Improved Compound Spiral Car Spring for Railway Carriages.

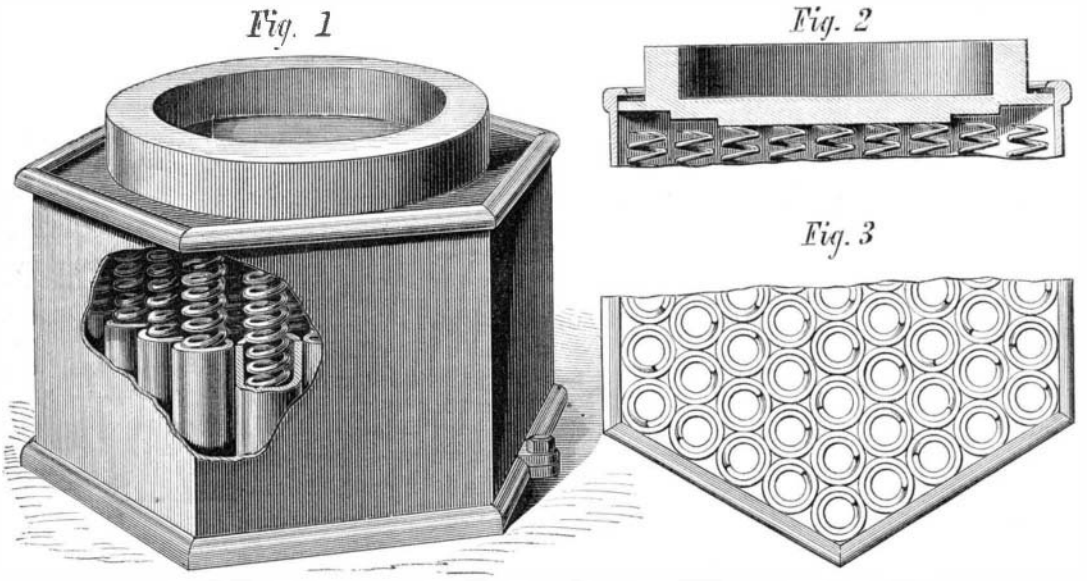
Our engravings illustrate an improved compound car-spring, which appears to possess all the requisites of a first-class spring, combining in its construction extreme simplicity with great strength, and a feature whereby the power of the spring increases with increase of the load, and *vice versâ*, so that its flexibility remains nearly constant for all loads.

Fig. 1 is a perspective view of this spring, with a portion of the side of the case broken out to show the interior arrangement of the spiral springs. Fig. 2 is a section of the compressing plate. Fig. 3 is a plan view, showing the arrangement of the tubes which enclose the springs.

The case is cast in two pieces. Its vertical wall is cast in a single piece, and has at the top a flange or bead extending inwardly, against which the compressing plate abuts when the spring is not compressed, as shown in Fig. 2. A bottom plate completes the case.

The spiral components of the spring are inclosed in tubes, as shown in Figs. 1 and 3. It is not deemed essential that these tubes should be seamless, or that their edges, brought together in bending, should be soldered, brazed, or welded. They act merely as guides to compel the component springs to expand or contract in vertical lines, and need only be strong enough for that purpose.

The compressing plate is formed with concentric steps or ledges, as shown in Fig. 2, so that with light loads, only a portion of the component spirals act. With a heavier load a new series of spirals is brought into action, and so on, till the spring is loaded to its full capacity. This feature is novel, and as important as novel, as it gives the spring a far more easy and flexible carriage, with light loads, than would be the case if all the spirals were permitted to act.



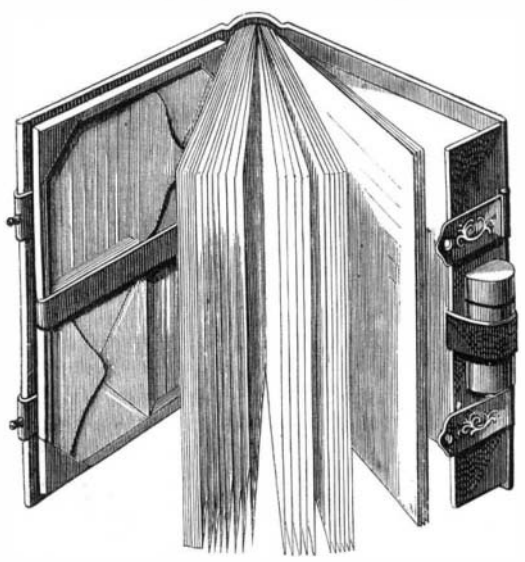
POTT'S' SPIRAL CAR SPRING FOR RAILWAY CARRIAGES.

In putting the spring together, the vertical part of the case is inverted. The compressing plate is then placed within the case, resting upon the inner flange of the case above described. The tubes with their inclosed springs are then arranged in position, as shown in the plan view, Fig. 3. The bottom plate of the case is then placed in position, and held to its place by lugs and rivets, as shown in Fig. 1; the spring is then ready for use.

The employment of tubes in the manner described, enables springs of the greatest practical length to be used, without the sectional or division plates met with in other spiral car springs. A greater and easier movement is therefore obtained. These springs can, it is claimed, compete in price with any spring in market, and are guaranteed by the manufacturers. Patented through the Scientific American Patent Agency, December 27, 1870, by Albert Potts, whom address for further information, No. 490 North Third street, Philadelphia, Pa.

PORTABLE WRITING AND COPYING CASE.

This device is the invention of A. G. Buzby, of Philadelphia, Pa. It is a combined writing and copying case. Besides the usual recesses or chambers for pen, ink, paper, etc., it is provided with a book of copying paper, in which copies



of important letters may be made, by damping the letters in the usual way, and pressing them between the leaves of the copying book; or the transfer paper may be used, so that the letter will be copied as it is written, if preferred.

How Walking Sticks are made.

Sticks are manufactured both from large timber of from two to six feet girth, and from small underwood of about the thickness of a man's thumb. The timber, which is chiefly beech, is first sawed into battens of about three feet in length and as many inches in width; and from each of these battens two square sticks, with square heads are afterwards cut in opposite directions, so that the middle portion is waste wood. The corners of each are afterwards rounded off by a planing process called "trapping," and the square head is reduced, by a small saw, to a curve or rectangular bend, so as to form a handle. When the sticks are brought in this way to the exact size and pattern, they are polished with great care, are finely varnished, and packed in boxes or bundles for the market. Many sawn sticks, however, are supplied with bone and horn handles, which are fastened on with glue; and then of course there is less wood waste, as a larger number of them may be cut from one batten.

A very different process takes place in the manufacture of sticks from small underwood, in which there is no sawing required. The rough unfashioned sticks, which are generally of hazel, ash, oak and thorn, are cut with a bill in the same way as kidney bean sticks, and are brought to the factory in large bavins or bundles, piled on a timber tug. There must of course, be some little care in their selection, yet it is evident that the woodmen are not very particular on this score, for they have in general an ungainly appearance; and many are so crooked and rough, that no drover or country boy would think it worth while to polish the like of them with his knife. Having arrived at this place, however, their numerous excrescences are soon pruned away, and their ugliness converted into elegance. When sufficiently seasoned and fit for working, they are first laid to soak in wet sand, and rendered more tough and pliable; a workman then takes them one by one, and securing them with an iron stock, bends them skillfully this way and that, so as to bring out their natural crooks, and render them at last all straight even rods. If they are not required to be knotted, they next go to the "trapper," who puts them through a kind of circular plane, which takes off knots, and renders them uniformly smooth and round. The most important process of all is that of giving them their elegantly curved handles, for which purpose they are passed over to the "crooker." Every child knows that if we bend a tough stick moderately when the pressure is discontinued, it will soon fly back, more or less, to its former position; and if we bend it very much, it will break. Now the crooker professes to accomplish the miracle of bending a stick as it might be an iron wire, so that it shall neither break nor "backen." To prevent the breaking, the wood is rendered pliant by further soaking in wet sand; and a flexible band of metal is clamped down firmly to that portion of the stick that will form the outside of the curve; the top end is then fitted into a grooved iron shoulder which determines the size of the crook, the other end being brought round so as to point in the opposite direction; the metal band during this process binding with increasing tightness against the stretching fibers of the wood, so that they cannot snap or give way under the strain. The crook having been made, the next thing is to fix it, or remove from the fibers the reaction of elasticity, which would otherwise, on the cessation of the bending force, cause it to backen more or less, and undo the work. In the old process of crooking by steam, as timber bending is effected, the stick was merely left till it was cold to acquire a permanent set; but in the new process, a more permanent set is given by turning the handle about briskly over a jet of gas. The sticks being now fashioned, it only remains to polish and stain or varnish them; and they are sometimes scorched or burned brown, and carved with foliage, animal heads and other devices.—*Chambers' Journal.*

FLOWERING OF THE VICTORIA REGIA IN THE OPEN AIR.—Joseph Mager, Esq., has succeeded in flowering the Victoria lily, in his pond in England. The pond is perfectly open, but the water is heated by hot water pipes coming from a boiler near the pond, carefully concealed. The seeds of the Victoria were planted in May last, and the first flower was produced Sept. 10th. Afterwards seven other flowers opened. The plant has eight leaves, of which the largest is five feet two inches in diameter. Mr. Mager has also succeeded in flowering a large number of other tropical lilies in his pond.

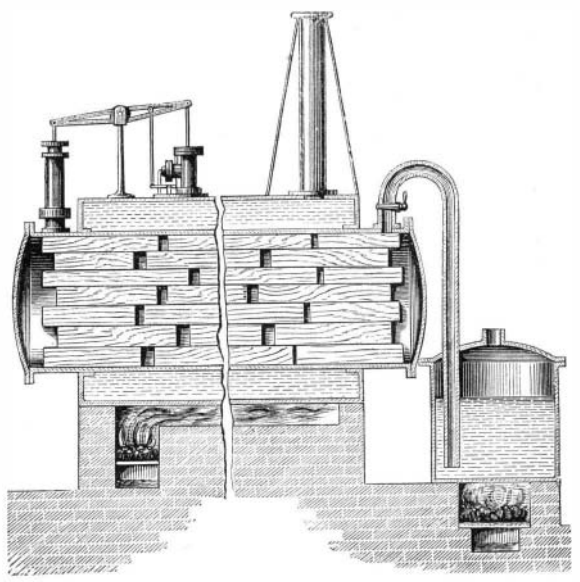
JUTE, a material largely used in combination with hemp, for making cordage, sacking, mats, and carpets, is produced in India to the extent of 300,000 tuns per annum. The scarcity of fuel prevents its manufacture on the spot, except by the rudest and most primitive means, so that the bulk of the growth is sent to Great Britain.

Ventilation of the Liverpool Tunnel.

This tunnel, which forms an ascending incline of a mile and a quarter length from the terminal station in Lime-street, London and N. W. Railroad, was worked until recently by a rope and stationary engine, to avoid fouling the air of the tunnel by the passage of locomotives; but the increase of the traffic having necessitated the abandonment of the rope, and the substitution of locomotives for bringing the trains up through the tunnel, it became requisite to provide some efficient means of ventilation for clearing the tunnel speedily of the smoke and steam after the passage of each train. A large exhausting fan has been designed by Mr. John Ramsbottom for this purpose, which works in a chamber situated near the middle of the length of the tunnel, and draws the air in from the tunnel, through a cross drift, discharging it up a tapering chimney that extends to a considerable hight above the surface of the ground over the tunnel. The fan is about thirty feet diameter, and is made with straight radial vanes; it revolves on a horizontal shaft at a speed of about forty-five revolutions per minute, within a brick casing, built concentric with the fan for the first half of the circumference, and afterwards expanding gradually for discharging into the base of the chimney, the air from the tunnel being drawn in at the center of the fan at each side, and discharged from the circumference of the fan by the revolution of the vanes. The engine driving the fan is started by telegraph signal at each departure of a train from the terminal station, and the fan is kept running until the discharge from it becomes quite clear, showing that no steam or smoke remains in the tunnel; this is usually the case in about eight minutes after the time of the train entering the lower end of the tunnel, the passage of the train through the tunnel occupying about three minutes. The fan draws air in at both ends of the tunnel simultaneously, and begins to clear the lower end immediately upon the train entering; the clearing of the u per end commences as soon as the train has passed out of the tunnel, and as the fan is situated nearer the upper end of the tunnel than the lower, the clearing of both lengths is completed almost simultaneously. The fan is so constructed as to allow an uninterrupted passage through it, for the air, whilst the fan is standing still; and the natural ventilation thus obtained by means of the large chimney is found sufficient for clearing the tunnel during the night and some portion of the day, without the fan being worked at those times. This natural ventilation is aided by the engine exhaust and the boiler discharging into the chimney. The fan has now been in regular operation for three-quarters of a year, and has been found completely successful.

IMPREGNATING WOOD WITH TAR OR OTHER PRESERVING MATERIAL.

The preservation of wood is a problem which is attracting increased attention, as year by year diminishes the material supply of timber, and consequently gradually increases its price. Among other methods employed, the impregnation



of wood by the vapors of tar, creosote, petroleum, etc., has been tried, and one of the practical difficulties met with has been the obtaining of suitable apparatus for the purpose.

The engraving annexed is an invention intended to supply this want. The wood is inclosed, in a tank kept hot by a steam jacket which surrounds it, as shown. A boiler at one end is used to heat the substance with which it is desired to impregnate the wood. An air pump is also employed to remove the steam, generated in the heated timber, and the air from the tank. The pores of the wood being thus rendered vacuous, the hot liquid or vapors from the heating tank readily penetrate the entire substance, and thoroughly impregnate it. This apparatus is the invention of George Pustkuchen, of Hoboken, N. J.