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(54) **Improvements on webs for continuous business forms assemblies.**

(57) An improvement in a continuous business form assembly with a window eliminates window edge snagging on high speed printers and form handling equipment. The improvement is of the window having a trailing edge bowed in the trailing direction.

EP 0 132 905 A2

IMPROVEMENTS ON WEBS FOR
CONTINUOUS BUSINESS FORMS ASSEMBLIES

BACKGROUND AND FIELD OF THE INVENTION

Field

5 This invention relates to continuous business form assemblies and webs for the same having windows for address information and the like.

Background

Business forms, including envelopes and continuous
10 business form assemblies, have long been address windows. Examples are found in U.S. Patent Nos. 91,728 (envelope with oval cut window and transparent cover, or uncut with portion made transparent); 835,850 (envelope with portion made transparent by paraffin-oil or grease); 1,438,122 (envelope with
15 generally rectangular cut window) 3,136,476 (envelope with generally rectangular cut window); and Re. 25,872 (envelope with generally triangular cut window). As shown in these patents, oval and triangular windows in single envelopes have been disclosed. However, at present, windows in continuous
20 business form assemblies are consistently rectangular with small rounded corners. The art of continuous business form assemblies with windows has developed and become focused upon such windows for a variety of reasons, including cost savings and aesthetic appearance. Window shape has become so
25 standardized as to be ignore, and considered unchangeable.

SUMMARY OF THE INVENTION

In certain high speed impact printers and other continuous business form assembly processing equipment, continuous assemblies and assembly webs with windows are fed
5 through slits in equipment shields and the like. The assemblies and webs are positioned by air vacuums, and travel at speeds from about 9.6 feet (3 metres) per minute (fpm) and less to about 25 fpm feet (8 metres per minute) and more. With a paper weight of about 32 pounds, the assemblies and
10 webs travel well. However, with lower paper weights, such as 28 pounds, the windows frequently snag the shields adjacent the slits, and are frequently torn. The equipment is sometimes jammed.

Such form damage and jamming can be extremely costly.
15 Where the forms are sequentially marked with serial numbers, as with payroll checks, damage to a single form may require that the equipment be stopped, the torn form removed, the machine adjusted and restarted, and manual or computer book-keeping entries made to void the torn form.

20 It is an object of the present invention to provide an improved construction of web for business forms assemblies having windows, it is a further object of this invention to provide an improved web for a continuous business forms assembly in which the problems caused by such form damage
25 referred to is overcome.

While equipment changes and window panel gluing changes are obvious possibilities for attempting to eliminate the problems of window snagging and equipment jamming, this invention proceeds with the discovery that a mere change of

window shape substantially eliminates the problems. Thus, in a principal aspect, the invention is an improvement in a web, the web (a) being continuous in both of two longitudinal directions along a longitudinal axis, (b) having a series of business forms thereon, the series being continuous in the longitudinal directions, (c) defining a series of cut windows in the web on the forms, the series of windows being continuous in the longitudinal directions, and (d) being adapted to be fed and high speed impact printed in a first of the two longitudinal directions, the first longitudinal direction thereby being a direction of travel of the web during feeding and printing characterised in that the web has at least two distinct window edges along each window extending generally transverse to the longitudinal axis, one of the at least two window edges being a leading window edge and the other of the two window edges being a trailing window edge trailing the leading window edge when the web is moved in the direction of travel. The trailing window edge has trailing edge sides and a trailing edge center, the trailing window edge being bowed away from the direction of travel such that the trailing edge center trails the trailing edge sides when the web is moved in the direction of travel.

BRIEF DESCRIPTION OF THE DRAWING

The preferred embodiment of the invention will be described by way of example in relation to the accompanying drawing consisting of two figures of FIGS., as follows:-

Fig. 1 is a plan view of a preferred continuous business form assembly web; and

Fig. 2 is an enlarged plan view of the area encircled by line 2 in Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, the preferred embodiment of the invention is an improvement in a continuous business form assembly of a web 10 being continuous in both directions along a longitudinal axis 12. The assembly 10 has a continuous series of business forms 14 which extend transversely across the assembly 10 and are joined longitudinally end-to-end across a series of perforation lines 16. The assembly 10 has feed strips 18, 20 along transversely opposite edges 22, 24. The strips 18, 20 include continuous rows 26, 28, respectively, of spaced tractor holes.

Each form 14 defines a window 30 for displaying address information (not shown) to be printed on the form 14 at a location 31. The location 31 is equidistant with the window 30 from a continuous, longitudinal fold line 32.

The assembly 10 is fed and printed in a first longitudinal direction 34 along the axis 12, away from the second longitudinal direction 35. By definition, the direction 34 is the direction of travel, and components of the assembly 10 which precede other components in the direction of travel 34 lead such other components, or are, in relation to the other components, leading components. The other components are, then, trailing components.

Each window 30 is an area cut from a form 14. The area is covered with a transparent sheet 36 as in Fig. 2. The sheet 36 is adhered to the form 14 by an encircling adhesive 38.

The web 10 and each form 14 have, along each window 30, four distinct window edges 40, 42, 44, 46. Two of the edges 40, 42 extend generally transversely across the form 14. The other two edges 44, 46 extend generally longitudinally along the form 14. The first transverse edge 40 is the leading edge of the window, while the opposite transverse edge 42 is the trailing edge. The two edges 44, 46 are opposed side edges of the window.

The edges 40, 44, 46 are substantially completely straight, geometrically. The edge 40 is perpendicular to the longitudinal axis 12, while the edges 44, 46 are parallel to the axis 12. Thus, the edges 44, 46 are perpendicular to the edge 40. Small, rounded, or partially circular corners 50, 52 join the edges 44, 46 to the edge 40 in a smooth transition therefrom.

The edge 42 is unique. The edge 42 is bowed in the trailing direction. The center 54 of the edge 42 trails the sides 56, 58 of the edge 42. The edge 42 is nowhere straight, but continuously curved throughout its extent. The degree, rate or amount of curvature of the edge 42 does not substantially vary across its extent; the degree of curvature is substantially uniform. The sides 56, 58 are longitudinally even with each other, and lead the center 54 by about one-eighth inch. Small, rounded corners 60, 62 join the edge 42 to the edges 44, 46 in smooth transitions.

With such an edge 42, the problem of printer snagging and jamming is substantially eliminated. This is the only known solution to the problem.

It is believed that so long as no points are located along the edge 42, the bow (longitudinal distance from the sides 44, 46 to the center 54) of the edge 42 could be greater or less than one-eighth inch without affect on freedom from snagging or otherwise. It is also believed a bow of less than one-sixteenth inch would not be any more free of snagging than no bow. Points along the edge 42, as with a V-cut edge, are disfavoured due to die wear.

WHAT IS CLAIMED IS:

1. A web for a continuous business forms assembly

(a) being continuous in both of two longitudinal directions along a longitudinal axis,

5 (b) having a series of business forms thereon, the series being continuous in the longitudinal directions,

(c) defining a series of cut windows in the web on the forms, the series of windows being continuous in the longitudinal directions, and

10 (d) being adapted to be fed and high speed impact printed in a first of the two longitudinal directions, the first longitudinal direction thereby being a direction of travel of the web during feeding and printing,

characterised in that the web has at least two distinct
15 window edges (40,42) along each window extending generally transverse to the longitudinal axis, one of the at least two window edges being a leading window edge and the other of the two window edges being a trailing window edge trailing the leading window edge when the web is moved in the direction of
20 travel. the trailing window edge (42) having trailing edge sides and a trailing edge center (54), the trailing window edge (42) being bowed away from the direction of travel such that the trailing edge center (54) trails the trailing edge sides when the web is moved in the direction of travel.

25 2. A web as claimed in Claim 1 in which the web has four window edges, (40,42,44,46) two of the window edges (44,46) being opposed side window edges extending generally in the longitudinal directions from the leading window edge (40) to

the trailing window edge (42), the leading window edge (40) and the side window edges (44,46) being substantially completely geometrically straight.

3. A web as claimed in Claim 2 in which the side window
5 edges (44,46) join the trailing window edges at opposed trailing corners, the trailing corners (60,62) being rounded and the trailing edge center (54) trailing the trailing corners by about one-eighth of an inch (3 millimetres).

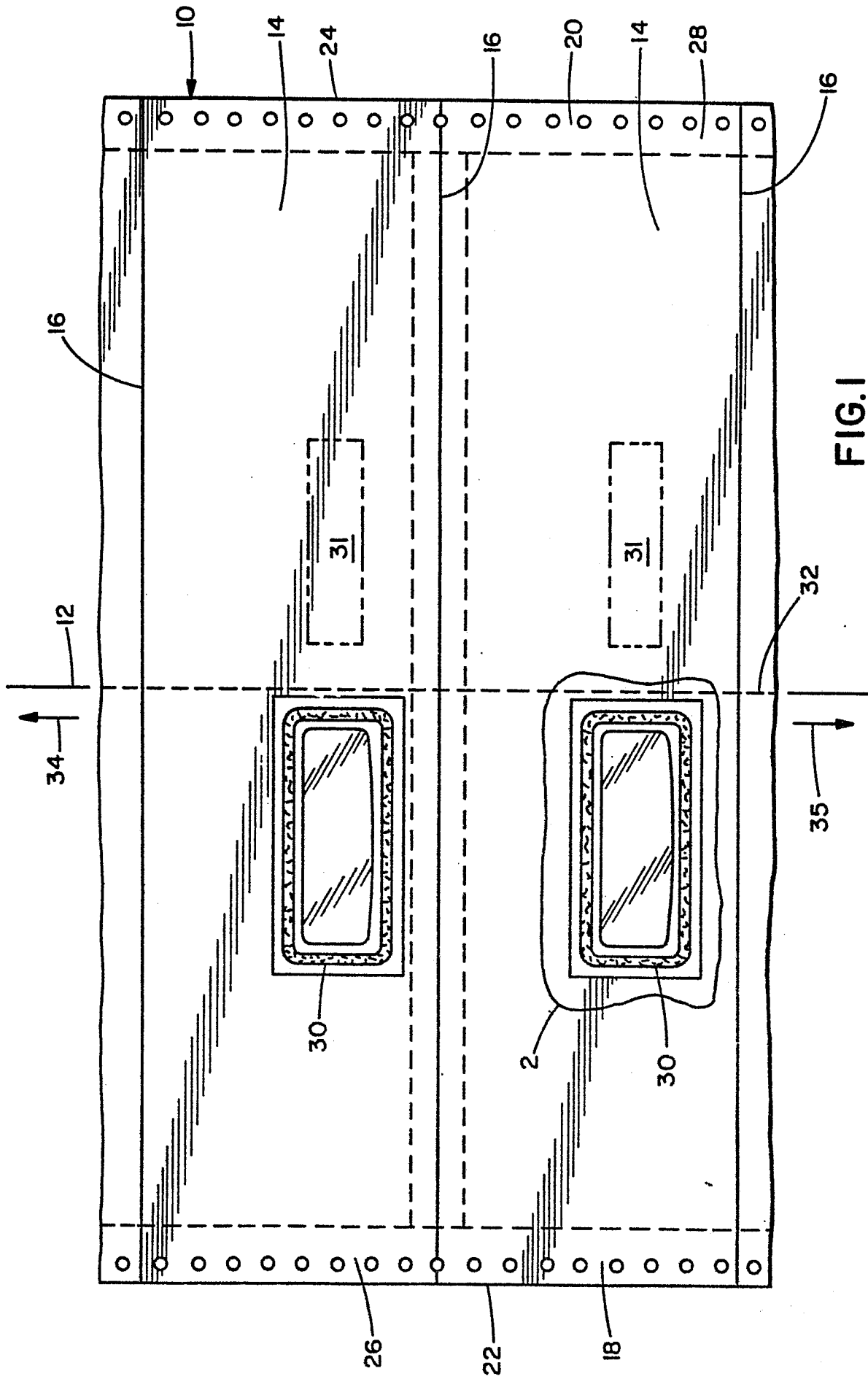


FIG. 1

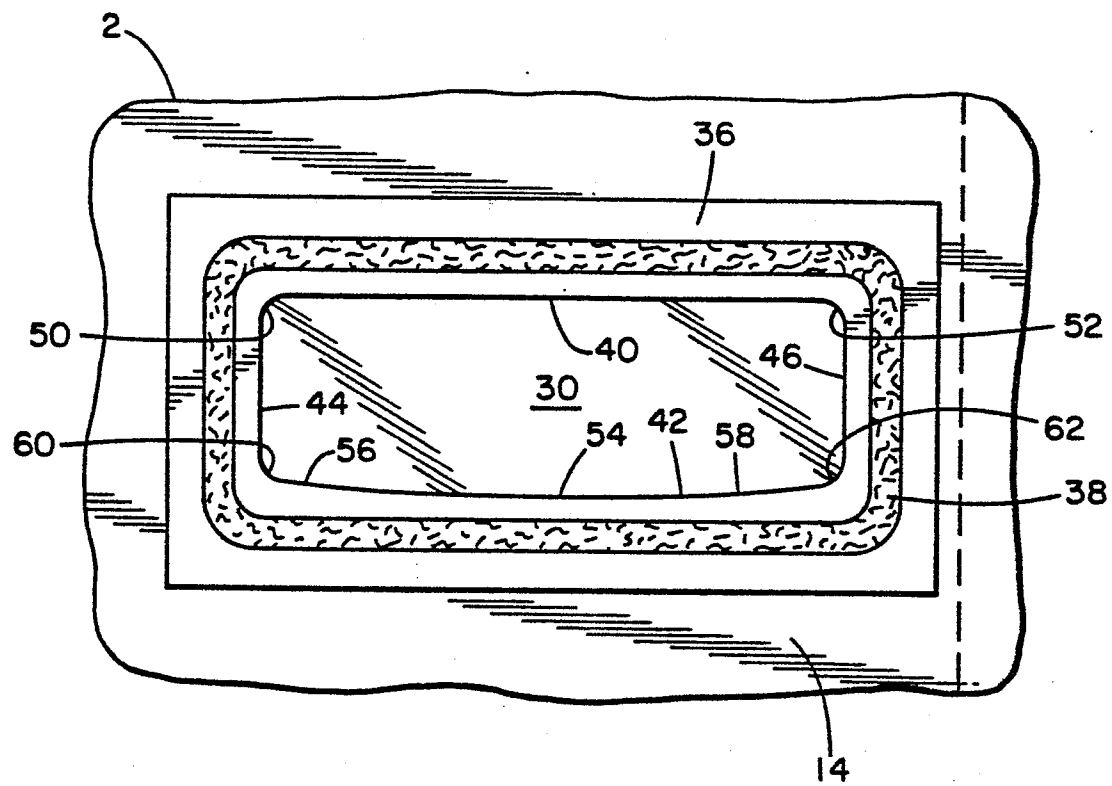


FIG. 2