

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.—No. 15.
[NEW SERIES.]

NEW YORK, OCTOBER 7, 1868.

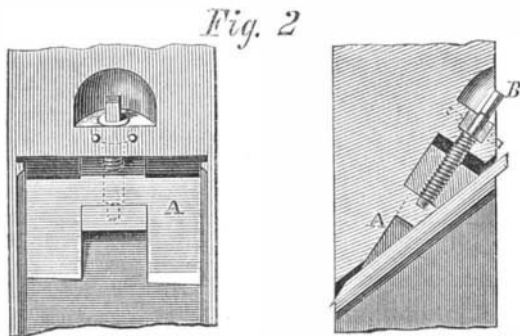
\$5 per Annum.
[IN ADVANCE.]

Improved Machine for Mitering Frames.

The joints of rectangular frames as picture, looking glass, window, and other frames must be cut at the proper angle before being put together; and to make perfect joints they should be planed as well as sawed. Usually, these two processes are performed on separate machines, and sometimes the fitting is done by a hand plane. The machine, however, which is herewith illustrated performs both these operations at one time, perfectly and with great rapidity.

The machine is an iron frame carrying a sliding platen, also of iron, on the top, and having two saws and cutter heads mounted on a single central shaft. This shaft, with its combined saws and cutters, is driven by a belt running on a small pulley on it, driven by a belt running from a larger pulley at the rear of the machine and near the floor, the shaft of which carries a fast and loose pulley. On this shaft is also a worm engaging with a worm gear on an upright shaft, having on its upper end a pinion engaging with a rack fixed to the under side of the sliding platen. This combination is the feed of the platen. The upper journal of the vertical shaft runs in the end of a lever pivoted to a brace under the platen, the other end of the lever being a handle projecting beyond the forward end of the platen. A slight transverse movement of this handle throws the pinion out of gear with the platen rack, and by pressing lightly on the handle of another lever, pivoted to the platen, the under face of the lever being covered with leather, it engages with the top of the saw shaft under the platen and the revolving of the shaft carries the platen rapidly back ready for another forward movement, which is obtained by the action of the pinion and rack thrown into gear. If the automatic feed is not desired, the pinion and rack may be left disengaged, and the platen moved simply by pushing with the hand, as on ordinary sawing machines.

For guiding and holding the stuff to be sawed there are three frames, formed at an angle of 90°, secured to the face of the platen, their raised edges being graduated to inches and their parts, and in a score cut diagonally across the platen is a sliding guide, or holder, that may be held by a thumb nut and bolt at any point desired, to regulate the length of the piece to be cut.



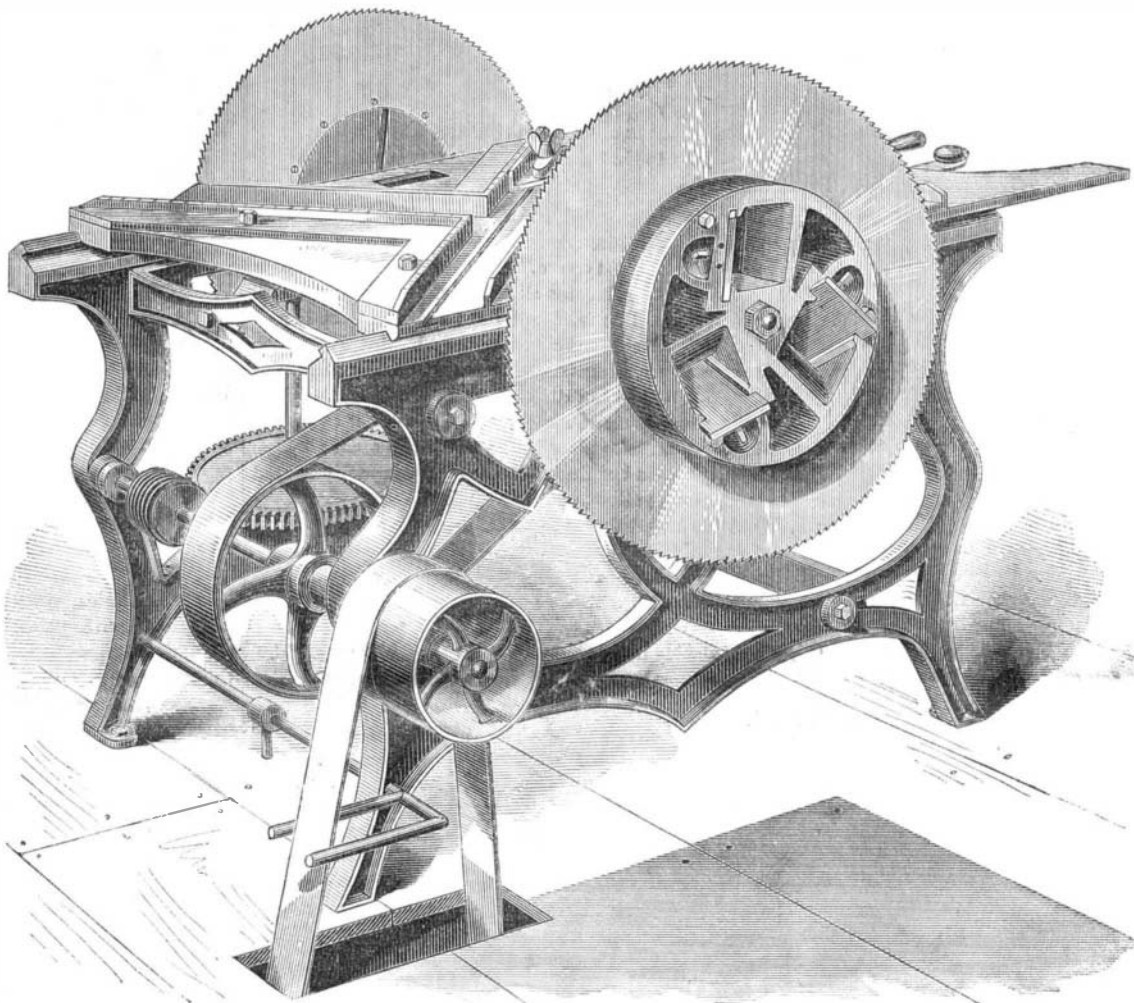
The saws are not ordinary circular saws, but annular, the blades being secured to turned wrought iron flanges insuring stiffness and perfect truth. These flanges are bolted to hollow heads, which are formed to receive two, three, or more planing bits, or cutters, that finish the joint of the stock after it passes the edge of the saw. The method of setting and securing these blades is peculiar and very effective. It is shown in detail in Fig. 2.

These hollow heads are divided into as many radial compartments as there are planing bits. The sides of these compartments have planed ledges on their sides, which hold the edges of one side of the bits. They are seen in perspective, in Fig. 1. These ledges are planed or filed perfectly smooth and straight. On the other side of the bits are wedges, A, Fig. 2, with planed surfaces meeting the back of the bit. These wedges are moved by means of screws, B, the heads of which are seated in semi-circular recesses in the head, as seen, and turned by means of a socket wrench. The edge of the bit being set at the proper distance from the inner face of the

head, a slight turn of the screw brings the wedge down upon it and hugs it with great force against the ledges.

This method of securing cutters (which may be also applied to any tenoning or grooving machine) leaves a clear throat for the discharge of chips, unimpeded by bolt head or other devices, and does not necessitate the slotting of the bit, which is simply a plain plate.

This device was patented through the Scientific American Patent Agency, May 26, 1868, by John J. Sanders, Jr., who may be addressed for the purchase of the entire right, or for other information relative to the patent, at 257 Hudson street,



SANDERS' PATENT MITERING MACHINE.

New York. He will also sell the right to hold planing irons, etc., by his method, to plane makers, wood workers, and others wishing to use it.

NATURAL SELECTION--THE DARWINIAN THEORY.

The theory of the origin of species as first enunciated by Darwin, and which has been so widely discussed, has undoubtedly been gaining ground among the most celebrated naturalists. The basis of that theory is, first, that variations, so slight as not to form distinctive features of classification, are constantly occurring in the reproduction of both plants and animals; second, that these variations of form are capable of transmission to progeny, and that the peculiar characteristic resulting from the variation is generally intensified in its transmission; third, that whenever the variations give their inheritors peculiar advantages in obtaining sustenance, etc., over that possessed by their fellows, they will live longer, will procreate more, and consequently, in the lapse of ages, will extinguish the weaker types. The author of the theory called this process natural selection, and supported his theory by the results of numerous experiments, in which, by artificial selection, he produced similar results to those which he claimed for the natural selection. He experimented mainly with animals which propagate very rapidly, as pigeons, rabbits, etc., and thus was enabled to produce between generations widely separated, very astonishing differences in form, color, and habits. He produced such marked changes in the descendants of wood pigeons, that he truly said, that had they been found at large by a naturalist, they would not have been classed with the same genus. They ate meat, had hooked beaks, and talons, and were both in appearance and habit similar to the family of hawks.

When this theory was first propounded, it met both vehement opposition and ridicule. It was attacked by philosophers and wits, and forced the subject of many a lampoon and satire. It was denounced as opposed to the teachings of revelation, as a system of guesses, which were not sustained by either facts or logic. But there was a vitality in the theo-

ry, and the conclusions of a man who fortifies his opinions with such a host of facts as Mr. Darwin brought to sustain his, are not easily put aside. One after another the thinkers of the entire world have slowly been accepting the theory, until it may fairly be doubted whether any hypothesis is more nearly established upon a permanent basis.

Dr. J. D. Hooker, in his recent address to the British Association at Norwich, thus reviews this subject:

"Ten years have elapsed since the publication of 'The Origin of Species by Natural Selection,' and it is hence not too early now to ask what progress that bold theory has made in

scientific estimation. The most widely circulated of all the journals that give science a prominent place on their title pages, the *Athenaeum*, has very recently told it to every country where the English language is read, that Mr. Darwin's theory is a thing of the past; that natural selection is rapidly declining in scientific favor; and that, as regards the above two volumes on the variations of animals and plants under domestication, they contain nothing more in support of origin by selection than a more detailed reassertion of his guesses founded on the so-called variations of pigeons.' Let us examine for ourselves into the truth of these inconsiderate statements.

"Since the 'Origin' appeared ten years ago, it has passed through four English editions, two American, two German, two French, several Russian, a Dutch, and an Italian; while of the work on 'Variation,' which first left the publisher's house not seven months ago, two English, a German, Russian, American, and Italian edition are already in circulation. So far from natural selection being a thing of the past, it is an accepted doctrine with every philosophical naturalist, including, it will always be understood, a considerable proportion who are not prepared to admit that it accounts for all Mr. Darwin as-

signs to it. Reviews on 'The Origin of Species' are still pouring in from the Continent, and Agassiz, in one of the addresses which he issued to his collaborators on their late voyage to the Amazon, directs their attention to this theory as a primary object of the expedition they were then undertaking. I need only add, that of the many eminent naturalists who have accepted it, not one has been known to abandon it; that it gains adherents steadily, and that it is, *par excellence*, an avowed favorite with the rising schools of naturalists: perhaps, indeed, too much so, for the young are apt to accept such theories as articles of faith, and the creed of the student is also too likely to become the shibboleth of the future professor. The scientific writers who have publicly rejected the theories of continuous revolution or of natural selection, or of both, take their stand on physical grounds, or metaphysical, or both. Of those who rely on the metaphysical, their arguments are usually strongly imbued with prejudice, and even odium, and, as such, are beyond the pale of scientific criticism. Having myself been a student of moral philosophy in a northern university, I entered on my scientific career full of hopes that metaphysics would prove a useful Mentor, if not quite a science. I soon, however, found that it availed me nothing, and I long ago arrived at the conclusion, so well put by Agassiz, where he says, 'We trust that the time is not distant when it will be universally understood that the battle of the evidences will have to be fought on the field of physical science and not on that of the metaphysical.' (Agassiz on the 'Contemplation of God,' in the *Kosmos. Christian Examiner*, 4th series, vol. xv. p. 2). Many of the metaphysicians' objections have been controverted by that champion of natural selection, Mr. Darwin's true knight, Alfred Wallace, in his papers on 'Protection' (*Westminster Review*) and 'Creation of Law,' etc., (*Journal of Science*, October, 1867), in which the doctrines of 'continual inference,' and the 'theories of beauty,' kindred subjects, are discussed with admirable sagacity, knowledge, and skill. But of Mr. Wallace and his many contributions to philosophical biology it is not easy to speak without enthu-