

**AN IMPROVED MILLING MACHINE.**

The milling machine in its various forms is rapidly taking its proper place in the modern machine shop. It has long been an indispensable tool in the tool room of every well appointed shop, and has been in quite general use for various special kinds of work. It is only in very recent years, however, that it has been demonstrated that for many kinds of work heretofore done on a planer or shaper a properly designed milling machine is a much more practical and economical tool. It is also a fact, not generally appreciated, that for surfacing and many other kinds of work, a face or end mill is a more desirable form and will give much better results than can be obtained with the ordinary forms cutting on the circumferential edge. Probably the main reason why the end or face mill has not come into more general use is because of the fact that it is difficult to hold work and bring it into proper cutting relation, using this form of mill on the type of machine most generally adopted, viz., the horizontal spindle type. Special milling machines are now being introduced, but the types that mechanics in general are most familiar with are: 1. Those with a fixed horizontal spindle, made in the plain and universal forms. And 2. The more recent type, with a spindle in a fixed vertical position. The horizontal type possesses some advantages over the vertical, and in like manner the vertical has decided advantages over the horizontal. It will be conceded that a machine which combines these two

riety of work with same outfit of cutters. Holes may be drilled in absolute alignment in vertical and horizontal position. The tables are arranged to give automatic feed almost the entire length, so that work may be secured on the full length of the table and the cutters brought to bear on same in either vertical, horizontal or angular position, thus rendering it a very valuable general manufacturing tool. The machine has a gear-driven mechanism, the cone being held in a stationary bracket with a splined shaft, attached to gear, passing through it, and moving with the main frame and head.

Charles E. Van Norman, president and manager of the Waltham Watch Tool Company, of Springfield, Mass., is the inventor and designer of the machine, which will be manufactured by the company. A variety of attachments for spirals and other special cuts can be used with the machine when desired, and a number of tools used in connection with the machine are shown in one of the views.

**The Eclipse of the Sun.**

If it be true that science advances through failures, the clouds which prevented the observation of the total eclipse of the sun on August 8 may be a blessing in disguise. During the past quarter of a century, several astronomers have taken up the problem of discovering a means of photographing the corona in broad daylight, but the results have not been very encourag-

British observers had set up their instruments, the weather was wet and the sky cloudy, and it is reported that the preparations made ended in a fiasco. It is not definitely known what happened at Esashi, where Prof. Todd and Dr. Deslandres were stationed, but little hope of success is entertained. A telegram received at Copenhagen from Bodo, Norway, states that a photographer from Flensburg has taken eleven photographs of the eclipse at Breavik, on the Skjerstad Fiord, but more details are needed before an opinion can be expressed as to their value. News has yet to be received from the British observing party at Nova Zembla, and from the expeditions of the Russian Astronomical Society stationed at Enontekis (Finland), the mouth of the Obi, and Olekminsk, on the Lena.

Mr. Norman Lockyer has sent to Nature the following telegram from Kio Island, where he established a station to observe the eclipse: "Although the sun was clouded during totality, the sight was most impressive. The darkness was so great that lamps were needed. The party from H.M.S. Volage consisted of seventy-seven observers all trained to make notes or drawings of particular characteristics of eclipse phenomena, such as coronal structure, extent of the corona, and the colors of sky, cloud, and land and water surfaces, and to take the times of contact. The party was also provided with spectroscopes for analyzing the lights of the corona and prominences, prismatic cameras for photographing the spectra of these objects, and polari-

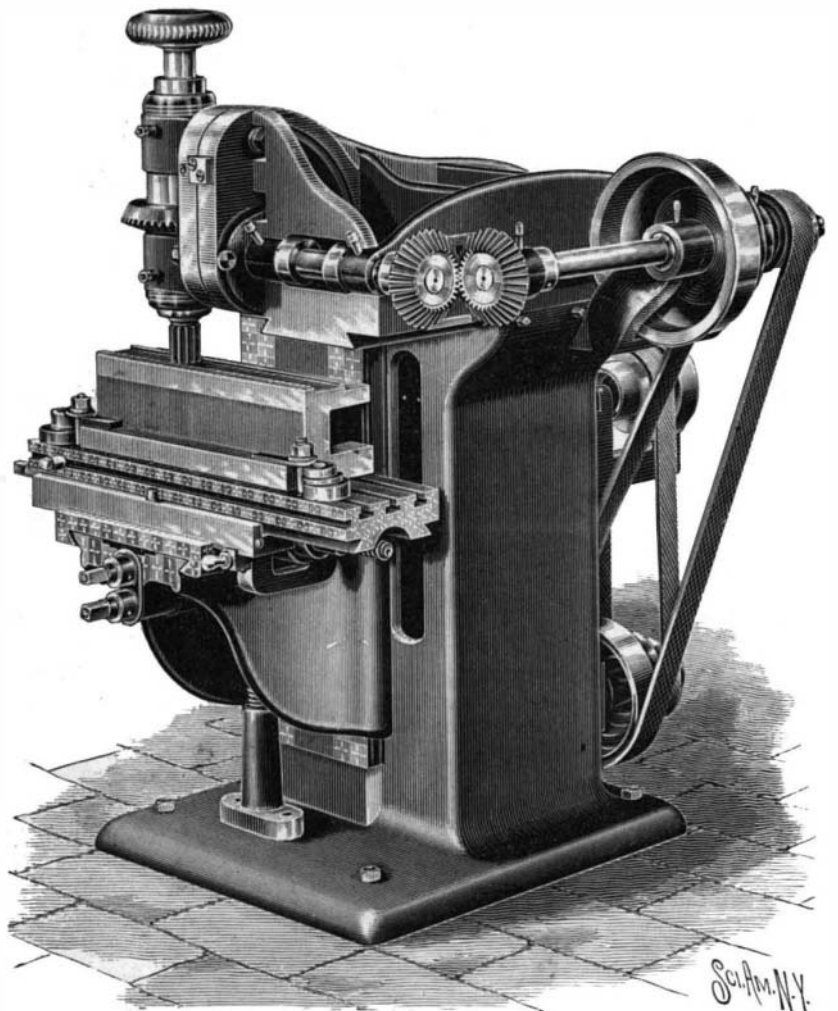
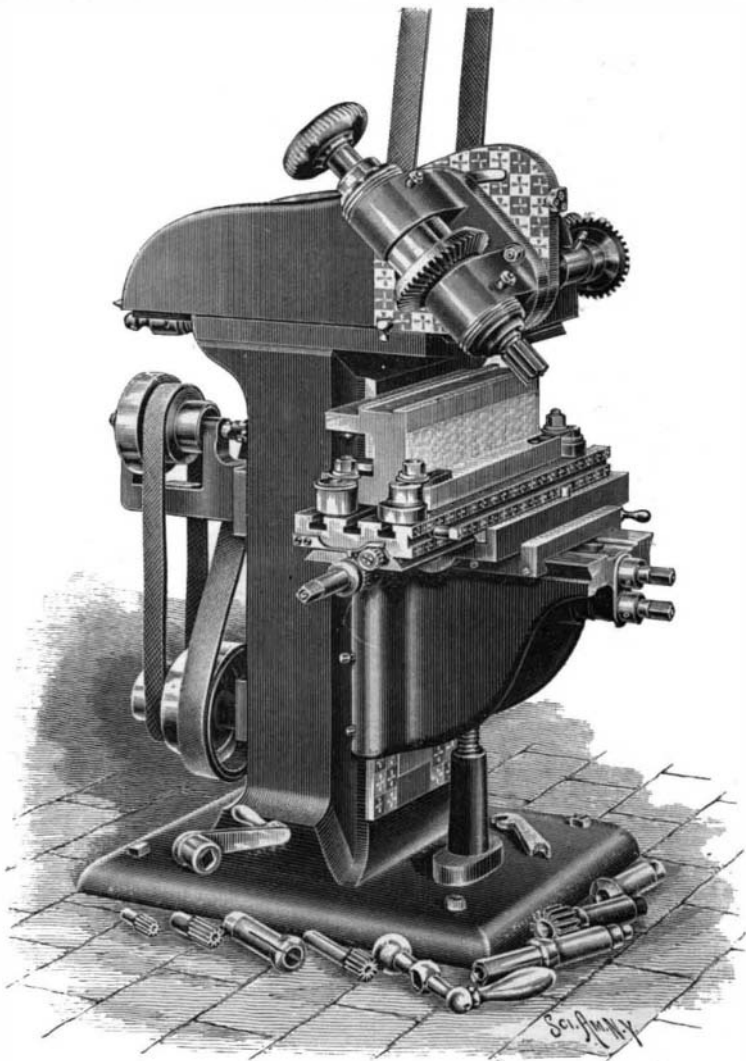


Fig. 1. THE VAN NORMAN DUPLEX MILLING MACHINE. Fig. 2.

types, without sacrificing its efficiency in either position, will be a valuable addition to the list of machine tools.

The Van Norman "Duplex" milling machine, shown in the accompanying cuts, is an entirely new type of machine, which not only embodies the good points of both the horizontal and vertical types, but also has a range of movement and work that is not possessed by either of these. Reference to the illustrations shows a machine with a base and a work-holding table with slides very similar to the ordinary forms. It also has a main head frame with a large range of movement at right angles to the longitudinal movement of the work-holding slide or table. Attached to the main head frame in a vertical plane and parallel with the main head frame is the spindle or cutter head, which has a pivotal connection with the frame, so it can be set in any position between the vertical and horizontal.

The design and arrangement of the parts is such that extreme rigidity is obtained in whatever position the frame and cutter head is placed.

Fig. 1 shows machine with cutter head placed at an angle on the frame. Fig. 2 represents the cutter head in a vertical position.

There is hardly any limit to the variety of cuts that may be made with this machine. Work may be clamped on the table or held in a vise, and without releasing the work, the cutter or cutters may be brought to bear upon the work in any position between the vertical and horizontal. Bevel cuts can be taken with right-angled cutters, thus allowing a much larger va-

ing. In the photography of solar prominences, Prof. Hale and Dr. Deslandres have obtained distinctly valuable pictures, and, were it possible to delineate the corona with the same success on any day when the sun is shining, our knowledge of the nature of that solar appendage would increase much more rapidly than it can at present, when the only opportunities for studying it are afforded by the brief moments of totality of a solar eclipse. Perhaps this latest experience will induce solar physicists to give further attention to the artificial reproduction of eclipse conditions. It is, of course, not suggested that every-day observations will make eclipse expeditions unnecessary—there will be work for astronomers during solar eclipses for a long time to come; but if it were possible to carry out systematic researches on the structure and constitution of the solar surroundings, instead of depending entirely upon the rare intervals when the photosphere is obscured, several moot points might be settled before the end of this century.

Observations of the recent total eclipse were made impossible by clouds. From all along the line of observers, the same report of foiled intentions has been received. At Vadsø, and in the neighborhood, the sun was entirely obscured during totality, and no observations of scientific importance were obtained. The party of Russian astronomers who stationed themselves at the village of Orloffskoe, on the Amoor, were equally unsuccessful in making observations. The eclipse was visible as a partial eclipse at Tokio, but at Akeshi, in the island of Yezo, where the Japanese, American, and

scopes." With such an army of organized observers, an immense amount of valuable information would have been accumulated had the eclipse been visible. The exceptional opportunities for accurate observation offered by the presence of the Training Squadron gives astronomers reason for keen disappointment at the failure of the eclipse as an observable event; but students of science are used to the destruction of their hopes, and the next total solar eclipse will be as eagerly looked forward to as the one just hidden from them.—Nature.

**The Steamboat Night Record to Newburg Broken.**

The new night steamer Adirondack smashed her own and all night records to Newburg on August 22. She made the run of sixty miles in exactly three hours. Her previous best time was twenty minutes slower. A head wind and good flood tide were the conditions. The fleet Mary Powell holds all records on the Hudson. She has covered the distance in two hours and forty minutes. The propeller Homer Ramsdell and the Adirondack have a race up the river on alternate nights. The Ramsdell leaves New York an hour ahead of the Adirondack, but is compelled to make four landings. They reach Newburg within five minutes of each other.

THE receipts on the Kaiser Wilhelm Canal during the first year amount only to 1½ per cent of the capital invested in it.