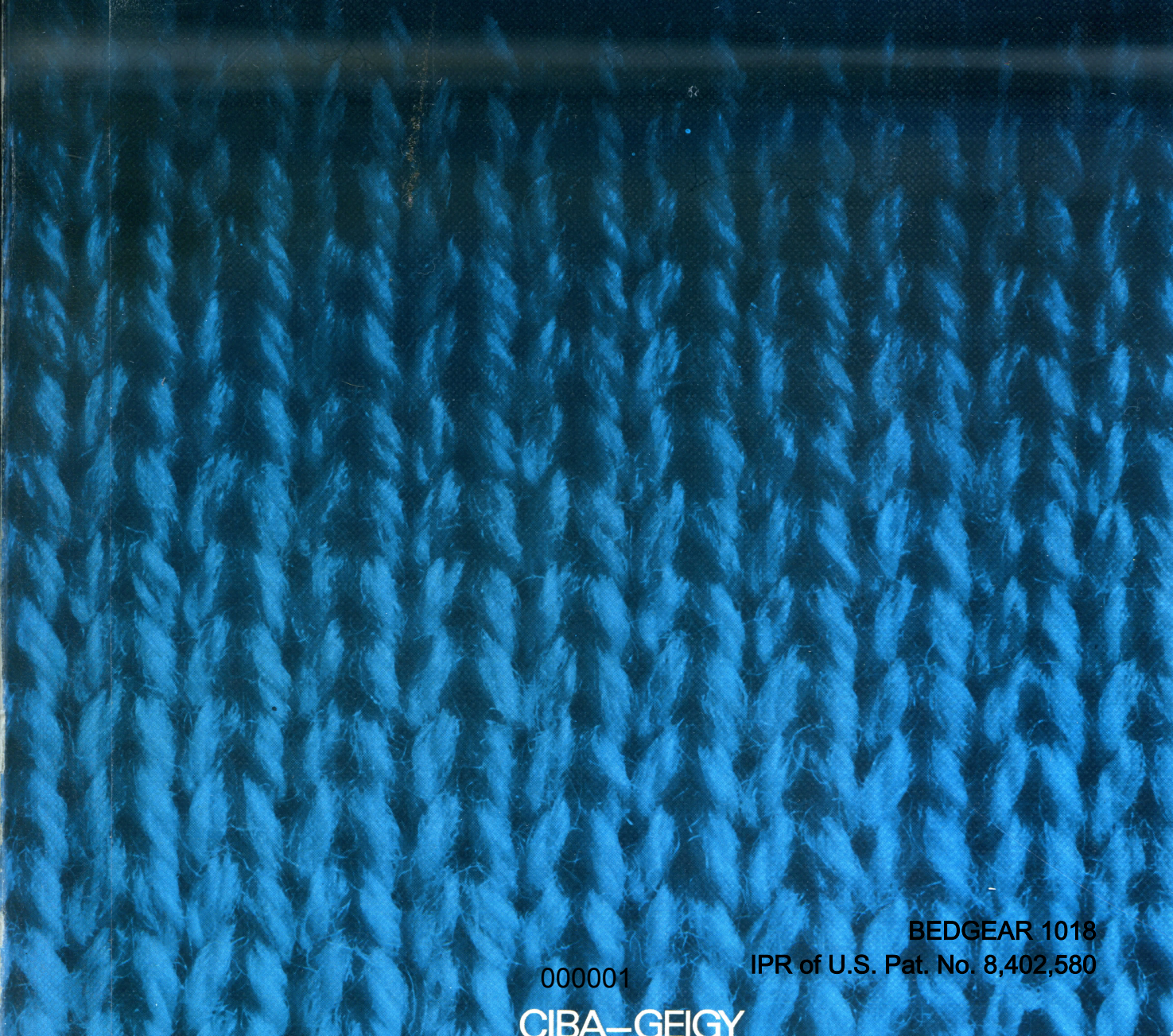


# Knitted fabrics

Manufacture and processing



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BEDGEAR 1018  
IPR of U.S. Pat. No. 8,402,580

CIBA-GEIGY

#### Hand flat knitting machines

In advanced industrialized countries, hand flat knitting machines are now mainly used for experimental work and sampling. In less advanced countries, however, these machines are still used for bulk production of knitted garment pieces.

#### Power flat machines

Power flat machines come into being by fitting a motor and mechanical drive to basically hand-operated flat machines. Included in this group are flat knitting machines specifically designed for the production of strapping and other trimmings.

#### Automatic power flat machines

The automatic power flat machine is available in a wide variety of machine types, depending on its patterning facilities and ability to knit shaped fabric pieces. The widest patterning scope is offered by machines equipped with jacquard needle-selection facilities, stitch-transfer mechanisms to transfer stitches from the needles in one bed to needles in the bed opposite, including needles which do not carry a stitch, and other advanced patterning units. The ability to transfer a stitch onto an empty needle is particularly useful for knitting cable-stitch patterns and shaped collars. The three-way technique available on some of these machines makes it possible to knit tuck-float and rib structures in the same course. Included in this group of automatic power flat machines are such special machines as flat machines with automatic running-on facilities for use with garment pieces knitted on Cotton's patent frame by the fully fashioned principle, and for fully fashioned collars and gloves.

### 2.2. Latch-needle circular machines

#### • Construction

On a large-diameter circular latch-needle machine, the machine frame usually consists of a tripod structure. The legs of the structure are usually designed in the form of boxes which house such machine elements as the electrical installations and the machine drive. The centre part of the machine frame supports the needle cylinder. Machines designed for knitting rib fabrics or crossed-rib fabrics (interlock) use a horizontally arranged dial for housing the second set of needles or dial needles, whilst machines designed for knitting primarily purl-fabric structures have a second needle cylinder arranged above a bottom cylinder. For knitting rib fabrics, the needles in the dial are arranged in such a way that they operate midway between every two cylinder needles, but when knitting interlock fabrics, the dial needles are in direct alignment with the needles in the cylinder. In the case of circular purl-knitting machines, the tricks for housing

knitting points or knitting feeders, and a continuous system of knitting. Both small-diameter circular machines and large-diameter machines can be divided into models for knitting stitch-shaped garment-length pieces and models for knitting fabric in the roll as yard goods.

#### Small-diameter circular latch-needle knitting machines

Small-diameter circular machines having a single cylinder and one set of latch needles are usually used for knitting fine-gauge ladies' legwear or, when equipped with two superimposed cylinders and one set of double-headed latch needles, for knitting socks, three-quarter hose and half-hose. Fine-gauge automatic single-cylinder machines in this range are able to knit complete ladies' tights, often with a toe closed on the knitting machine and with elasticated threads knitted into the waist section of the garment. After such tights have left the knitting machine, they are merely dyed and heat-set, when they are ready for packaging and sale. Double-cylinder legwear machines, too, are able, in some instances, to produce garments with the toe closed on the double-cylinder machine.

#### Large-diameter circular latch-needle knitting machines

Large-diameter circular knitting machines are used for producing fabric as yard goods for outerwear, sportswear and so on, and also for producing body-width garment lengths for, for instance, underwear garments without side seams. Large-diameter circular knitting machines with jacquard installations use a variety of jacquard mechanisms such as pattern levers, pattern wheels and pattern discs, steel tapes and drums, and such electronic pattern installations as film strips, magnetic tapes and magnetic plates for carrying the patterning data. The electronic patterning facilities frequently permit the production of almost unlimited pattern areas right up to the full circumference of the needle cylinder (about 1.5 m fabric width) and extending over the full length, of, for instance, a lady's dress. Connected to these electronic patterning installations are electronically operating pattern-preparation units where the design can be projected on a television screen and transferred very quickly to the knitting machine either manually or automatically. By exchanging yarn colours and cancelling a particular colour without having to change yarn packages, it is possible to develop mirror effects, extensions in the height and width of the pattern and other variations of the design, by just pressing a button.

- Special machines

Large-diameter circular knitting machines with one set of latch needles

This includes a large-diameter circular knitting machine for producing imitation-fur fabrics. The machine has attachments for feeding slivers of fibres to the needles. The latest machines in this range are fitted with electronically operating needle-selection units, thus making it possible to produce complete imitation animal pelts.

Another machine in this group, which has a special inlay installation and makes economic use of pile yarn, can be used to produce floorcoverings.

On another machine in the same group, warp and weft threads supplied by packages on a special creel are incorporated into a plain weft-knitted fabric without being formed into loops.

Automatic circular knitting machines for knitting rib and purl fabrics

Automatic cylinder and dial machines for knitting rib fabrics and superimposed double-cylinder machines for knitting purl fabrics are available both in body-width diameters and in 33-inch diameters for knitting stitch-shaped garment lengths for ladies' underwear, pullovers and shirts with a firm non-roving rib bottom or tubular welt.

Circular knitting machines for producing flat pieces of fabric

These are special machines where knitting takes place only round roughly four-fifths of the circumference of the needle cylinder. This produces flat pieces of fabric, which are knitted both with regard to length and width in accordance with pre-determined dimensions. These semi-fashioned pieces of fabric resemble the product of the flat knitting machine.

Large-diameter circular warp-knitting machines

Only a few of these machines are in existence at the present time. The threads for forming the fabric are supplied from two concentrically arranged sets of sectional warp beams, with each circle of warp beams moving in opposite direction to the other. This arrangement of warp-beam movement produces thread-crossing over the latch needles in the machine for a milanese fabric with open laps (double atlas fabric without turn-round courses).

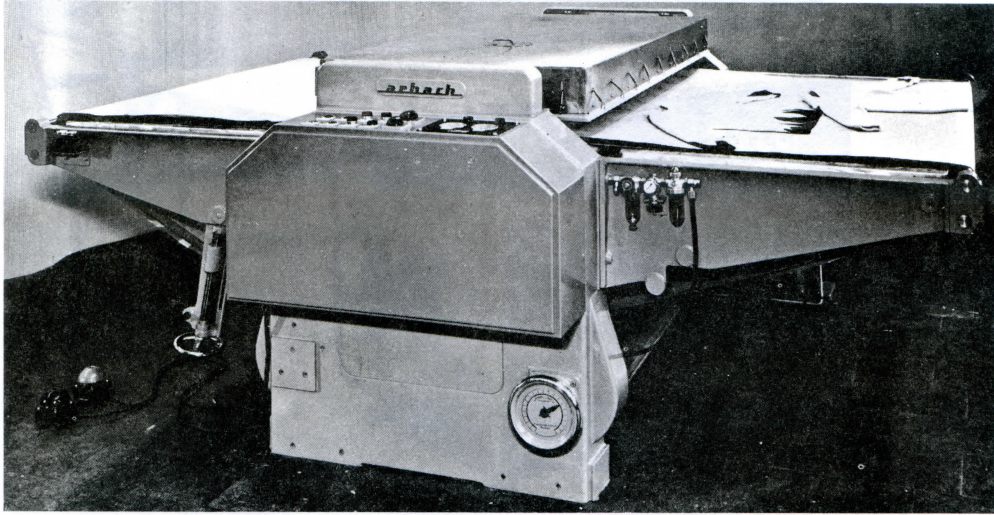
2.3. Straight-bar weft-knitting machines

- Construction

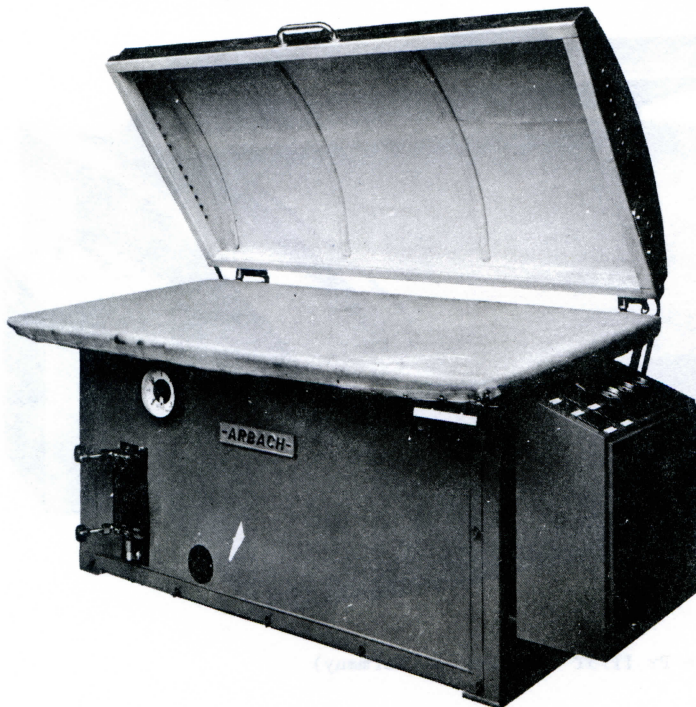
The long frame of the machine is sub-divided into sections by a number of dividing walls. The two outer sections of the machine, and on machines which have many knitting heads, the centre section, too, accommodate the central control installation of the machine. The latter is frequently in the form of a punched tape, and controls the movement of the yarn-carrier stops and sets of fashioning points as well

3. Fully fashioned goods

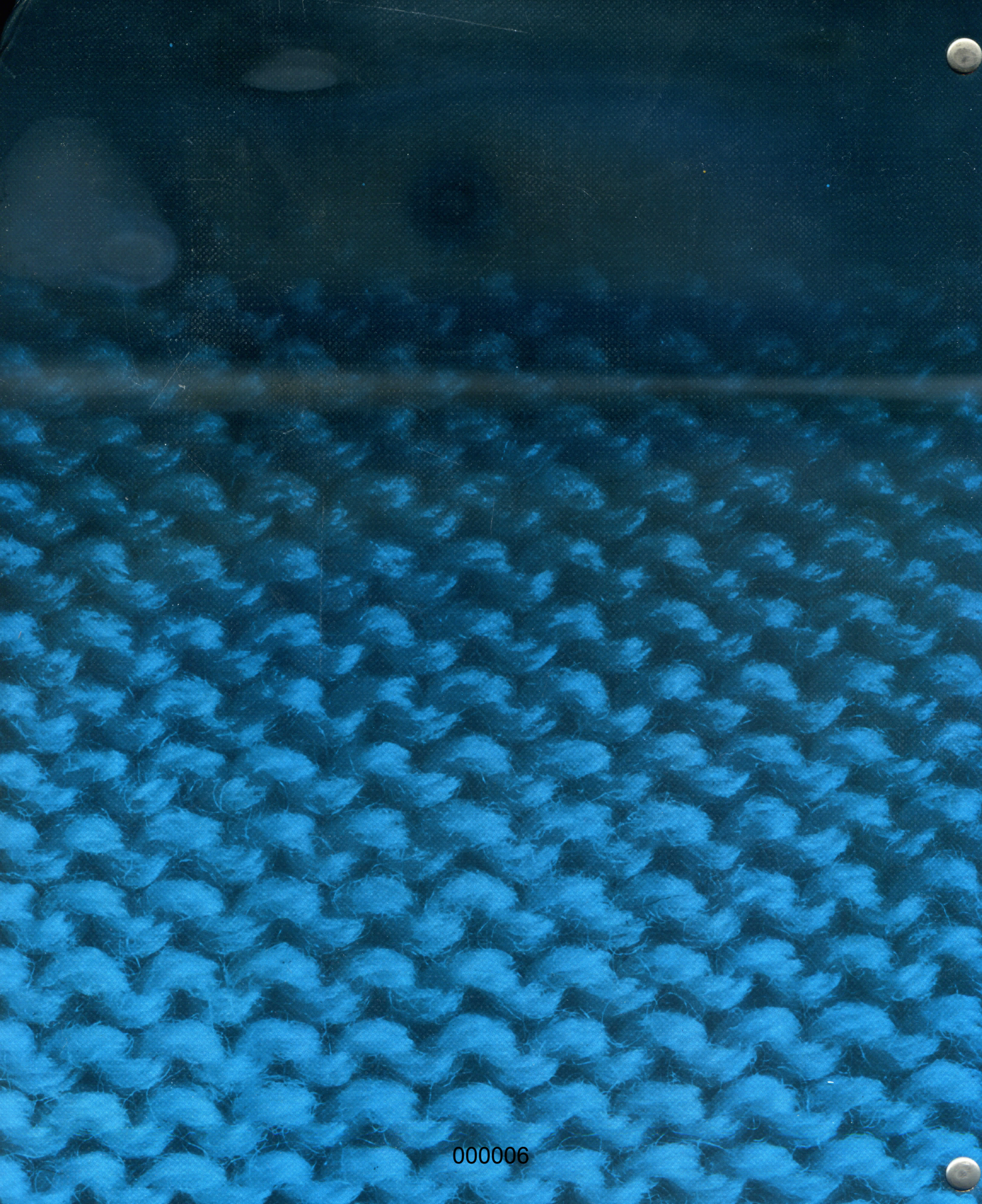
Steaming tables, steaming presses, steaming and ironing machines



Steaming and ironing press, type 4060 (Arbach, W. Germany)



Steaming and shaping table,  
type 457 (Arbach, W. Germany)



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