

The invention relates to an apparatus for adjusting the format on sheet-conveying drums of a printing machine, in particular on the storage drum of a sheet-fed offset printing machine for selective single-sided printing or perfecting, which apparatus has the features of the generic type according to the preamble of Patent Claim 1.

Such a device is described and illustrated diagrammatically in DE-A-3,410,689 by the example of a storage drum in a sheet-fed offset printing machine. In such machines having devices for sheet turning, many elements are required for precise sheet conveying. In the generally practised turning of the sheet at the trailing edge, the sheet is aligned precisely, held and smoothed on a storage drum prior to turning. This purpose is served by smoothing devices consisting of suckers or grippers or even of suckers and grippers. The position of these smoothing devices relative to the transporting grippers for the sheet must be matched to the format of the sheet to be processed and therefore has to be adjusted when the sheet format is changed as well as when changing over from single-sided printing to perfecting, specifically generally independently of the changeover of the transporting and turning grippers. For this adjustment, the smoothing devices are arranged on a support element which is mounted so as to be pivotable on the drum shaft and can be locked by clamping with the drum body in any desired rotational position such that, when the clamping is released, infinitely variable adjustment can be carried out.

In the known arrangement, an adjusting apparatus having a control shaft which can be rotated from the outside is provided, which control shaft is mounted centrally in a hollow shaft which is assigned to the elements of the clamping device and, in turn, is mounted concentrically in a drum shaft of hollow (tubular) construction. At the end guided towards the outside, the control shaft has a hexagon socket so that rotation can be carried out using a correspondingly profiled tool.

With the inner end, the control shaft projects, due to the system, beyond half the drum width far into the hollow shaft, the pinion fixed at this point meshing with an intermediate gear which is mounted so as to be rotatable in the wall of the hollow shaft and engages in a toothed segment fixed on the support element. Although such an adjusting device can be actuated from the outside, it is complicated in production and assembly. Hollow shafts for bearing the storage drum result in a weakening of the drum bearing journal.

The object of the invention is to design an apparatus for adjusting the format which can be operated from the outside, consists of few easily assembled parts, and can be accommodated without significant weakening of the bearing journal.

The invention achieves this object by design features according to the characterizing part of Claim 1 in conjunction with an apparatus according to the preamble.

An important feature is that a short, thin control shaft is provided eccentrically in a bore of correspondingly small cross-section in a bearing journal of the drum shaft made of solid material and engages directly with the pinion, fixed on said control shaft, in a toothed segment which is arranged on the end face of the support element adjacent to said bearing journal. The bore provided for the bearing of the control shaft and a lateral cutout in the bearing journal, required for guiding the pinion on the control shaft, do not lead to an appreciable weakening. According to a further concept of the design of the invention, a further pinion is fixed on the end of the control shaft guided towards the outside, which pinion is mounted so as to be rotatable in a [sic] concentrically to the longitudinal axis of the drum shaft on the end face thereof. The features of the invention are suitable both for operation of the adjusting apparatus by hand and for a motor adjustment. For operation by hand, a hexagon or the like is provided on the outer end of the control shaft in a manner known per

se. The pinion arranged on the outer end of the control shaft engages, in this case, in the inner toothing of an indicator ring which is mounted so as to be rotatable concentrically to the longitudinal axis of the drum shaft and interacts with a fixed format scale. Advantageous features of such a design are contained in the subclaims 5 and 6.

In the case of a motor-driven apparatus for adjusting the format, the pinion arranged on the outer end of the control shaft engages in a drive pinion which is mounted so as to be rotatable concentrically in the bearing journal of the drum shaft and is coupled to an adjusting motor whose housing is held on the frame fixed to the machine.

An exemplary embodiment of an apparatus for adjusting the format which can be operated by hand and of an apparatus for adjusting the format which can be motor-driven is illustrated with the features of the invention in the drawing, in which:

Figure 1 shows a longitudinal section in an axial plane through the one bearing of a storage drum, Figure 2 shows a section along the line II-II in Figure 1, Figure 3 shows a view in the direction of the arrow III in Figure 1, and Figure 4 shows a section through a bearing corresponding to Figure 1 with a motor-powered adjusting drive.

The storage drum 1 is mounted by the bearing journals 2 of its shaft 3 made of solid material at both ends in the machine frame 4 and can be driven by a gear 5 which is located in the chain of driving gears and is firmly connected to the end face of the bearing journal 2 by means of screws 6. Sheet grippers 7 are arranged in a manner known per se on the body of the storage drum 1. A support element 8 is infinitely variably adjustable in terms of its angle of rotation about the longitudinal axis 9 of the drum shaft 3 relative to the body of the storage drum 1 and can be clamped firmly with the body of

the storage drum 1 in the set position by a clamping apparatus which is not represented in the drawing. Illustrated in Figure 2 as an example of the smoothing device are suction nozzles 10 which are arranged opposite the transporting grippers 7 in the groove or the drum channel running axially between the support element 8 and the body of the storage drum 1.

The mechanism for adjusting the support element 8 relative to the body of the storage drum 1 consists of a control shaft 11 which is mounted so as to be rotatable in a bore of the bearing journal 2 arranged asymmetrically and parallel to the longitudinal mid-axis 9. The inner end of said control shaft 11 bears a pinion 12 which is rotatable in a lateral cutout of limited depth and engages with its toothing directly in the internal toothing of a toothed element 13 which is fixed on the end face of the support element 8 adjacent to the bearing journal 2. The toothed segment 13 extends on the support element 8 over the maximum adjustment range. The end of the control shaft 6 guided towards the outside passes through the gear 5 and, in the case of the example of Figures 1 to 3, has a hexagon 14 which allows rotation of the control shaft 11 by means of a correspondingly profiled tool. Fixed on the control shaft 11 below the hexagon 14 is a further pinion 15 which engages with its toothing in the inner toothing of an indicator ring 16 which is held on the end face of the bearing journal 2 or of the gear 5 so as to be rotatable concentrically to the longitudinal mid-axis 9. On its inside, the indicator ring 16 has an annular projection 17 which engages in a correspondingly profiled annular groove 18 on the end face of the gear 5. With its edge, the indicator ring 16 grips behind head-like thickenings of a plurality of holding screws 19 arranged distributed over the circumference. A pointer 20 fixed on the indicator ring 16 interacts with a scale 21 constructed on the gear 5. This scale is matched to the sheet formats which can be processed by the machine. The format adjustment achieved by rotating the control shaft 11 by means of the hexagon

14 is indicated by the pointer 20 on the scale 21.

In the case of a motor-powered format adjustment, indication of the adjusted format is not required. The pinion 15 arranged on the outer end of the control shaft 11 can thus be used for transmitting the drive forces. In the example, this pinion 15 is engaged with a drive pinion 22 which is mounted in the gear 5 so as to be freely rotatable concentrically to the longitudinal mid-axis 9 and can be coupled to a drive motor 23, for example an electric drive motor. Otherwise, the design corresponds to the example according to Figures 1 to 3.

List of reference numerals

	1	Storage drum
	2	Bearing journal
	3	Drum shaft
5	4	Frame
	5	Gear
	6	Screw
	7	Transporting gripper
	8	Support element
10	9	Longitudinal mid-axis
	10	Suction nozzle
	11	Control shaft
	12	Pinion
	13	Toothed segment
15	14	Hexagon
	15	Pinion
	16	Indicator ring
	17	Projection
	18	Annular groove
20	19	Holding screw
	20	Pointer
	21	Scale
	22	Drive pinion
	23	Drive motor

Patent Claims

1. Apparatus for adjusting the format on sheet-conveying drums of a printing machine, in particular on the storage drum of a sheet-fed offset printing machine for selective single-sided printing or perfecting, in which at least one support element (8) for devices for gripping the sheet and/or smoothing the sheet is mounted on the drum shaft (3) and is adjustable in the circumferential direction thereof by means of a control shaft (11), said control shaft (11) being mounted in the drum shaft (3) and having, at one end guided towards the outside, a member (14) for rotation and, at the inner end, a pinion (12) which acts on a toothed segment (13) on the support element (8), characterized in that the control shaft (11) is mounted eccentrically and parallel to the longitudinal mid-axis (9) of the drum shaft (3) in a bearing journal (2) of said drum shaft (3) made of solid material, and the toothed segment (13) is arranged on the end face of the support element (8) adjacent to said bearing journal (2), the pinion (12) on the control shaft (11) engaging directly in the toothing of said support element.

2. Apparatus according to Claim 1, characterized in that the toothed segment (13) is screwed to the end face of the support element (8) which is mounted so as to be pivotable and adjustable on the drum shaft (3).

3. Apparatus according to Claims 1 and 2, characterized in that a pinion (15) is likewise fixed on the end of the control shaft (11) guided towards the outside, which pinion engages with its toothing in the inner toothing of an indicator ring (16) which is mounted so as to be rotatable concentrically to the longitudinal mid-axis (9) of the drum shaft (3) and interacts with a fixed format scale (21).

4. Apparatus according to Claim 3, characterized in that the indicator ring (16) engages with a projection (17) arranged on its back in an annular groove (18) of complementary profile in the end face of a driving gear (5) for the storage drum (1) or the like.





5. Apparatus according to Claim 4, characterized in that the indicator ring (16) grips with its edge behind collars of a plurality of holding screws (19) on the driving gear (5).

- 5 6. Apparatus according to Claims 1 and 2, characterized in that an outer pinion (15) on the control shaft (11) engages in a drive pinion (22) which is mounted so as to be rotatable concentrically in the bearing journal (2) of the drum shaft (3) and can be coupled to a drive
10 motor (23) acting as the adjusting motor.