A quality desk (11) of a newspaper printing plant provides inking zone control by placement of a printed page (14) against a datum edge (12) and manual identification (17, 18) where across the width of the page, relative to the datum edge, adjustment is needed. Programmed logic means computes which ink zone corresponds to the manually identified location, and outputs an appropriate signal to the actuator of the specific inking zone thus identified. The apparatus can handle different widths of print web.
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BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the control of a web treatment parameter and, more particularly but not exclusively, it concerns the control of flows of ink on a double width newspaper printing press with centralised control.

2. The Prior Art

Most newspaper printing presses are of the "letterpress" or web offset type, printing a succession of newspaper page images on a paper web. A single width press prints two broadsheet pages wide and a double width press prints four broadsheet pages wide. An ink train is provided to feed ink to each printing plate. The proportion of printed area to unprinted area varies from page to page, and from colour to colour and from zone to zone within each page. To provide for this variation in demand for ink, the ink train is provided with a number of ink flow rate controls across the width of the press so that ink can be supplied at an appropriate rate to each printing zone. It is usual to have 8, 9 or 10 such zones for each broadsheet page across the press.

Historically there was a one-to-one relationship of these zones with the print columns on the standard newspaper page for which the press was designed, and the ink flow controls were mounted adjacent to each printing unit. Of course, if the number or width of the columns on the actual page being printed is different from that on the
page for which the press was designed, the ink zones and printed columns do not correspond. Moreover, in the case of newspapers with tabloid format, the printed columns are at right angles to the ink zones, and in this case there can be no correspondence between ink zones and printed columns.

Recent presshouse practice and the need for improved industrial hygiene have led to all the press controls being centralised in a clean, noise-free control room - usually one control room for each press. It has been proposed, in such a system, to provide one control desk and one set of ink zone controls to control all the printing units on the press. The operator places a newspaper on a "lay down" area of the desk and inspects each page in turn.

It has been proposed that the following controls be centralised in this way: ink control, register control, dampener control and sidelay adjustment. Others may also be centrally controlled.

The lay down area on the desk accommodates an open broadsheet newspaper, i.e. it is two pages wide. Conceptually the ink control zones run vertically up the desk. In GB-A-2 217 653, each zone is controlled via an increase and a decrease control located immediately below the zone in the lay down area. In the case of a single width press the centre line of the printed web corresponds with the division between the two broadsheet pages at the middle of the lay down area on the desk. Hence, if a narrow web is printed, to make a narrower product, the ink control zones at the two extreme edges of the press and lay down area are made to supply less and less ink until they are shut off completely, and supply no ink if the web is so narrow that the edge zones do not touch the web at all. It is relatively straightforward to reduce ink requirement in this way, when a narrow web is being printed.
In the case of a double width press (which is four pages wide), however, the centre line of the press corresponds to one side of the desk lay down area. Thus, when the paper is laid down on the desk for inspection, the centre line of the press lies to the right of some pages but to the left of others. When printing a narrow product the unused ink zones on the edges of the press lie to the left of some pages but the right of others. Thus, fixed ink zone controls on a fixed lay down area do not correspond with the zones on the printed page unless the page to be inspected is aligned appropriately to the left or right hand edge of the lay down area. This is so confusing for the operator as to be impractical.

The confusion could be resolved by mechanically moving either the lay down area or the ink zone controls, so as to align the appropriate left or right hand edge for the page being adjusted. The range of movement required for a double width press is of course twice the difference in width between the page being printed and the standard full size page. Mechanical movement is inconvenient, however, and it would be difficult to guard against accidental trapping of the operator's fingers in the mechanism.

It is an object of the present invention to alleviate these disadvantages.

**SUMMARY OF THE INVENTION**

According to the present invention, there is provided apparatus for varying UP or DOWN a web treatment parameter in any selected one of a plurality of fixed width treatment zones which together span the fixed width of a web treatment path along which, in use, a selected width web undergoing treatment is caused to advance, each of the zones containing a controllable web treatment unit for treating that part of the web which is within the
respective treatment zone;
the web itself having at least two preselected width pitches, each such pitch receiving treatment from more than two of the treatment units;
the apparatus comprising:
a web pitch inspection station for inspecting a selected pitch of the web, for determination whether the said treatment parameter requires adjustment UP or DOWN at any particular location transversely on the width of the pitch under inspection;
electronic logic means;
an actuator for each of the web treatment units, each of the actuators itself being actuated by an output signal from the electronic logic means;
a longitudinal datum edge at the inspection station, for matching with a longitudinal edge of the web pitch undergoing inspection;
sensor means extending width-wise across the inspection station perpendicular to the datum edge and manually actuable anywhere along its length, thereby to generate an UP or DOWN command signal at a manually chosen distance transverse to the datum edge; and
naming means to input the logic means with a naming signal which identifies which of the width pitches is under inspection; and
the apparatus being characterised by:
memory means for storing data representative of the manually selected positions of the longitudinal edges of the web width pitches relative to the longitudinal edges of the web treatment path;
and further characterised in that:
the electronic logic means is adapted to receive the said naming and command signals and compute from these signals and from data drawn from memory which single one of the web treatment units requires adjustment UP or DOWN to give effect to the command signal, and to send an appropriate output signal to the single treatment unit so identified.
Thus, with the invention, the operator selects a transverse distance from the datum edge where adjustment is required, and the logic means computes which single one of the treatment zones needs to be actuated to give effect to the adjustment command. With GB-A-2 217 653, by contrast, the logic means outputs to the inspection station a display of the boundaries of zones which correspond to columns of print on the page under inspection, and the operator generates a command signal which of the columns requires ink control alteration. The logic means computes which ink control units (normally two) contribute to the inking of the print column identified for adjustment, and makes an adjustment to the inking units which is in magnitude proportional to the amount of the width of the column covered by each of the two inking units in question.

The invention has primary application to newspaper printing but may be useful in other industries.

For newspapers, the datum edge of the inspection station corresponds to a guide bar at the lay down area of the master desk. The treatment zones are the individual fixed ink flow control width zones. The width pitch boundaries of the web correspond to page boundaries of the printed images on the web of newspaper.

Thus, the present invention makes possible a control apparatus in which the two pages to be inspected are placed in a standard position (conventionally with the right hand edge of the right hand page against the guide bar on the desk). The operator decides which page to adjust and names it to the control apparatus. The operator decides which part of the page is to be adjusted, and touches the increase or decrease control as appropriate vertically below the part of the page to be adjusted. The control apparatus then carries out the
necessary computation and adjusts the appropriate ink flow control. In so doing, of course it takes into account any displacement of the controls which would be the consequence of running a web which is narrower than the full width of the web printing path.

It is not necessary for the operator to know where the actual ink zones are in relation to the page being adjusted. However, it may be psychologically helpful to indicate on the control desk the inking zone locations as they are in relation to the page being inspected. A method of providing such indication is described below.

For a better understanding of the invention, and to show more clearly how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings.

DESCRIPTION OF A PREFERRED EMBODIMENT

In the accompanying drawings:

FIGURE 1 is a perspective view of a control desk which embodies the present invention;

FIGURE 2 is a perspective view of a web of newsprint undergoing letterpress printing of eight broadsheet pages of print in a double width printing press; and

FIGURES 3 to 10 each show a different one of the eight pages of Figure 2 on the control desk of Figure 1.

Referring to Figure 1, the desk 11 has a longitudinal guide bar 12 and a transverse guide bar 13 which together fix the position on the desk of a width pitch 14 of newsprint which in this embodiment is two broadsheet pages 15 and 16 of newsprint (as shown) or four tabloid pages.

Beneath the transverse bar 13 is a line of UP switches 17 and a line of DOWN switches 18, and each line runs the full width of the lay down area of the desk defined by the
bar 13.

To the other side of the guide bar 12 is a key pad 19 for input of numerical data to the logic means which serves the desk, and a set of function keys 20.

In use of the apparatus, a selected sheet (pitch) of newsprint is placed against the bars 12 and 13 in the lay down area, and its page number (conventionally it is identified by the number of its right hand page) inputted to the logic means by the key pad 19. Then a first treatment parameter, say, control of inking, is selected by depressing the appropriate function key 20. Inking function on the page is inspected, and, if a particular vertical strip of the page is too heavily inked, the DOWN button 18 vertically below the identified strip is depressed. Conversely, if the same strip were to be too lightly inked then the UP button 17 below the strip would instead be depressed.

Turning now to Figure 2, the numbers on the letterpress rolls indicate how the newsprint pages fit with each other. Thus the near edge 30 of the web carries the back page (8) and inside back page (7) of the 8 page newspaper, the spine 31 of the newspaper comes next, and between that spine and the centre line 32 of the web is the front page (1) and the inside front page (2). After printing, the web is parted along its centre line 32 and the other side 33 of the web provides the separate piece of paper carrying inside pages 3, 4, 5 and 6.

We turn now to Figures 3 and 4. The page 1 is on the right hand side of the lay down area and because a full width web is being used the left hand edge of page 2 coincides with the left hand edge of the lay down area. The press has 36 ink zones across its width, on each face of the web, so 9 of these are in a position to control flow of ink to page 1. The 18 ink zones covered by the
lay down area have been indicated, and numbered 1a - 18a, 
away from the centre line of the press towards the page 
7/8 press edge. It is zones 1a - 9a which print on to 
page 1, and a different set of zones 1b - 9b (on the other 
side of the web in the press) which print page 2. Figure 
4 illustrates how the page 2/7 web pitch presents on the 
lay down area, with the edge of page 7 against the guide 
bar 12, so that there is used a set of nine zones beneath 
the page 2 under inspection different from the set used to 
provide ink flow to page 1. 
As long as the logic means has been told correctly which 
page is under inspection it will have computed the 
relationship between any particular transverse position of 
UP or DOWN command signal and the ink zones on the press. 
It will be appreciated that any one ink control serves 
only one page, and for any particular page only 9 of the 
72 controls have any relevance. 

Figures 5 and 6 show how the 10th to the 18th ink zones on 
each face of the web, again counting away from the centre 
line of the press, affect inking on pages 8 and 7. 

Now turning to Figures 7 and 8, the consequence can be 
seen of using a less than full width web to make a smaller 
newspaper. The left hand edge of page 1 now no longer 
occludes with the left hand boundary of ink zone 9a. Some 
of ink zone 9a prints on page 1 but the remainder on page 
8. Furthermore, zone 18a has no printing at all to do 
because the left hand edge of page 8 falls within zone 
17a. However, the memory means has already been given 
data about the relationship between the page widths and 
the inking zones, so it "knows" that ink zone 18a is 
superfluous. When the desk operator singles out a part of 
page 8 for inking density change, the logic means will 
modify the setting of one of inking zones 9a to 17a, but 
not 18a, unlike for the full width page 8 of Figure 6. 

Figures 9 and 10 show how narrow pages 2 and 7 would be
inked. Note how the extreme left hand region of page 2 is always inked by zone 1b, but zone 1b has moved relative to the lay down areas. The line 17 of UP buttons and the line 18 of DOWN buttons can be replaced, in other embodiments, by a pair of control strips, each comprising an electrically resistive element overlaid by a conductive strip in such a way that a touch of the overlay causes the overlay to make electrical contact with the underlying resistive element, in a small area underneath the point of contact. A voltage drop is maintained along the length of the resistive element, and so the contact by the conducting overlay has a voltage divider effect, to provide a command signal with a voltage in proportion to the transverse distance of the point of contact along the control strip. This proportionate signal voltage inputs the logic means to determine where along the length of the control strip it is being touched.

If desired, an indicator strip or set of indicator lamps can be provided, running parallel with the UP and DOWN switches, to indicate where, in relation to the switches, the boundaries of the ink control zones lie. Although this has no functional purpose, it may nevertheless be included at the desk for the purpose of giving the operator a greater sense of being in control of the adjustment operation. The indicator lights can be light emitting diodes which illuminate light and dark in alternate zones along the length of the guide bar 13.

Furthermore, both the UP and DOWN switches could be provided on a touch-sensitive screen.

Otherwise, the total length of the control strips 17 and 18 could be broken down into a plurality of shorter strips placed end to end. The main reason for adopting this construction would be to reduce the vulnerability of the strips to damage in storage and transport, and reduce the cost of replacing any particular faulty strip.
It is contemplated that a variable configurable display panel and touch-sensitive element could be used with a single set of controls in order to permit control of a variety of functions, such as control of ink in inking zones, dampener control, register control, compensator control, page selection, colour selection, throw off functions and conveyor controls.

It will be appreciated that the control hardware remains the same, irrespective whether there are 8, 9 or 10 ink zones per page. Recognition of the different width of the control zones and web path, from press to press, is accommodated solely within the software with which the control hardware is loaded.

A quality desk of a newspaper printing plant provides inking zone control by placement of a printed page against a datum edge and manual identification where across the width of the page, relative to the datum edge, adjustment is needed. Programmed logic means computes which ink zone corresponds to the manually identified location, and outputs an appropriate signal to the actuator of the specific inking zone thus identified. The apparatus can handle different widths of print web.
CLAIMS

1. Apparatus for varying UP or DOWN a web treatment parameter in any selected one of a plurality of fixed width treatment zones (1a-18b) which together span the fixed width (13) of a web treatment path along which, in use, a selected width web (14) undergoing treatment is caused to advance, each of the zones containing a controllable web treatment unit for treating that part of the web which is within the respective treatment zone;

the web itself having at least two preselected width pitches, each such pitch receiving treatment from more than two of the treatment units;

the apparatus comprising:

a web pitch inspection station (11) for inspecting a selected pitch of the web, for determination whether the said treatment parameter requires adjustment UP or DOWN at any particular location transversely on the width of the pitch under inspection;

an electronic logic means:

an actuator for each of the web treatment units, each of the actuators itself being actuated by an output signal from the electronic logic means;

a longitudinal datum edge (12) at the inspection station, for matching with a longitudinal edge of the web pitch undergoing inspection;

sensor means (17,18) extending width-wise across the inspection station perpendicular to the datum edge and manually actuable anywhere along its length, thereby to generate an UP OR DOWN command signal at a manually chosen distance transverse to the datum edge; and

naming means (19,20) to input the logic means with a naming signal which identifies which of the width pitches is under inspection; and

the apparatus being characterised by:
memory means for storing data representative of the manually selected positions of the longitudinal edges of the web width pitches relative to the longitudinal edges of the web treatment path;

and further characterised in that:

the electronic logic means is adapted to receive the said naming and command signals and compute from these signals and from data drawn from memory which single one of the web treatment units requires adjustment UP or DOWN to give effect to the command signal, and to send an appropriate output signal to the single treatment unit so identified.

2. Apparatus as claimed in claim 1 wherein the web pitch inspection station is a quality desk of a newspaper printing plant.

3. Apparatus as claimed in claim 1 or 2 wherein the web treatment parameter is control of flow of printing ink to individual printing zones arranged widthwise along the length of a printing roller of a printing plant.

4. Apparatus as claimed in claim 1, 2 or 3 wherein the sensor means comprises an UP signal generating means (17) and a DOWN signal generating means, which are discrete touch sensitive electrical switch elements.

5. Apparatus as claimed in any one of the preceding claims including means to display the location of the web treatment zones on the width dimension of the web being treated.

6. Apparatus as claimed in any one of the preceding claims wherein the sensor means, and any web treatment zone location display, is provided by a touch-sensitive screen.
**INTERNATIONAL SEARCH REPORT**

**International Application No.** PCT/GB '91/00576

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**I. CLASSIFICATION OF SUBJECT MATTER**

(Classification symbols apply, indicate all)

According to International Patent Classification (IPC) or to both National Classification and IPC

- **Int.Cl. 5**
- **B41F33/00**

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**II. FIELDS SEARCHED**

*Minimum Documentation Searched*  
*Classification System* | *Classification Symbols*  
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**Int.CL. 5** | **B41F**

*Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched*

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**III. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Citation of Document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to Claim No.</th>
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| Y | BROWN BOVERI REVIEW.  
vol. 69, no. 9/10, September 1982, BADEN CH  
pages 297 - 309;  
F. FURRER ET AL: 'MPS-THE BBC CONTROL SYSTEM FOR  
ROTARY OFFSET PRINTING PRESSES'  
see page 297, left column, line 1 - page 303,  
left column, line 25; figures 3-6  
--- | 1-6 |
| Y | GB,A,2 217 653 (ALLEN BRADLEY INTERNATIONAL LTD)  
November 1, 1989  
cited in the application  
see page 1, line 1 - page 2, line 33  
see page 10, line 10 - page 20, line 28; figures 1-10  
--- | 1-6 |

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- **O** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed
- **T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- **X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
- **Y** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- **&** document member of the same patent family

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**IV. CERTIFICATION**

**Date of the Actual Completion of the International Search**  
13 JUNE 1991

**Date of Mailing of this International Search Report**  
24. 07. 91

**International Searching Authority**  
EUROPEAN PATENT OFFICE

**Signature of Authorized Officer**  
DELZOR
ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. GB9100576
SA 46347

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EIDP file on
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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82