even inking occurs. It is, above all, the *distribution rollers* (especially those close to the ink form rollers) that break down or smooth out the resplit ink profile in the circumferential and axial direction of the rollers. Due to the cylinder gap on the plate cylinder there is no continuous flow of ink from the inking unit. In connection with the ink accepted by the printing plate in accordance with the image and the generally discontinuous supply of ink from the ink fountain into the inking unit via a vibrator roller (fig. 2.1-19), there is a variation of the ink film thickness on the printing plate in the circumferential direction. This is referred to as "*gradual fading.*" The profile of the ink film thickness on the plate in the circumferential direction can be influenced by the phase position of the axially reciprocating distributor rollers in relation to the plate cylinder gap (starting point of lateral distribution). With high-grade inking units it is possible to adapt this phase position to the printing plate. More recent inking unit developments enable remote adjustment. The color setting data from prepress can be used to calculate the optimal starting point for lateral distribution.

The *dampening unit* can be designed as a continuous-type dampening system for the application of minimal quantities of dampening solution. A dampening unit is not required in waterless offset printing; that is, when plates and inks are used for waterless offset printing, the dampening unit is switched off (for waterless offset printing, the printing unit is fitted with a temperature control unit and/or cooling unit).

The ink flows from the inking unit via the plate, the blanket and the impression cylinders. This group of cylinders operates with considerable reciprocal interaction. These three cylinders form a unit within the printing unit. There are various cylinder configurations. One blanket cylinder may, for example, be inked by two plate cylinders or the sheet may be printed by several blanket cylinders on one impression cylinder (see sec. 1.6.2.1). The most important configurations are discussed in detail below.

Three-Cylinder System

The three-cylinder system (fig. 2.1-37) has become the most widely-used in sheet-fed offset printing. Presses for multicolor printing are put together in *unit construction* (as shown in fig. 2.1-18), which are connected by sheet transfer systems. The fact that all the printing units in a multicolor press are identical has many advantages in manufacturing terms and also regarding operation. There are also process-related advantages,

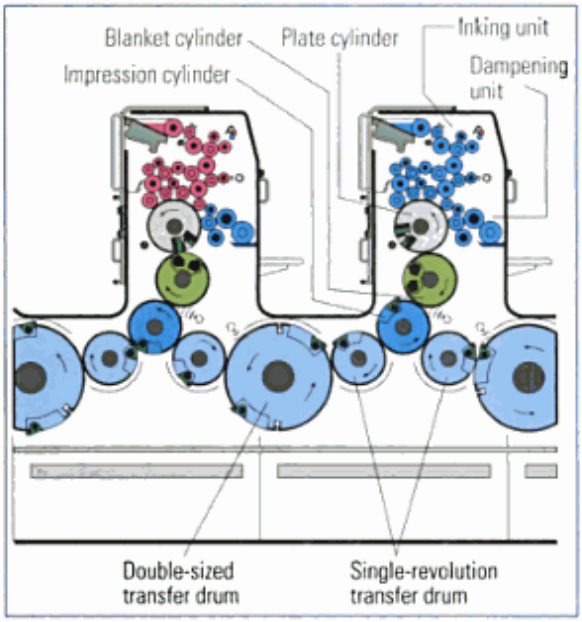

Fig. 2.1-37
Printing unit in a 3-cylinder design with single-revolution transfer drums

such as the same drying periods for the color separations that are printed in sequence.

Most components and operating elements are identical from printing unit to printing unit throughout the entire press. In virtually all presses in the three-cylinder group, the bearers of plate and blanket cylinders run in direct contact, which means that the distance between the plate and blanket cylinders cannot be adjusted by the operator. The printing pressure between plate and blanket is determined by the cylinder packing (the thickness of the plate, blanket, and underlay). The distance between the blanket and impression cylinders can be adjusted via a cam control system attached to the side frames. To adapt the blanket pressure to the quality and thickness of the substrate, the blanket cylinder is adjusted during make-ready to the impression cylinder on which the substrate is located, without changing the pressure ratios to the plate cylinder. Multicolor presses in unit construction using the three-cylinder systems are usually equipped with single-sized (single-revolution) impression cylinders. However, there are some press configurations that use double-sized (half-revolution) impression cylinders.