that they are intended for tailors and those who have sufficient work of the kind to keep the machine going. A short distance off from this useful instrument stood another, in a dark corner, and altogether, considering its character, strangely neglected; this was

#### A PATENT TREADLE-MOTION.

This is a set of rods connected by short arms to a pair of cams (such we took them to be) working on a coupling. It is impossible to give an intelligible description of this motion without drawings; but it worked admirably and is a most excellent invention for sewing machines, foot-lathes, and all purposes where a treadle is used. The machine can only run one way, and has no dead center; in this respect it would be desirable for steam pumps, &c. Charles Spencer is the patentee.

#### WASHING MACHINES.

Of these machines Johnson's was pointed out to us as having taken the first prize at the Hamburg Fair in Germany. Avery's pendulum machine—consisting of a series of small rollers arranged around a drum, the whole operated by a lever like a pump-handle—was novel to us, and seemed to do good work, as also did many others. The labor of washing by hand is very great, and the most fastidious housewife can find, in the great variety here, something to please her. Inventors have now only to make an ironing-machine, to render the laundry de-

partment complete. The wringers, or clothes-squeezers, need no comment; every woman is loud in their praise, and we have yet to hear of one who, knowing their virtues, does not use them or importune her husband for one.

#### A MITERING MACHINE.

Near the stage we noticed a compact little machine at work in mitering and dovetailing the edges of planks. A short length is placed on a bed, and, by a simple movement, the board is cut across, mitered, and dovetailed, at one operation; the dovetail is across, or at right angles with the grain, and is continuous throughout. When the pieces are fitted together they make a perfect water-tight joint. F. A. Gleason is the patentee.

#### PATENT WINDLASS.

E. Requa exhibits a patent windlass (illustrated on page 97, current volume of SCIENTIFIC AMERICAN), which is extremely convenient and well adapted to the work done by this class of machine. By a series of friction grooves and a quick pitch-screw, the work can be thrown in or out of gear instantly.

#### APPARATUS FOR STARTING CITY CARS.

When the cars on city roads stop for a passenger, the horses have great difficulty in overcoming the inertia of the load, and frequently strain themselves severely in trying to move the car. It is desirable to obviate this evil, and Mr. Bernard Morehan, has invented a motion which worked well in the small model at the Fair. It consists of a series of elliptic springs compressed together by the momentum of the car; when about to stop, these springs are thrown into gear with the axle, and the force of the momentum is stored up in them. When the car is to be started, the force of the springs is communicated to it by a simple method, and the horses are assisted according to the extent to which the springs are compressed. This is a very useful and much-needed machine, and if it works as well on a car as in the model, will be a manifest advantage.

#### IRON-CLAD BATTERY.

Captain Augustus Walker, of Buffalo, N. Y., exhibits a model of an iron-clad battery, which at once attracts the eye of the nautical man for its fine lines and the peculiar construction of its frame and hull. The hull is supported fore and aft by two arches, one inverted and interlocking with the other, through stanchions and bulkheads running athwart-ships; the whole forming a series of trusses or girders, as applied in the best bridges. The turret is semi-globular in appearance, externally, and the pilot-houses rise and fall through the deck so that they can be completely out of sight and danger from the enemy; the perfect control of the ship is not affected by this feature. No entrance can be effected to the vessel except through the pilot-houses. Thorough ventilation is obtained through a series of narrow slits or openings in the side. The design and conception of this ship as a light draft vessel—she being only 16 feet draft from keel to load-line—is very good, and we may have occasion to report on her hereafter at greater length. Other novelties were examined by us, but space will not permit further discussion of their merits at this time.

EXPORTS OF PETROLEUM.—The following table shows the immense proportions to which our trade in petroleum has attained:—Since Jan. 1, 1863, to Aug. 27, from New York, 13,579,677 gallons; from Boston, 1,322,779 gallons; from Philadelphia, 4,232,646 gallons; from Baltimore, 726,571 gallons; from Portland, 268,443 gallons; making a total of 20,080,116 gallons. It is exported to all parts of the civilized world. The Liverpool market is said to be overstocked at present, and prices for refined rule at from 2 shillings to two shillings and two pence sterling—a little over 50 cents per gallon wholesale.

A STEAM thrasher has been at work during part of the week, in thrashing grain for Mr. Mallory, of this town. The power consists of a 10-horse, portable, wood-burning engine, and it is claimed that considerable more grain can be thrashed in a day by this power than by horses. It is a humane improvement, at least; for thrashing, we believe, is pretty hard on the horses. We are informed the proprietor, Mr. McLeon, intends to stay in this vicinity during the season, and attend, as far as practicable, to all orders he may receive for thrashing.—Lane Register.

#### Mechanical and other Items of the War.

SHARP SHOOTING.—Our parallels, it is well known, had been carried close up to Fort Wagner, and it is necessary for the men, on both sides, to keep their bodies well covered, behind the intrenchments. The moment that a moving thing became visible, pop went a sharp-shooter, with unerring precision. The other day Capt. Luiss had occasion to adjust one of the sand baskets or "gabions," near the front, and in doing so his hands were exposed to the enemy for a few minutes, when he was struck by a sharp-shooter's ball. All the fingers [of his] right hand were taken off.

DURING the recent bombardment of Fort Wagner from the *New Ironsides*, it was found impossible to drive the balls through the sand and cotton of which the works are made, or to elevate the guns so as to throw the shot in as from a mortar. The gunners resorted to the expedient of depressing the pieces, whereby the balls striking the water about fifty yards from the beach, bounded upward and over into the fortress. This was remarkably successful. "These are what I call billiards," said the captain, watching the firing. "They carom on the bay and beach, and pocket the ball in the fort every time."

THE speed of the *Florida*, the rebel cruiser, may be inferred when she failed to catch the *Ericsson*, one of the slowest steamers we have in this port. The *Florida* tried her best to come up, but failed.

THE iron-clad gunboat *Cincinnati*, which was sunk by the rebel batteries at Vicksburg, has been raised and towed to Cairo, where she is undergoing necessary repairs.

THE coolness and audacity of the rebel pirates is astonishing. Quite recently one of them (the *Retribution*) was captured in this port, whither she had come from the West Indies with a load of fruit.

AN iron 36-pounder, which has a history, was captured at Vicksburg and has been sent to Washington. It was cast in France in 1768, and was brought to this country by Lafayette in 1777. It did good service in the Revolution, in the second war with England, and was used in the Texan war by a company of volunteers from New Orleans, who assisted the Texans in achieving their independence.

UNDER a recent order of the Navy Department, the great steamship *Franklin*, at the Portsmouth naval station, is to be completed and made ready for service. The ship was commenced under the administration of President Pierce.

ONE of the newly-invented southern guns, Brooks' patent, of large calibre, was lately sent from Richmond to Beauregard at Charleston, intended as an offset to the "Swamp Angel." On arrival at its destination it was found to have been spiked by skilful but unknown hands.

ON page 164, Vol. IX of the SCIENTIFIC AMERICAN, will be found an illustration of the torpedoes recently used by the rebels. During one of the assaults, a negro corporal was blown out of our trenches. In the night the rebels seized the dead body, stripped it, and bound it to a spar, which was connected to a torpedo. This was done in the hope that our men would be foolish enough to come out and carry their comrade away, when they would of course have been destroyed. It is needless to say that the little plan did not work.

DURING the present attack on Charleston, a shot from one of our gunboats struck a cannon in Fort Wagner and stood it on end. Another shot directly after, struck the breach and loosed the weapon to make a series of ground and lofty tumblings for a long distance.

QUANTITIES of hook-ended pikes were planted in the embankment of Fort Wagner, to prevent our troops from carrying it by assault. Torpedoes were also thickly scattered about.

DR. ANDREW'S flying machine alluded to in last week's SCIENTIFIC AMERICAN, proves to have been a lamentable failure, and the public have been gulled by the misrepresentations and balderdash of the journal which originated the incorrect report of its success. The only successful flight was the flight of fancy indulged in by the enthusiastic devotee of science attached to the Daily at fault.