Improved Silk-Assigning Machine.

All butterflies, moths or millers come into existence as worms or grubs. The grub is hatched from the egg, grows to maturity and then changes into a curious mummy-like form called the chrysalis. In this state it is dormant, and appears to be dead; but the forces of nature are busy in its structure, changing it so strangely from the crawling worm into the perfect and beautiful insect that soars away above the earth upon its gossamer wings, these metamorphoses affording the most forcible suggestion that is furnished by nature of the possible change of men from the animal to the angelic state. During its dormant condition the chrysalis would be very liable to be eaten by birds or otherwise destroyed, did not Nature make provision for its protection, and numerous are the contrivances to which she has resorted for this purpose. The plan which she has most commonly employed is to teach the worm to weave a little house around his person from matter secreted in his body before he passes into his immovable and helpless condition. The thread with which the insect, longlegs, builds the cocoon for his habitation during chrysalis state is of so strong, smooth and glossy a character that it has been appropriated by man for his most beautiful garments. It is known in the English language by the name of silk.

The individual fibers of the silk cocoon are so attenuated that several of them are combined to make the very finest thread. The fibers also differ very much in size, and this variation has been a source of great difficulty to silk manufacturers, especially in making sewing silk; and more especially that which is to be used in sewing machines. For these machines it is very important that the thread should be of uniform size, and great efforts have accordingly been made to accomplish this result, which have resulted in notable improvements in the evenness of sewing silk since the introduction of sewing machines.

Most of these efforts have been directed to the more careful assorting of the raw silk in parcels of uniform size; and several machines have been invented to facilitate the operation. The accompanying engravings illustrate one of these machines, invented by John A. Atwood, of Mansfield, Conn., and Lewis Leigh, of Seymour, Conn., and for which patents have been procured through the Scientific American Patent Agency, in England, France and the United States.

It is a device by which variations in the size of the thread are multiplied several fold, and the thread is wound in three sizes upon as many spools. Fig. 1 of the engravings is a front view of the machine, and Fig. 2 a vertical section. A series of light smooth rollers, C C G, are hung upon the ends of counterbalanced levers, D D D D', in such a manner that they may rest lightly one upon the other, as clearly shown in Fig. 2. The levers are suspended on their fulcrums, b b b, b, with weights upon their outer ends to nearly counterbalance the weight of the rollers, C. The lower end of lever, G, carrying the bent upper end of this lever under the pulley, J, of bobbin, G, lifting this pulley out of contact with the friction wheel, H, by which the bobbin is driven. This of course stops the winding of the thread upon the bobbin, G, which reminds the operator to change the bobbins. He accordingly substitutes for the ob-
bin, G, the bobbin, G', which is designed to receive the largest-sized thread. At the same time he slips the lever, F, sideways upon its fulcrum, H (see Fig. 6), when it rests against the pin, e; this pin being raised above the notch, n, by the elevation of the lever, D.

The work now proceeds as before, until a section of smaller thread enters between the rollers, C C, when the end of lever, D, falls, bringing the pin, e, opposite the notch, n, in the side of lever, F; allowing the lever, F, again to fall forward and lift the bobbin out of gear. The action of a section of smaller thread is so similar that it needs no separate explanation.

The rod, U, is a guide for winding the thread upon the bobbin in regular spirals. It is secured to the upper end of the lever, T, the lower end of which lever is drawn against the cam, S, by the spring, V.

By this machine the variations in the size of the thread are so multiplied that the thread can be assorted in different sizes with the most delicate accuracy.