SILK CULTURE IN THE UNITED STATES.

BY PROF. C. V. RILEY.

The SCIENTIFIC AMERICAN has recently contained various items respecting silk culture in the United States, and as a very marked interest in the subject has of late been manifest, it may be well to calmly consider the present prospect of the permanent establishment of the industry. This I have just done in the preface to a second edition of the "Manual on the Silk Worm," issued by the Department of Agriculture, the substance of which I would here give in advance

We can best understand the present prospects for silk culture in this country by stating the dangers to be avoided and the obstacles to be surmounted. They are:

1. The disposition to exaggerate.
2. Inexperience.
3. The higher value of labor as compared with older silk-producing countries.
4 The want of a ready market.

1.—The disposition to exaggerate is common. Enthusiasm is laudable; but the difference between the practical and successful and the visionary and unsuccessful man lies in the ability of the former to fully appreciate the obstacles to any undertaking against the tendency of the latter—whether from ignorance or purely speculative motives—to exaggerate the bright and ignore the dark side of any project. The multicaulis furor, the white willow fever, and, more recently, the Utopian claims for tea-culture and corn-stalk sugar, are examples of the evil effects of the over-zealous promulgation of narrow and one-sided views; while the failure of recent attempts to establish sericulture on the Pacific, in Kansas, at Vineland, and elsewhere, may, in each instance, be traced to over-zeal on the part of the projectors, coupled with inexperience of our country and our people. To avoid this danger we cannot too strongly enforce the facts that the elements of successful silk culture on a large scale are at the present time entirely wanting in the United States; that the profits of silk culture are always so small that extensive operations by organized bodies must necessarily fail because there are so many more lucrative ways to employ capital; that extensive silk-raising is fraught with dangers that do not beset less ambitious operations; that silk culture, in short, is to be recommended only as a light and pleasant employment for those members of the farmer's household who have no other way of earning money, and have time to spare.

2.—The want of experience is a serious obstacle to silk culture in this country; for while the mere feeding of a certain number of worms, and the preparation of the cocoons for market, are simple enough operations, requiring neither physical strength nor special mental qualities, yet skill and experience count for much, and the best results cannot be attained without them. In Europe and Asia this experience is traditional and inherited, varying in different sections both as to methods and races of worms employed. With the great variety of soil, climate, and conditions prevailing in this country, experience in the same lines will also vary, but the general principles which I have indicated in the manual afore-mentioned should govern. They may be adopted from the older countries and should be inculcated in our common schools. We have a number of special agricultural colleges to which both sexes are admitted; but I am not aware that the principles governing silk culture are ever taught to the girls attending them as helping to one means of remunerative employment which is becoming more and more desirable for that portion of our rapidly increasing population.

3.—The greater value of labor here, as compared with labor in the older silk-growing countries, has been in the past a most serious obstacle to sericulture in the United States, but conditions exist to-day that render this obstacle by no means insuperable. In the first place comparative prices, as so often quoted, are misleading. The girl who makes only twenty or thirty cents a day in France or Italy does as well, because of the relatively lower price of all other commodities there, as she who earns three or four times as much here. Again, the conditions of life are such in those countries that every woman among the agricultural classes, not absolutely necessary in the household, finds a profitable avenue for her labor in field or factory, so that the time given to silk raising must be deducted from other profitable work in which she may be employed. With us, on the contrary, there are thousands—ay, hundreds of thousands—of women who, from our very conditions of life, are unable to labor in the field or factory, and have, in short, no means outside of household duties of converting labor into capital. The time that such might give to silk culture would, therefore, be pure gain, and in this sense the cheap labor argument loses nearly all its force. This holds more particularly true in the larger portions of the South and West that are least adapted to dairy products, or where bee-keeping and poultry-raising are usually confined to the immediate wants of the household. In the early part of the century the females in most households, even of the well-to-do, found profitable employment in the spinning wheel and the distaff. With modern improved appliances and the general introduction of machinery the average American girl is too often doomed to idleness or else forced to leave her home to add to the family income.

4.—The want of a ready market for the cocoons is, as it always has been, the most serious obstacle to be overcome, and the one to which all interested in establishing silk culture should first direct their attention. Ignore this, and efforts to establish the industry are bound to fail as they have failed in the past. A permanent market once established, and the other obstacles indicated will slowly but surely vanish as snow before the coming spring. Owing to the prevalence of disease in Europe there grew up a considerable demand for silkworm eggs in this country, so that several persons found the production of these eggs quite profitable. Large quantities are yet shipped across the continent from Japan each winter, but this demand is, in its nature, transient and limited, and with the improved Pasteur methods of selection and prevention of disease, silk raisers are again producing their own eggs in Europe. Silk culture must depend, therefore, on the production of cocoons, and these will find no remunerative sale except where the silk can be reeled. Reeling establishments are, therefore, absolutely essential to the success of silk culture.

Now, if the mere raising of cocoons is a simple operation, the reeling of the silk is one requiring both skill, capital, and experience. There is little hope of inducing our business men to engage in the establishment of filatures so long as the reeled silk from other countries can be obtained free of duty, and this is the whole difficulty. Under a heavy protective tariff our silk manufactures have grown rapidly in importance and wealth, until during the year 1881, raw silk to the value of $11,936,865, and waste silk and cocoons to the value of $769,186, were imported at the ports of New York and San Francisco, while our manufactured goods reached in value between $35,000,000 and $40,000,000. Now the so-called raw-silk thus imported to the value of nearly $12,000,000 is just as much a manufactured article as the woven goods, and its importation free of duty is as much an encouragement to foreign manufacturers, and an impediment to home industry, as the removal of the duty would be on the woven goods. Yet just so sure as you attempt, for the encouragement of silk culture in this country, to get Congress to impose a duty on the "raw" material, you will be met and overcome by the combined capital of the manufacturers, who, with their powerful organizations, can more readily influence our legislators. A protective tariff for the succoring of an infant industry is all well and good, as the masses are thereby so indirectly taxed that the tax is less noticeable; but when it is imposed for the benefit of strong and wealthy corporations at the expense of home production, it becomes monopoly, and is adverse to public interests. It matters little that the treasury coffers are overflowing, or that the manufacturers, now firmly established, could afford a reduction in profit. They hold the vantage ground, and will not lose it without a struggle.

There are left but two other ways of establishing a home market—either by getting government aid in an indirect way, or by the patriotic and benevolent efforts of private individuals. In the line of the former method, to quote from my manual: "I have urged, and would urge that Congress give to the Department of Agriculture the means to purchase, erect, and appoint with skilled hands, on the department grounds, a small filature or reeling establishment. In such an establishment reelers could be trained, and the cocoons, at first raised from eggs distributed by the department, could be skillfully reeled and disposed of to our manufacturers. A market would thus be formed for the cocoons raised in different parts of the country, and a guarantee be given to those who chose to embark in silk culture that their time would not be thrown away. All industries should be encouraged in their infancy; and for the first few years, or until the silk industry could be considered well established, the cocoons should be paid for at the European market rate, plus the cost of reeling, which would range from 50 cents to 75 cents per pound of choked cocoons This last should be looked upon as a premium offered by the government to the raisers in order to stimulate the industry until such times as the reeling might be safely left to private enterprise, when government encouragement might be withdrawn."

Meanwhile the establishment of a filature by any private individual or organization will prove a benefaction, and it is gratifying to be able to state that Messrs. Crozier & Co., of Corinth, Miss., have made preparations for reeling, and offer to purchase cocoons at Lyons prices, and that the "Women's Silk Culture Association," of Philadelphia, by the use of a good hand reel and the employment of a skilled reeler, is also able to purchase cocoons. These are beginnings in the right direction. Messrs. McKittrick & Co., of Memphis, Tenn., also inform me that they have established a silk school and a filature, and are prepared to purchase cocoons; but I fear that such efforts are so far warranted only either through benevolent support, or as an aid to the general business of supplying eggs and mulberry cuttings.

The obstacles which I have set forth are none of them permanent or insuperable, while we have some advantages not possessed by other countries. One of infinite importance is the inexhaustible supply of osage orange (*Maclura aurantiaca*) which our thousands of miles of hedge furnish; another is the greater average intelligence and ingenuity of our people, who will not be content to tread merely in the ways of the Old World, but will be quick to improve on their methods; still another may be found in the more spacious and commodious of the farmers' barns and outhouses. To all interested in this industry I would, therefore, say: Go on in the good work by avoiding exaggeration and by disseminating accurate and needed information as to methods and principles. Above all we should bear in mind the admirable adage, "Festina lente." To move slowly and with caution is the only way to move surely to success in this matter.

Strength of Manganese Bronze.

The twin screws of the new English Ironclad Colossus, launched March 21, are of manganese bronze. This metal was adopted in place of gun metal, as first ordered, after a series of comparative tests of the two metals made in the presence of a representative of the Admiralty at the works of the contractors for the engines. In these tests bars of both metals, one inch square, were placed on supports twelve inches apart, and first subjected to a steady pressure applied in the middle of the bars, and afterward to impact by a weight of fifty pounds falling from a height of five feet. With a steady pressure the gun metal bars slipped between the supports or broke with a strain of 28 cwt., while the manganese bronze bars required 54 cwt. to break them. Tested by impact the gun metal bars broke with from seven to eight blows, while it took from thirteen to seventeen blows to break the manganese bronze bars. The ultimate bend of the latter was also in both cases more than that of the gun metal, thus showing fully double the strength with superior toughness. The advantages claimed for manganese bronze over gun metal are—first, a considerable saving of actual weight of machinery; and, second, that it enables a thinner and consequently a better blade to be made, offering less resistance to the water and equaling in strength the gun metal blade of greater dimensions.

The Colossus is intended to be the most formidable vessel of the British navy. She is of 9,146 tons burden. Her engines are 6,000 horse power.

Vibration of Bridges.

To the Editor of the Scientific American:

I have just read the article in your weekly issue for December 24, 1881 (having only lately received it), under the heading of "Vibration of Railway Bridges," and I agree with you; such defects as you point out have more than a tendency to ultimate destruction. You are correct in your requirement of such details as will tend in the construction of bridges to resist vibration. The vertical disturbances I will take as *nil;* but bridges—I mean other than those of masonry—as at present designed, must have a tendency to sway, and the results are what you have particularized, namely, the weakening of all joints and rivets, and the crystallization of the metal. (It was that and the dead weight of the train at a particular spot, and time, which caused the destruction of the Tay Bridge. See my articles in the *Scientific Canadian* shortly after the accident.) But all the stays and braces you could put to a structure would in no way cause that rigidity so essential to stability. You must depart from *parallelism* and *flat sidedness* in your *structures;* calculate what your bridge will bear at its center; allow the usual excess; quadruple that excess gradually to the haunches, and provide strength accordingly. If *these features* are attended to, vibration or oscillation is impossible.

I. KILNER,
Major-General Royal Engineers.

Fredericton, March 16, 1882.

How to get Rid of Water Bugs.

To the Editor of the Scientific American:

I notice that one of your correspondents asks how to rid him of water bugs. *Powdered borax* and equal parts of *pulverized sugar* will rid any house of them. They will not eat the borax alone, but with sugar they will, and either die or leave, if scattered about. This is my experience.

A READER SCIENTIFIC AMERICAN.

Diphtheria.

Dr. Franklin Staples, of Winona, Minn., after an extended correspondence with physicians in most of the counties of his State, has published a report on diphtheria, in which he classes the disease as contagious and infectious, and demonstrates that it is on the increase, a fact due, in his opinion, to failure on the part of physicians in recognizing its self-propagating properties; to want of systematic nursing of patients suffering from the disease; to incomplete disinfection of premises attacked; and last but not least, to the frequent intercourse of convalescents with healthy persons. He maintains that strict regulations, rigidly enforced, are the only means adequate to cut short its career, and since individual power is unable to cope with it, urges that every city and town should devise efficient sanitary laws, and let them be enforced by intelligent medical officers, who shall also make it their duty to instruct the people in sanitary rules. To guard against contamination, he believes that filth, whether from dirty rooms, soiled clothing, defective drains and cesspools, ill-ventilated rooms, poisonous inodorous gases, etc., should be regarded as conditions which invite the disease; that the apartment set apart for the patient should be divested of all furniture, carpets, curtains, and fabrics of any kind not absolutely required; that discharges from the nose, mouth, and bowels should be carefully collected and destroyed, and that all personal clothing, bed linen, etc., should be thoroughly disinfected before being sent to the general wash. In case of death, all clothing and unimportant articles should be burnt, the body should be immediately disinfected, and put into its coffin, which should be kept permanently closed. There should be no public funeral. He prefers disinfection by chlorine gas, which is to be set free in the room. Ventilation for a number of hours should then be insisted upon. Precautions falling short of these Dr. Staples considers to be useless in preventing the spread of the infection.—*Report on Diphtheria to the Minnesota Board of Health*, 1881.

The Effect of Oil on Water.

What is regarded as a complete demonstration of the value of oil in diminishing the violence of heavy seas, was made at Peterhead, near Perth, England, March 1, by Mr. John Shields.

Having chosen Peterhead as the most suitable place for his experiment, Mr. Shields caused iron and lead pipes to be laid from the beach into the sea in front of the entrance to the harbor. A force pump was attached to the land end of the piping, and near it was placed a large barrel containing one hundred gallons of oil. On March 1, Mr. Shields, having been informed by the Meteorological Office that the sea was rough at Peterhead, went thither from Perth, accompanied by several seafaring men from Dundee and Aberdeen. When the white-crested waves were rising to a height of ten to twenty feet at the harbor entrance, the oil pump was put in motion, causing the oil to spread in the bottom of the sea, and on its gradually rising to the surface, the white foam entirely disappeared, and although the swell continued, the surface of the sea was perfectly smooth, so that a ship or a small boat could have entered the dock without the slightest danger—an impossibility before the oil was distributed in the water. The experiments satisfied the shipmasters who witnessed them. Mr. Shields is willing to give any harbor board the benefit of his invention, and render assistance in carrying it out.

RECENT INVENTIONS.

Messrs. Thomas M. Righter, of Sandy Run, and Thomas R. Griffith, of Wilkesbarre, Pa., have patented an improved can for use in oiling machinery. It is designed to prevent accidental or careless waste of oil. The invention consists in the combination with an oil can of a discharge tube or nozzle extended down into the can, nearly to the bottom, and provided with a bell-shaped mouth at its lower end, and a ball valve for closing the lower end when the can is turned from an upright position.

An improved door securer has been patented by Mr. John J Tierney, of New York city. This is an ingenious arrangement of a screw and guard plate for preventing access to the screw. The guard plate is held in position by the bolt of the door lock.

Mr. George W. Johnson, of Newton, Ill., has patented a tool for removing rollers from the balance wheel posts of watch movements, one of the jaws of the tool being flattened and divided to form fingers or tines adapted to be passed between the balance wheel and the roller, straddle of the post, the other jaw being formed with a recess for the reception of the pivot of the post, so that the end of the jaw will rest upon the shoulder of the post where power is applied to the handles of the tool for forcing off the roller.

An improvement in cultivators has been patented by Mr Francis O. Williams, of North Cohocton, N. Y. The object of this invention is to prepare ground to receive seed and cultivate the plants.

A novel spring-hinged bracelet has been patented by Mr. Abraham H. Engel, of New York city. The invention consists in the combination, with the two parts of the bracelet connected by a hinge and the spring, of the lug beveled upon its opposite sides, whereby the parts of the bracelet will be held in position, both when opened and when closed, by the tension of the spring.

IMPROVED STALK RAKE.

The annexed engraving represents a stalk rake for gathering corn and cotton stalks, potato vines, and other rubbish in the field into windrows, preparatory to burning them up, and in this way cleaning the field. When it is desired to pull the roots up with the stalks the rake is drawn crossways, as the rake will then take better hold of the stalks by the roots.

To unload the rake the driver raises the handle at his right, when the rake turns over without being raised from the ground.

The rake is made from fine oak timber. The teeth, which are of iron, are 30 inches long by seven-eighths square; the head piece is 10 feet 6 inches long and 4 inches square. From twenty-five to thirty acres of stalks can be raked with one of these rakes in a day.

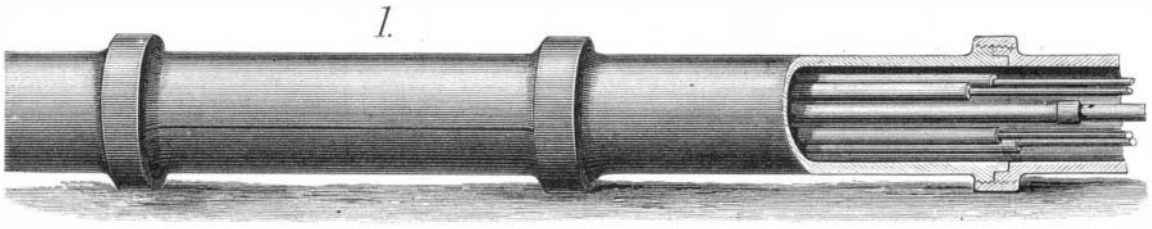
As a reason for burning cornstalks and all other rubbish on the field the inventor calls attention to Bulletin No. 5, published by the Interior Department, from which he quotes the following in regard to the destruction of the chinch bug: "Having made observations in reference to the habits of this insect, and finding that it wintered in the perfect state, I suggested, in 1859, burning over the infested fields in the winter as perhaps the best means of destroying them, and am still inclined to look upon it as the best practical means of counteracting those that are susceptible of general adoption." "If it is possible, therefore, to reach their retreat with fire, this will be the most effectual method of destroying them where irrigation is impracticable."

Great difficulty is experienced in cultivating corn planted on ground where old stalks have been plowed under, as the cultivator will pull up the old stalks, and with them the new corn, and small grain can be harrowed under much better when the old stalks are out of the way. This improved rake affords a ready and inexpensive means of clearing the fields and getting the rubbish out of the way.

This invention was recently patented by Mr. Henry Grebe, of Omaha, Neb., who should be addressed for further information.

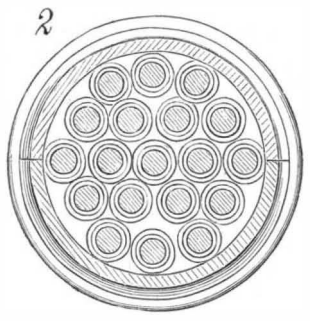
IMPROVED INSULATOR AND PROTECTOR FOR UNDERGROUND LINES.

The great problem in telegraphy and telephony seems to be the disposition of the wires. Looking up from many of our New York streets, one can but wonder that the multitude of wires extending in every direction perform their function with so little interference one with another. Still the trouble caused by "crosses," breakages during storms, and by the excursions of line men in building and repairing lines, is very great, and daily increasing, and a remedy is demanded. Clearly some system of underground lines is preferable to any arrangement of overhead wires. We give an engraving of one of the latest, and apparently a very practicable device for insulating and protecting underground telegraph and telephone wires, the invention of Mr. William A. French, of Camden, N. J.



FRENCH'S INSULATOR AND PROTECTOR FOR UNDERGROUND LINES.

The protector or outer casing consists of a tube of hard rubber made in ten-foot lengths and of a diameter suited to the number of wires to be used. The ends of the tubes are united by a water-tight joint. Short connecting tubes, made in halves, join the longer lengths and admit of being removed to insert or remove the conductor.



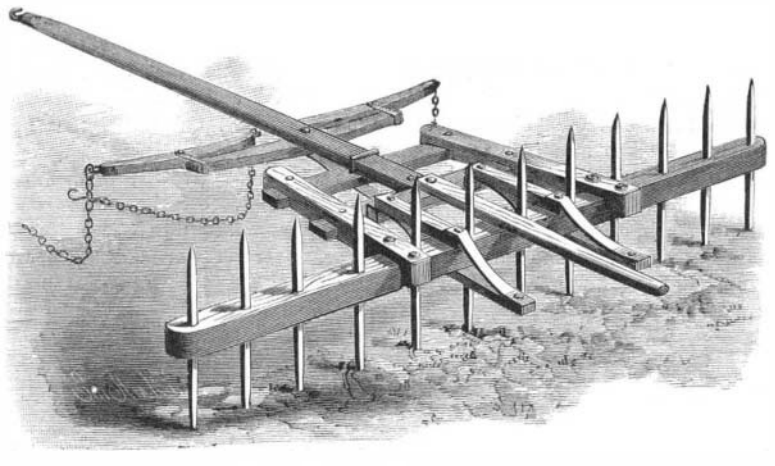
SECTION OF INSULATOR AND PROTECTOR.

The lengths of large tubing are filled up with smaller tubes of soft rubber, which project a short distance from the ends of the large tube into the connecting tubes, where they meet the ends of the corresponding tubes of the adjacent section, and are connected by a short coupling of hard rubber.

The small tubes are of such size as to admit of readily inserting and removing the telegraph wire. In some cases the inventor covers the wire with a protective coat of insulating material before placing it in the small tubes.

In applying the invention to practical use the telegraph wires are passed through the small soft rubber tubes of a number of hard rubber tubes, which are placed at such a distance apart that the ends of the soft rubber tubes will meet. The ends of the corresponding tubes are then connected by the small hard rubber couplings. The divided connecting tubes are then applied to the adjacent ends of the hard rubber tubes, and the coupling bands are screwed on the collar, the joints being made tight by cement or packing.

The soft rubber tubes can be made of any desired length, and can be inserted in the hard rubber tubes before or after the hard rubber tubes have been put in position, and that the half section tubes can be dispensed with in whole or in part.



GREBE'S STALK RAKE.

MECHANICAL INVENTIONS.

An improved peanut picker and cleaner has been patented by Mr. Everitt H. Powell, of Buckhorn, Va. This invention is an improvement in that class of machines for removing peanuts from vines, and also cleaning them, which have fixed and vibrating screens and a vibrating shoe and fan blower arranged beneath the same. This inventor employs in addition to these an endless traveling apron or carrier for delivering the cleaned nuts into a receptacle provided for the purpose; but the particular feature of novelty and superiority of this machine consists in the arrangement whereby the screens, shoe, apron, etc., are operated.

An improvement in stop-watches has been patented by Mr. Charles H. Audemars, of Brassus, Switzerland. This invention consists in the use of two pinions placed between the usual pinions, by which the stop-watch hands are driven from the second hand of the watch, such two pinions fitted for being connected and disconnected with each other, and retained in either position by springs acting endwise of the arbor, with the result that the pinion gearing to the second hand arbor is continuously in motion.

A new method of locking nuts upon bolts has been patented by Mr. Albert R. Clark, of Amite City, La. It consists in first flattening one side of the bolt near the face of the nut and then casting a metal ring around the bolt, so that a portion of the ring will rest in the flattened portion of the bolt.

Mr. William S. Wood, of Denver, Col., has patented an improved ore washer, which is an improvement on the ore washer for which Letters Patent No. 209,789, dated November 12, 1878, were heretofore granted to Theophilus T. Allen.

An improvement in sleds, patented by Mr. Charles M. Amsden, of Wooster, Ohio, consists in combining with the ordinary cross bars, side rails, and seat board a metallic frame. The sled is light and strong, and in appearance is much handsomer than the ordinary wooden sled. The parts can be made almost entirely by machinery, and but little handwork is required to complete the sled.

An improved barrel stave jointer has been patented by Mr. Robert O. Dobbin, of Berlin, Ontario, Canada. In this machine the stave is carried over a circular saw by an overhanging carriage, which is swung laterally so as to give the proper curvature to the edge of the stave. The swinging is effected by an arrangement of guides on the saw table.

An improved link for horse powers has been patented by Mr. Barnard L Olds, of St. Albans, Vt. This invention relates to the means by which the lags are secured to the jointed links of the endless treads in horse powers; and it consists in loops or stirrups forming part of the links and engaging slotted lags, by which arrangement lags of uniform construction may be used and the use of bolts may be avoided.

An improvement in sawmill log-carriages has lately been patented by Mr. Morgan B. Campbell, of Beverly, W. Va. This invention facilitates the setting of logs on sawmill carriages, and renders the handling of logs in the mill a simple and easy operation.

An improved machine for dressing box straps and barrel and tierce hoops split from poles, has been patented by Mr. Samuel R. Garner, of Cassville, Wis. The invention consists in certain novel features in the feeding mechanism and in new mechanism for holding the hoop up to the cutter.

An improved baling press has been patented by Mr. Louis Ensinger, of Little Elm, Texas. This press is operated by racks and pinions, the latter being driven by worm gear. The press has a quick return motion, and has novel devices for filling and discharging.

An improvement in compass saws has been patented by Mr. Charles Bush, of New York city. The invention consists in a blade tapered from the center toward each end, curved transversely, with a curve gradually decreasing in size from the center toward each end, and pivoted at its center by a clamping screw to a handle grooved upon its opposite edges, so that larger and smaller curves can be sawed by the same saw, and a curved kerf can be continued in a curve in the opposite direction.

A novel cloth-measuring machine has been patented by Mr. Albert Winter, of Plainfield, N. J. These improvements relate to machines of the class in which revolving drums are used for measuring cloth as unwound from rolls. This invention insures accuracy by employing devices for clamping the cloth to the drum as it progresses through the machine.

An improved cultivator has been patented by Mr. Montgomery C. Meigs, of Romney, Ind. In this implement the stalks of the corn being cultivated are made to regulate the width of the cultivator.