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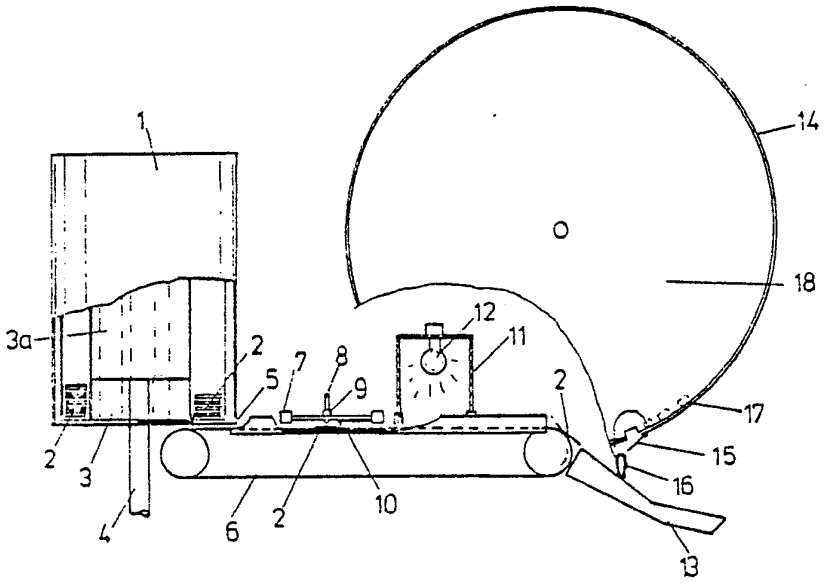
(54) Title: APPARATUS FOR MANUFACTURE OF INDICIA BEARING ELEMENTS

(57) Abstract

In the manufacture of indicia bearing elements such as luggage labels, key tags or the like, available type styles are presented on a video screen. The outline of the label blank is portrayed on the screen to permit entry of the required information. The operator can adjust the size of the information. The operator can adjust the size of the information array by a multiplying or dividing facility on the keyboard. Type styles and/or print colours can be altered by a further keyboard facility. A label blank (2) is transferred from carousel (3a) via conveyer (6) to the scribing station where its position is detected by photoelectric cell (10). X-Y plotter (7) is activated to select inscribing pen (8) of chosen colour and/or tip width. Control of the pen in the X and Y axes is effected by stepping motors controlled by a microprocessor from inputted information within its memory. The inscribed label then passes to curing chamber (11). Then the label is dispensed via chute (13) with an attachment chain (16).



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"APPARATUS FOR MANUFACTURE OF INDICIA BEARING ELEMENTS"

This invention relates to an apparatus for manufacture of indicia bearing elements and particularly to an apparatus wherein the size and style of indicia and the element substrate can be individually selected and combined to produce indicia bearing elements of individual or unique character.

The invention is particularly suitable for adaptation as a coin or note operated vending machine for manufacture of indicia bearing elements such as luggage labels, key tags, identification cards etc.

Hitherto, luggage labels, key tags and like indicia bearing elements have comprised a wide variety of devices adapted for receiving information by for example writing or printing the required information on a paper or card substrate or by embossing a thin plastics substrate coated on its rear face with a contact adhesive suitable to adhere the embossed substrate to items of luggage or other surfaces.

Each of the above systems suffers the disadvantage that individual writing or printing styles are not always legible and in the event of exposure of the luggage label, key tag or like indicia bearing element to solvents such as water or on exposure to other weathering conditions, damage can occur to obliterate the information intended to be conveyed.

While embossed self-adhesive substrates are more permanent in their retention of information, they cannot be reliably secured to a surface such as for example a container, suitcase or the like due to variable suitabilities of such surfaces to retain the adhesive layer.

A further disadvantage is that generally only one style and size of print is available from plastics embossing machines of the type such as a "Dymo" (Trade Mark) tape labeller.

It is an aim of the present invention to provide

an apparatus for the selective manufacture of indicia bearing elements which overcomes or at least alleviates the above disadvantages.

According to the present invention there is provided an apparatus for the manufacture of indicia bearing elements comprising:-

substrate selection means;

indicia selection means;

means to apply selected indicia to a selected substrate in a predetermined manner, whereby in use an operator can select a substrate, adapted to receive indicia, from a predetermined variety of substrates and selectively apply thereto an array of indicia selected from a predetermined variety of indicia characters.

Preferably the substrate selection means comprises means to select a substrate of suitable shape, pattern, ornamentation or configuration from a predetermined range of such features. Suitably, the substrate selection means comprises means to select from a variety of preformed cards, labels, discs, tags or like elements or most suitably comprises means to produce such elements from a continuous band or strip of substrate.

Preferably the indicia selection means comprises means to select indicia from a predetermined range of characters and may further comprise means to adapt said characters to one or more of a plurality of indicia styles. Suitably the indicia selection means also includes means to arrange selected indicia in a predetermined array of predetermined size.

Most suitably, the indicia selection means comprises a microprocessor programmed to provide a matrix array of characters selected from a variety of indicia styles and adapted to be adjustable in size.

One embodiment of the invention will be described with reference to a coin or note operated vending machine

for manufacture of indicia bearing labels, tags and the like. Such a machine would provide luggage labels, key tags or like identification labels to the particular requirements of a customer. In its simplest form the machine may comprise a note or coin accepting actuating device of known type, an alpha-numeric keyboard with erase, space, backspace, cursor movement and like keys. Suitably the apparatus may also comprise a video screen to display the selected information in the selected array. The keyboard may also include style selection keys and size selection keys. Substrates intended to bear the selected indicia may be provided as preshaped blanks of suitable material or in roll form from which the labels, tags or the like can be punched or otherwise formed by any suitable means. The means to apply the indicia to the selected substrate would depend on the nature of the substrate. For example, metallic substrates may be scribed by a scribing tool or etched by a spark or laser etching tool - all of known type. Plastics substrates may also be scribed or etched by suitable scribing or etching tools. The substrate may also include a photo-sensitive or electromagnetically sensitive portion over part or all of its surface to receive images imposed by an electromagnetic imaging system.

The indicia selection, sizing and arranging may be suitably controlled by a pre-programmed microprocessor or the like which may also serve to control the transfer of information to the substrate via the indicia applicator means.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:-

FIG. 1 illustrates a side elevation of the dispensing and inscribing apparatus; and

FIG. 2 illustrates a plan view thereof.

For the sake of simplicity, the various

microprocessor and other electronic controls have been omitted as it is considered that the nature of such devices will be readily apparent to a skilled addressee.

In FIG. 1, the apparatus comprises a dispenser 1 for label blanks 2. The dispenser comprises an outer cover 3 and a rotatably mounted carousel 3a supported on shaft 4 for selective rotation by a suitable means such as a stepping motor (not shown). A label blank dispensing gate 5 is provided to selectively dispense blanks as required. Below the dispensing gate 5 is a conveyor 6, the operation of which is also controlled by a stepping motor. At a position intermediate the ends of the upper surface of the conveyor is an X-Y plotter frame 7 with an inscribing pen 8 attached to the movable carriage 9 thereof. The pen 8 comprises a felt-tip pen filled with a free flowing non-air drying and non-air curing polymeric ink such as a polyurethane or other cross-linkable polymer based ink. Beneath the X-Y plotter frame is a photo-electric sensor 10 to detect the position of a label blank 2 and to stop the conveyor to locate the label blank in a desired position for inscribing.

A chamber 11 containing an ultra violet lamp or the like 12 of suitable irradiation characteristics is provided to cure or cross-link the fresh ink on the label as it passes therethrough. When the ink has cross-linked, the conveyor is actuated to direct the label, printed as required, to a dispensing chute 13. Mounted above chute 13 is a rotary chain dispenser 14. As a printed label is dispensed into the chute, a sensing means such as a photoelectric cell (not shown) actuates a dispensing gate 15 in dispenser 14 to release an attachment chain 16 from an aperture 17 in the dispenser drum 18.

FIG. 2 illustrates a plan view of FIG. 1 but with the outer cover of dispenser 14 removed for clarity. Dispenser drum 18 comprises a helical array of apertures 17

to enable many attachment chains to be stored. The position of gate 15 relative to an advancing row of apertures 17 may be controlled electronically or mechanically. Carousel 3 comprises a plurality of vertical racks 19 to permit label blanks of various colours or other characteristics to be stored in a predetermined array. Adjacent the X-Y plotter is a rack 20 containing an array 21 of pens 8 of different colours. The X-Y plotter, under the command of the microprocessor, is able to select any one of pens 21 to obtain a preselected indicia print colour. Such X-Y plotters having the ability to select a predetermined pen (and thus ink colour) are well known. In addition to having an array of pens of different colour, the plotter rack 20 may also contain pens with different tip thicknesses to suit the style of selected indicia. For example, if the substrate is to contain small print characters, the microprocessor may be programmed to select only a fine tipped pen to ensure that the print is legible.

In use an operator inserts a predetermined amount of money or a credit card into the acceptor which activates the apparatus to a ready mode. In the ready mode the video screen is illuminated and the microprocessor is programmed to permit interaction between the apparatus and the operator via instructions or questions presented on the video screen.

Available type styles are presented either on the screen or on a notice affixed to the machine and are suitably identified by code. The outline of the label blank is portrayed on the screen to permit entry of the required information in a desired arrangement within the boundaries of the label blank. After inputting the required information and checking same on the video screen, the operator can adjust the size of the information array or portions thereof to suit the label blank dimensions by a multiplying or dividing facility provided on the keyboard. If required, type styles and/or print colours for part or

all of the information can be altered to suit individual tastes by a further keyboard facility. When the operator is satisfied with the information array and any corrections have been made the scribing mode can then be activated. A selected label blank 2 is transferred from carousel 3a via conveyor 6 to the scribing station where the position of the blank is detected by photoelectric cell 10. The X-Y plotter is activated to select an inscribing pen 8 of chosen colour and/or tip width and is returned to a "ready" mode. Conveyor 6 is stopped and the inscribing pen 8 is activated. Control of the inscribing pen 8 in the X and Y axes (and Z axis if required) is effected by stepping motors controlled by the microprocessor from inputted information within its memory. After completion of the inscribing operation the inscribed label is transferred to curing chamber 11 and the conveyor is stopped to permit complete curing. The label then is dispensed via chute 13 with an attachment chain 16 and then the apparatus is deactivated.

The system operates in two (2) main modes - composing mode and inscribing mode. The programme in composing mode will lead the customer through the procedure of choosing text, style, design and label blank type. Information input in response to system prompts is loaded into a memory buffer where it can be corrected at will from the keyboard until the last invitation to correct is refused.

When the point-of-no-return is reached the system goes into inscribing mode and all entry from keyboard is disabled. The area to be inscribed is defined to the system by a matrix of points in rows and columns approximately 0.5mm apart and information generated by the character generators and other parts of memory during selecting of text and style (and design) maps bivalent data into this matrix. When in the inscribing mode the

"composing buffer" becomes the "inscribing buffer" and data from this buffer under programme control drives the inscribing tool.

The location of the inscribing tool is controlled by step motors appropriately geared down and if necessary a third step motor will control movement in "Z" axis. The programme may also provide on/off control to the inscribing tool as suited to the type of tool chosen.

Vending mechanics may be controlled through sensors and servo devices (relays, step motors). Sensing may be effected through microswitches and/or opto-pairs and provides information to the processor through input ports; similarly, servo devices driving the vending mechanism are controlled through output ports.

It will be readily apparent to a skilled addressee that many modifications or variations to the apparatus may be made without departing from the spirit and scope of the invention.

Label blanks may comprise any suitable material such as metal, plastics or like durable materials or any combinations thereof such as metal/plastic laminates. The blanks may be provided in a choice of colours or colour combinations and may bear advertising or other material on the reverse side. Alternatively the blanks may be stamped or punched from roll or strip stock.

Inscription of indicia may be effected by a variety of means such as an inscribing tool, ink jet, printing or embossing with an electromagnetically controlled indenting tool. Alternatively the inscription may be effected by etching for example with a laser. The advantage of laser etching is that vaporized material removed during the etching process may be readily removed without contaminating mechanical or electrical components.

In a further embodiment of the invention, the label blanks may comprise an electromagnetically sensitive

layer such as an "instant" photographic film. Information can be readily transferred to such a layer directly by optical or other electromagnetic means. In yet a further embodiment of the invention, part or all of the label blank may comprise such an "instant" photographic film whereby an image of the customer or operator of the apparatus can be transferred photographically to the label.

For use in manufacturing luggage labels and the like at international air terminals, such an apparatus could include a computer controlled multi-lingual translation or transliteration facility to produce labels bearing equivalent information in a variety of languages. Translation from say Japanese or Chinese characters or the like could be achieved by creating the character images on a video screen with a light pen, scanning the image(s) so produced and reconstructing a mathematical model able to be translated or transliterated into another language by the computer.

In other embodiments of the invention the label blanks could be provided as a plurality of identically marked perforated sections suitable for example as key tags. Thus for the same price as a larger luggage or identification label a number of smaller labels or tags could be produced, each bearing identical information.

The apparatus could also include a facility for dispensing attachment means for the labels such as chains, locking tags or the like either simultaneously with the labels or as a separate facility.

Although the invention has been described with particular reference to a coin or note operated vending machine it will be readily apparent that modified forms of the invention could be used for other applications such as sequentially numbered identification plates or tags in industrial applications.

In a further embodiment of the invention a

translation facility could be provided for predetermined messages such as "if lost, please return to nearest American Express Office". Such a message could be selectively or automatically programmed to translate the message into the language of the country in which the apparatus is situated.

CLAIMS:

1. An apparatus for manufacture of indicia bearing elements comprising:-

substrate selection means;

indicia selection means; and,

means to apply selected indicia to a selected substrate in a predetermined manner, whereby in use an operator can select a substrate, adapted to receive indicia, from a predetermined variety of substrates and selectively apply thereto an array of indicia selected from a predetermined variety of indicia characters.

2. An apparatus as claimed in claim 1 wherein the substrate selection means comprises means to select from a predetermined array a substrate of chosen shape, pattern, ornamentation or configuration.

3. An apparatus as claimed in claim 1 or claim 2 wherein the substrate selection means comprises dispenser means adapted to store and dispense preformed substrate elements.

4. An apparatus as claimed in claim 1 or claim 2 wherein the substrate selection means comprises dispenser means adapted to dispense substrate elements from one or more elongate strips.

5. An apparatus as claimed in any preceding claim wherein the indicia selection means comprises means to select indicia from a predetermined range of characters.

6. An apparatus as claimed in any preceding claim wherein said indicia selection means includes means to adapt indicia characters to one or more forms.

7. An apparatus as claimed in any preceding claim wherein said indicia selection means comprises microprocessor means programmed to provide a matrix array of characters selected from a predetermined range of indicia styles.

8. An apparatus as claimed in any preceding claim

wherein said means to apply selected indicia to a selected substrate comprises plotter means adapted to move in at least two planes at right angles to each other.

9. An apparatus for the manufacture of indicia bearing elements substantially as hereinbefore described.

10. An apparatus for the manufacture of indicia bearing elements substantially as hereinbefore described with reference to the accompanying drawings.

(1/1)

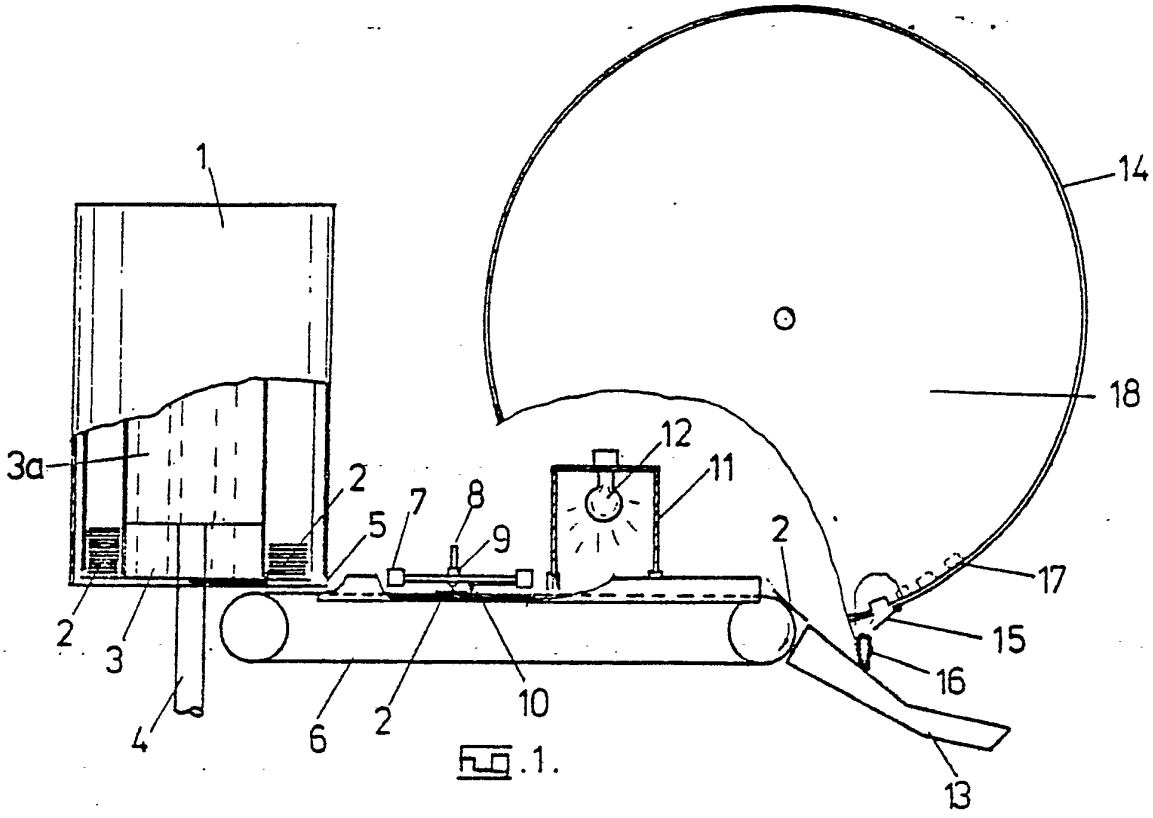

Fig.1.

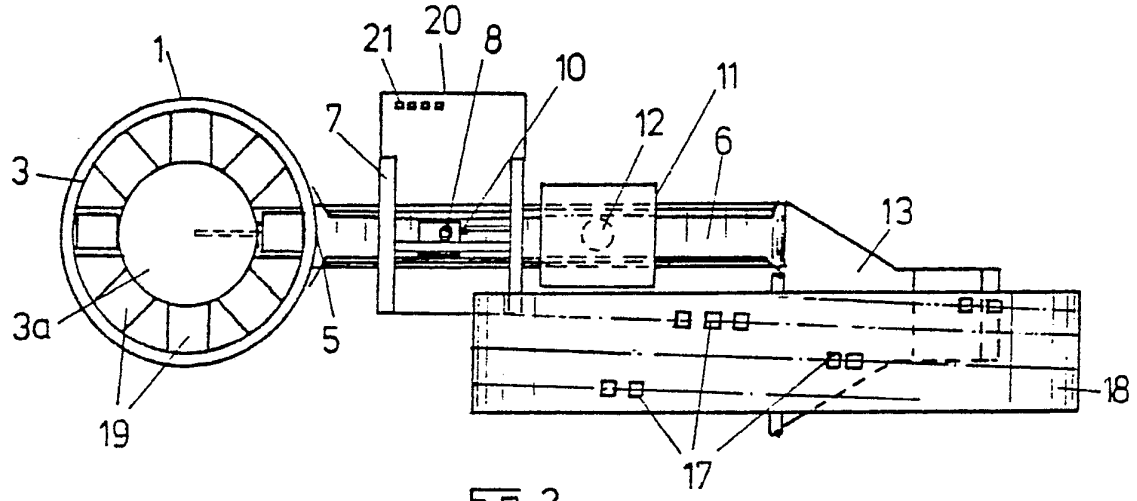

Fig.2.

INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 82/00123

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

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

INT. Cl[3] B41J 3/38// B41J 3/46, 5/08.

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	B41J 3/00

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

AU : IPC as above.

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X,A	AU,A, 87404/75 (504 144) (JACQUARD SYSTEMS) 16 June 1977 (16.06.77)(&FR,A, 2294053, & DE,A,2555849, & JP,A, 51108919)	(1-10)
X	US,A, 4088216 (DATA CARD CORPORATION) 9 May 1978 (09.05.78) (&DE,A, 2739619, & FR,A, 2410562, & US, A. 4180338, & US,A, 4271012, & CA,A, 1102269, & GB,A, 1593547, & GB,A, 1593548, & GB,A, 1593549, & GB,A, 1593550)	(1-10)
X,Y	US,A, 3820455 (DATA CARD CORPORATION) 28 June 1974 28 June 1974 (28.06.74) see column 11 line 64 to column 12 line 21 (& GB,A, 1375106, & CA,A, 969423)	(1-10)
Y	GB,A, 1395444 (PRONTOR-WERK ALFRED GAUTHIER G.m.b.H) 29 May 1975 (29.05.75)	(1-10)
P,Y,	US,A, 4316198 (HONEYWELL INC) 16 February 1982 (16.02.82) (& GB,A, 2076746, & DE,A, 3120191)	(1-10)
Y	US,A, 3958252 (CASIO CUMPUTER CO LTD) 18May 1976 (18.05.76)	(1-10)

(continued) .../2

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of parucular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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

IV. CERTIFICATION

Date of the Actual Completion of the International Search [1]	Date of Mailing of this International Search Report [2]
7 October, 1982 (07.10.82)	08 October 1952 (08.10.82)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Australian Patent Office	R.E.W. MAY

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

A	US,A, 4031993 (PITNEY-BOWES INC) 28 June 1977 (28.06.77) (& DE,A, 2446890, & CA,A,1029835)	(1-10)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____, because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.