

slides. The link of the trammel connected with the needle gave to the needle-bar the dip motion. The take-up was operated by a cam on the main shaft, located in the overhanging arm. A machine substantially like the one last referred to was exhibited by the Wanzer Sewing Machine Co., of Canada. The Canada machine was considered the more perfect as to details of construction, finish, etc.

J. & W. LYALL, *New York, N. Y.*

This firm exhibited the "Whitehall" machine. The mechanism below the cloth-plate was substantially like that in the Singer Family Machine, with the exception that the feed-operating lever was moved by an eccentric, rather than by a double cam. The main rotating shaft in the overhanging arm was provided with a gear engaged by a gear upon the upper end of a vertical shaft, as in the Singer. Instead of the heart-cam used in the Singer, the forward end of the main shaft had, attached to it, an annular disk provided with a toothed gear, having a crank-pin connected by a link with a pin upon the needle-bar. A stationary tubular sleeve surrounding the end of the main shaft was provided with a pinion, and the teeth of the pinion, carried by the disk, engaged the teeth of this stationary pinion as the disk revolved, thereby revolving the crank-pin, as the pinion carried by it was rotated in a circular orbit about the axis of the main shaft. This epicycloidal motion gave to the needle the same motion as the heart-cam. This machine had not the speed of the Wilcox & Gibbs, but was capable of being run faster than any other shuttle-machine. It will be found described in patents Nos. 134,119, 166,172, and 184,938.

COLE'S UNIVERSAL FEED SEWING-MACHINE Co., *New York, N. Y.*

The machine exhibited by this company made a lock-stitch, and employed a straight needle and reciprocating shuttle. The vibrating needle-bar was operated by a vibrating arm and a cam-grooved hub. A crank at the extreme forward end of the shaft was connected by a link with the shuttle-carrying slide. The rough-surfaced four-motioned feed was made as an annulus, and projected from a jointed portion of a pivoted sliding-bar, carrying at its back end a circular disk provided with a quadrangular opening to receive an oblique-faced cam, adapted to be moved up and down within the opening in the disk. The cam was arranged to slide upon a square shaft attached to the under side of the cloth-plate, but capable of being rotated by means of a crank, under control of the operator, so as to place the acting faces of the oblique cam in the desired direction. The disk