weight and unnecessary width of surface, many ar. wanting. With the different forms of regulator in use, where so many are excellent, it is invidious to particularize; but in the old-fashioned two-ball governor, which many yet adhere to, there are details which seem trivial and yet are not so. If we look at it, we find in all six joints and pins, whose friction is to be overcome before the valve can be moved. Suppose the machine in operation and these arms revolving, we find that the weight of the balls and the resistance of the atmosphere are continually throwing the faces of the joints against each other, and, in a word, doing all it can to jam them fast. All these joints and pins are fitted tight; consequently, from the very motion of the thing, the apparatus is half the time inoperative. The motion of the arms which move the sliding collar on the shaft is not at right angles and direct, but diagonal, and consequently slow. A properly constructed governor, according to our theory, consists of but four joints; these have no faces, but swing on hardened steel centers, whereby the friction is reduced to the lowest possible point. The arms are at right angles with the shaft, the balls hang vertically and the action of the centrifugal force is positive. With such a governor the speed can be maintained to a nicety, on account of its lessened friction, the extreme sensitiveness with which it acts and the correct principles involved in its construction. This detail of an engine, from its duty, requires to be as delicately made as possible, or else we shall find the engine varying in speed every minute. And we submit that if an engine, or any machine, be worth making at all, it is worth doing as well as the resources of the age will admit. Absolute accuracy goes far to insure perfection, where the general details and design of an engine or machine are faulty · and it is a source of pride to a maker when he can point to the product of his skill and capital, and say that the cost of repair, considered by the amount of duty done, has been infinitessimal.

WEEKLY SUMMARY OF INVENTIONS.

SILVERING LEAD TUBING.

Many attempts have been hitherto made to silver the interior of lead and other tubing employed in mineral water apparatus and for other purposes, by the voltaic process, but it has hitherto been found impossible to effect a uniform deposition of the silver throughout the whole length, or even to obtain any deposition beyond a short distance from the ends of the tubing. The object of this invention is to obtain by such process a uniform deposition of the silver on every part of the interior of a piece of tubing of any length, and to this end the invention consists in the employment as the bath or decomposition cell of the tube itself; also in the use, for the purpose of conducting the galvanic current and for replenishing the supply of the coating metal, of a rod or wire passing through the tube in the direction of its length; also in the extension or stretching of the tube and central conductor by means of screw threads and nuts, or their equivalents attached to their ends, for the purpose of keeping them straight, and thereby providing for the more ready insertion of the central conductor within the tube, and for the prevention of metallic contact; also in the use of non-conducting supports between the interior of the tube and the exterior of the central conductor, for the purpose of preventing the conductor coming in contact with the tube, and preserving a uniform distance between them in all parts; also in providing for the movement of the central conductor and its non-conducting supports within the tube to permit the deposition of the metal on all parts of the interior of the lead pipe, which could not take place if the supports were stationary; and lastly in connecting the poles of the battery at opposite ends of the tube and central conductor to insure uniformity of deposit throughout the whole length of the tube. The inventor of this improvement is John Matthews, Jr., of this city.

SEWING MACHINE.

One part of this invention relates to the feeding apparatus, and is an improvement in that kind of feeding apparatus sometimes termed the "four motion" feed. In this feed the dog rises from below the surface of the work-plate to bite the cloth or other material before advancing to move it, and descends to release the material before it moves back preparatory to the repetition of its operation. To effect this movement the dog has been heretofore generally, if not always, raised to bite the material with a positive movement effected by a cam or its equivalent, and has been generally depressed to release the material by its own weight or by the elasticity of a spring, to which it has hitherto been attached. This improvement consists in the employment of a spring to force the dog upward to make it bite, in combination with a cam to depress it to liberate the material, by which simple change some very important results are obtained, as will be easily understood. It also embraces certain means of withdrawing the dog from the material at the pleasure of the operator, to admit of the material being moved or for any other purpose, as well while the needle is out of, as while it is in the material. Another part of the invention consists in a novel arrangement of a hook to operate in combination with a needle and a reciprocating shuttle, interlocking the thread so as to form a half-knot, thus making a secure stitch. This device has been patented to Charles Scofield, of Adams, N. Y., and Clark Rice, of Watertown, in the same State.

CUT-OFF.

This invention relates to the employment as a cut-off, in combination with a slide valve or valves by which the induction and eduction of steam to and from the cylinder of the engine are effected, of two puppet valves, applied to seats provided for them in the ports of the slide valve or valves; and it consists in certain means of opening the said puppet valves at the proper time for the induction of the steam and of keeping them open as long as desired within the first half of the stroke of the piston, and then tripping them, and permitting them to close and cut-off the steam, the whole being arranged within the steam chest of the engine and operated by the movement of the slide valve, but made variable under the control of hand gear applied outside of the steam chest or of a governor. This improvement was designed by David Fellenbaum, of Lancaster, Pa.

BRIDLE BIT.

The object of this invention is to place the horse, especially a vicious one, under the better control of the rider or driver than it has hitherto been, and with the use of but a single pair of reins. The ordinary bar bits are frequently rendered inefficient in consequence of the animal grasping the bar with his teeth, and thereby preventing the action of the bit on the horses' jaw. The invention consists in the use of supplemental bars placed within the principal one, and having springs attached, the parts being so arranged as to adjust the action of the supplemental bars on the lower jaw of the animal in case of the latter grasping with its teeth the principal bar. The patentee of this invention is Henry Crane, of this city.

TEMPERING SPRINGS AND OTHER ARTICLES.

The object of this invention is to not only facilitate the manufacture of tempered steel articles, but also to temper the same in a better manner than heretofore. The invention is applicable to the manufacture of tempered steel articles which require to be bent or swaged in a particular form and tempered. The invention consists in applying water to the article to be tempered, while the latter is under pressure, and while being confined within a swage or die, and under the same heat in which it was formed or bent. The inventors of this improvement are C. G. and H. M. Plympton, of Walpole, Mass.

BARK SEPARATOR.

This invention has for its object the separating of the good from the worthless portions of bark, preparatory to the grinding of the former for the use of tanners. It is designed to have the invention applied to a bark mill in such a way that the separated superior portions of the bark may pass directly into the mill and be ground, the worthless portion dropping from the machine, while the portions of medium quality are reduced to dust by the action of the saw or cutter, separated from the other portions and discharged from the machine at a separate point. This device has been patented to Joseph Brakeley, of this city.

BAROMETERS.

The object of this invention is to make a mercurial barometer that shall be perfectly portable and free from liability to breakage in transportation. The invention consists in a certain mode of applying a valve in combination with a cistern surrounding the lower end of the tube, to provide for the closing of the lower end of the tube to keep it full of mercury, and thereby to exclude the air when it is desired to transport the barometer. The credit of this contrivance is due to Lum Woodruff, of Ann Arbor, Mich.

OUR SPECIAL SOUTHERN CORRESPONDENCE.

One of the assistant-editors of this journal has gone on a rapid trip down the Mississippi, as far as New Orleans, and will thence proceed to Galveston, Texas, visiting some interior portions of the State. During his absence he will furnish us with a weekly letter upon such topics as he may deem of interest to our readers. The first letter appears in this week's issue, and we expect soon to receive from his pen some account of the rise and progress of the cotton-seed oil business (which is now so rapidly assuming importance) and other industries of the southern States.

PURE BENZOLE FROM COAL NAPHTHA.—The sulphite of phenyle and ammonium ($C^{12} H^5 NH^4 2 SO^3$) usually called sulphobenzolate of ammonium, yields a very large proportion of pure benzole when submitted to dry distillation. The hydro-carbon thus procured can hardly be distinguished from the benzole obtained by heating benzoic acid with lime. Its odor is etherial, almost fragrant; and its boiling point is constant at 80°8. A chemists well acqnainted with the ordinary benzole obtained from coal naphtha, to whom I showed a specimen of the benzole thus prepared from the sulphobenzolate of ammonium, scarcely recognized it as the same substance, so pleasant was its color. To prepare the sulphobenzolate, the purified benzole of commerce is dissolved with the aid of a gentle heat, in a slight excess of fuming sulphuric acid; if ordinary oil of vitriol be employed, a much larger quantity of the acid is required. The acid liquid, after having been heated in the water-bath for some time, is allowed to cool, and then diluted with water. Commercial carbonate of ammonium, together with some ammonia water, is to be added till the solution is slightly alkaline. The whole is now evaporated to dryness in the water-bath, and the dry mass exhausted with boiling alcohol. The greater part of the sulphate of ammonium remains in the residue. The alcoholic solution of the sulphobenzolate of ammonium is to be transferred to a retort, and submitted to distillation. When all the alcohol has distilled over, the receiver is changed, and the heat raised. The benzole which collects in the receiver is accompanied by small quantities of solid products and by water. From these it may be separated by the addition of a strong potash solution, and the removal of the supernatant oil by the pipette. The benzole is then rectified off caustic potash. The benzole thus produced is perfectly pure, and although the quantity obtained is not very large, yet the result of the process is exceedingly interesting to the chemist, since it removes all doubt concerning the identity of the benzole from coal naphtha and similar sources with that obtained from benzoic acid.—*Chemical News.*

INTRODUCTION OF FIRE-ESCAPES.—The fire-escape imported from London by some gentlemen in this city, and constructed upon the plan illustrated on page 244 of the present volume, has been tested and promises to give good satisfaction. Messrs. Mickle & Carville, who, some months ago, patented (through the Scientific American Patent Agency) a fire-escape, which was illustrated on page 260 of the present volume, have been awarded $20.000 by the Common Council, to introduce their invention into the city.

INCREASE OF INVENTIONS AT THE SOUTH.—We have lately noticed a marked increase in the number of applications for patents from the southern States. Our receipts of money on account of patent business, published weekly, bears testimony to this fact. The activity of the inventors augers well for the prosperity of any section of the country.

STEEL DIES.—On another page will be found the advertisement of W. K. Lamphear & Co., of Cincinnati, Ohio, manufacturers of hand-made tools. We have examined specimens of their steel dies, which appear to be of the first quality, and of that character which first-class workmen use.

PATENTS FOR NEW INVENTIONS.—All persons who are interested in procuring Letters Patent for new inventions are invited to read the advertisement of MUNN & CO. (in this number), who, in connection with JUDGE MASON, late *Commissioner of Patents*, attend to every branch of this business.