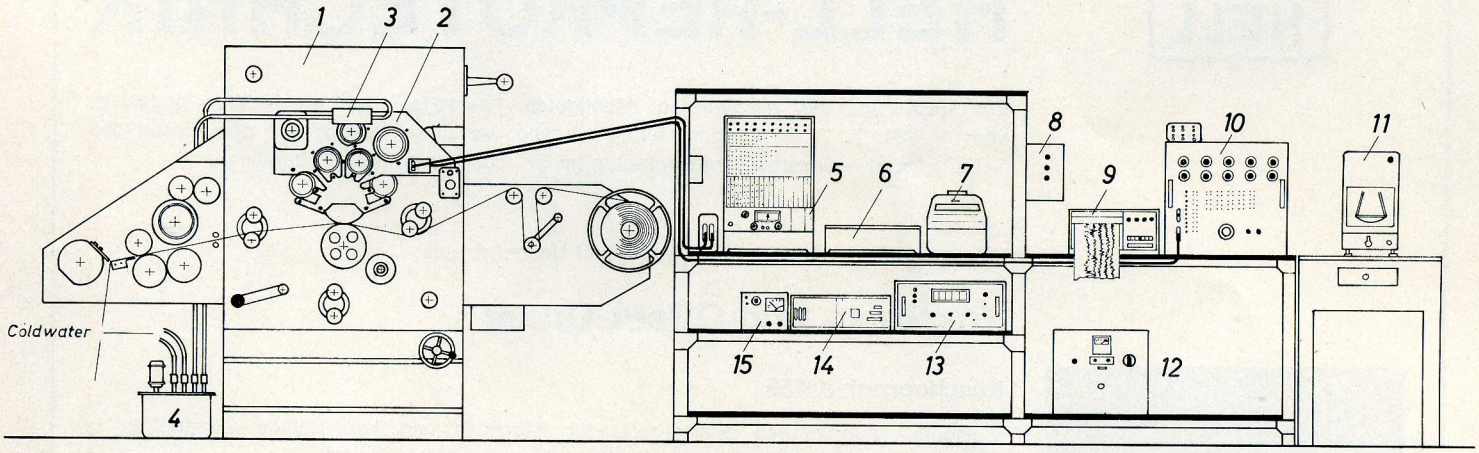
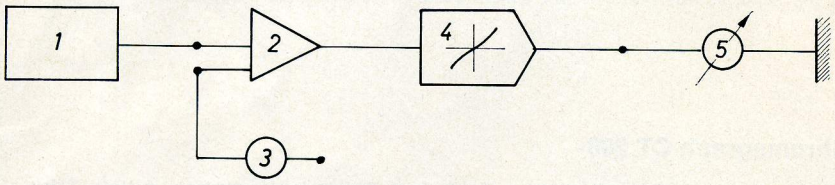


1 Test Press
2 Auxiliary Sensor Frame
3 Const. Temperatur Enclosure
4 Thermostat
5 Analog Computer
6 X-Y Recorder
7 Computer Printout
8 Control Panel
9 U.V. Oscillograph
10 Photocell Power Supply
11 Analytical Balance
12 A.C. Voltage Regulator
13 Digitalvoltmeter
14 Automatic Sensor Switch
15 D.C. Voltage Regulator

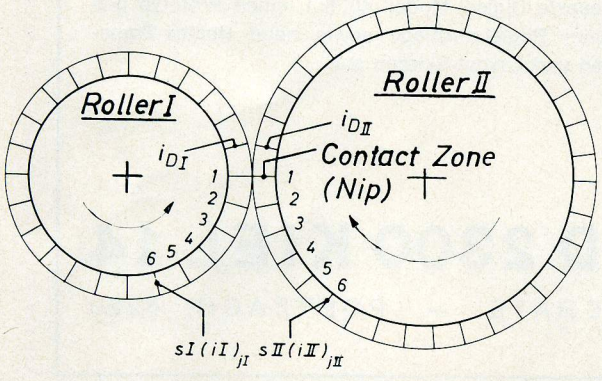
1



1 Photo Transistor
2 Summing Amplitier
3 Coefficent Potentiometer
4 Diode Function Generator
5 Galvanometer of U.V. Oscillograph

2

3



i_I = Rotation Index of Roller I
i_{II} = Rotation Index of Roller II
i_{D_I} = Number of Indices of Roller I
$i_{D_{II}}$ = Number of Indices of Roller II

is possible to record ink film thickness variations with frequences of some hundred cycles/second. As such investigations are extremely difficult and time consuming, an interpreting apparatus for the printed sheets was developed permitting to determine the relief of the thickness and from it, mathematically, the ink film thickness on the substrate. Since there is a non-linear relationship also between optical density and layer thickness, a linearization had to be made permitting to quickly determine the film thickness shape on the substrate.

3. Theoretical investigations

The known computing methods allow only the determination of average values. A point by point, i.e. a local determination of the ink flow as a function of time is not possible. These methods can not be applied to the variations of nonuniform ink feed or those of non-uniform ink transfer caused by an interrupted printing form layout or by the cylinder gap. To obtain the actual instantaneous ink film profile on any roller in the inking unit and on the substrate, a comprehensive theoretical model was developed which requires the use of a computer. Computation is done as follows: Each roller circumference of the inking unit system to be analyzed is subdivided into small segments. For these segments a system of equations is set up. The resulting values are used as initial conditions for the next revolution of the roller. As initial condition for the first revolution a constant ink film thickness is as-