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(54) **SIDE-LAY FOR A SHEET-FED MACHINE**  
SEITENANSCHLAG FÜR EINE BOGENMASCHINE  
GUIDE DE BORD POUR PRESSE A FEUILLES

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**DE-A- 19 534 966**                **DE-C- 528 991**  
**DE-C- 839 644**                    **US-A- 2 528 106**  
**US-A- 4 838 538**

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## Description

**[0001]** This invention relates to sheet-fed machines such as printing machines and punching machines and more particularly to side-lays therefor.

**[0002]** Machines for printing different colours on sheets transferred to successive stations including respective impression cylinders must register each sheet with great precision at each station to ensure printing accuracy. Similarly, punching machines must stationarily register pre-printed sheets with the same precision to ensure punching accuracy. The sheets are often not precisely rectangular, for instance out-of-square or tapered, and front lays carried by each impression cylinder of a printing machine for the precise registration of their leading edges have to be adjusted before production printing can commence. In one known arrangement, side lays for the registration of their side edges comprise one so-called fixed side-lay secured on a carriage reciprocable out of and into a predetermined registration position, as each sheet travels into printing position, by power-operated means along guides fixed to the machine frame, and another side-lay at the opposite side of the sheet reciprocable in like manner out of and into a predetermined position but in addition acted upon resiliently by spring or pneumatic means so that when in said position it urges the sheet into contact with said one side-lay. The side-lays normally comprise single rollers when so-called body-plate, which has nominally straight sides, is being printed. However, printing is also regularly effected on so-called scroll-edge sheets which have castellated sides. The castellations on one side may be offset by half a pitch from the castellations on the other side, and different pitches of castellations may be employed. In order to register the side edges of scroll-edge sheets, side-lays which are elongated strictly in the direction of travel of the sheets, and which typically incorporate a straight line of small ball bearings, have been employed. However, when necessary adjustment of the front lays has resulted in skewing of the side edges of the sheets relative to said direction, these elongated side-lays have the disadvantage that they have not contacted the tips of the castellations along the full length of the side-lays, so that the sheets have been over-constrained by the combined action of the front lays and side-lays and thus misalignment of the sheets has occurred but not been satisfactorily accommodated to the detriment of printing accuracy.

**[0003]** In another known arrangement using elongated side-lays, the angular disposition of these is set by manual adjustment so as to exactly match any skewing of the side edges of a sheet due to necessary adjustment of the front lays, but this arrangement has the disadvantages that misalignment of out-of-square or tapered sheets cannot be avoided, and that extensive time is required to make the manual adjustment.

**[0004]** US-A-2528106 discloses a pair of side-lays for a printing press each of which comprises a slightly ar-

uate array of rollers carried by an arm pivotted at one end and positively swung about said end by reciprocating its other end towards and away from the centre of the press. In one of the side-lays the rollers are on a bar yieldably coupled to the arm and urged towards the centre of the press by a spring.

**[0005]** DE-A-19534966 discloses a pair of side-lays for a banknote delivery apparatus each of which is pivotted at one end, spring-loaded towards the centre of the apparatus, and released by a latch to allow the spring to operate.

**[0006]** DE-A-4426861 discloses a side-lay for a sheet delivery apparatus which consists of a single roller or a pair of rollers mounted at one end of an articulated spring-loaded arm which is positively rotated about its other end.

**[0007]** US-A-4838538 discloses elongated side-lays for a sheet material positioning apparatus which are pivotally mounted between their ends but locked in predetermined angularly adjusted positions by bolts.

**[0008]** The object of the present invention is to overcome all of the aforesaid disadvantages.

**[0009]** According to the invention, a side-lay, for a sheet-fed machine, comprising a member incorporating sheet side support means which are elongated generally in the direction of travel of the sheets, is characterised in that said member is moveably mounted between its ends so as to enable its support means to make end-to-end contact with skewed sheet sides.

**[0010]** Preferably, the member is pivotally mounted.

**[0011]** Preferably, also, pivotal movement of the member is limited by means of stops.

**[0012]** The stops may be adjustable.

**[0013]** The member may be centred or angularly biased by adjustable spring means.

**[0014]** Alternatively, the member is compliantly mounted.

**[0015]** Alternatively, the member is both pivotally and compliantly mounted.

**[0016]** Movement of the member may be damped.

**[0017]** Preferably, the support means comprise a straight line of bearings.

**[0018]** Preferably, also, the member is mounted on a carriage reciprocable by power-operated means along fixed guides at right angles to the direction of travel of the sheets.

**[0019]** Preferably, where the side-lay has a fixed registration position, the sheets are pulled, pushed or guided into contact therewith.

**[0020]** A preferred embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, of which:-

Figure 1 is a diagrammatic plan view of a sheet registered by front lays and side-lays; and  
Figure 2 is a plan view on a larger scale of one of the side-lays.

[0021] Referring now to Figure 1, the leading edge 10 of a scroll-edge sheet 12 travelling through a printing machine in the direction indicated by the arrow 14 is precisely registered at each impression cylinder on the machine by two front lays 16 which are adjustable as shown by the arrows 18. The sheet 12 is urged into contact with the front lays 16 by springs 20 acting on pushers 22 carried by conventional sheet transfer means (not shown) moving continuously along the machine frame. A so-called fixed side-lay indicated generally at 24 comprises a carriage 26 reciprocable by power-operated means (not shown) along guides 28 fixed to the machine frame at right angles to the direction of travel of the sheet 12. An elongated member 30 incorporating sheet side support means (not shown) is pivotally mounted on the carriage 26 about a set-screw 32. Movement of the fixed side-lay into a predetermined registration position is limited by an adjustable stop 34 secured to the guides 28. Another side-lay indicated generally at 36 comprises a carriage 26 reciprocable by power-operated means (not shown) along guides 28, a member 30 and a set-screw 32 identical to those of the fixed side-lay 24, but instead of a stop 34 the side-lay 36 is provided with a spring 38 acting on its carriage so that it urges the sheet 12 into contact with the fixed side-lay 24. The elongated members 30 span a plurality of the tips 40 of the castellations 42 along the side edges of the sheet 12, and by virtue of the pivotal connection of said members to the carriages 26 their sheet side support means make end-to-end contact with said tips even though the sheet sides may have been skewed relative to the direction of travel 14 of the sheet 12 by necessary adjustment of the front lays 16. The load is accordingly spread evenly along each side-lay, and the net reaction is always through the axis of its set-screw 32. Thus over-constraint and consequent misalignment due to sheets not being precisely rectangular is avoided.

[0022] Referring now to Figure 2, the so-called fixed side-lay 24 is shown in greater detail. The guides 28 comprise a rail which is V-shaped along each edge so as to be engageable between two pairs of rollers 44 with v-shaped peripheral grooves which are rotateably mounted on the carriage 26. The member 30 comprises a body 46 to which there are rigidly secured elongated upper and lower plates 48 with a space between them in which there are rotateably confined a straight line of small ball bearings 50 constituting support means which facilitate sliding of each sheet side through said space as the sheet travels along the machine. The body 46 is pivotally mounted on the carriage 26 about the set-screw 32 as previously stated, and pivotal movement of the member 30 is limited at each of its ends by means of adjustable stops comprising two set-screws 52 on the carriage 26 which co-act with opposite sides of a tongue 54 formed integrally on the body 46. Spring means comprising two leaf-springs 56 anchored on the carriage 26 can if required be adjustably moved by respective set-screws 58 on the carriage into contact with the tongue

54 so as to centre or angularly bias the member 30 relative to the body 46. A predetermined registration position of the fixed side-lay 24 is defined by the adjustable stop means indicated generally at 34 which limit movement of the carriage 26 along the guides 28 in the direction towards each sheet.

[0023] The construction, arrangement and operation of the other side-lay 36 is identical, except that the adjustable stop means 34 are replaced by spring, pneumatic or other resilient means acting on its carriage 26 to urge each sheet into contact with the fixed side-lay 24 as previously stated.

[0024] In a modification, each side-lay is compliantly mounted on its carriage, for example by means of a rubber block or a leaf spring, instead of being pivotally mounted thereon. In another modification, each side-lay is both pivotally and compliantly mounted on its carriage. In a further modification, the adjustable leaf-springs for centring or angularly biasing each side-lay on its carriage are omitted. In yet another modification, the straight line of small ball bearings is replaced by a linear bearing or by a straight strip of low-friction material. In yet a further modification, the stops which co-act with the tongue are fixed. In still another modification, movement of the member is damped e.g. by friction. In still a further modification, the member is mounted on means other than a reciprocable carriage, for example on an arcuately-moveable member or on means permanently fixed to the machine frame.

[0025] In a still further modification, where the side-lay has a fixed registration position, the sheets are pulled, pushed or guided into contact therewith.

[0026] Side-lays according to the invention can also be used with body-plate, with the advantages that the downtime involved in changing over to side-lays of single-roller type is eliminated; and that superior registration is obtained when, as frequently occurs, the side edges of the plates are wavy, in which case said edges are supported at all their high spots.

### Claims

1. A side-lay (36) for a sheet-fed machine, comprising a member (30) incorporating sheet side support means (50) which are elongated generally in the direction of travel of the sheets, **characterised in that** said member is moveably mounted between as to enable its support means to make end-to-end contact with skewed sheet sides.
2. A side-lay according to claim 1, wherein the member (30) is pivotally mounted.
3. A side-lay according to claim 2, wherein pivotal movement of the member (30) is limited by means of stops (52).

4. A side-lay according to claim 3, wherein the stops (52) are adjustable.
5. A side-lay according to any one of claims 2 to 4, wherein the member (30) is centred or angularly biased by adjustable spring means (56). 5
6. A side-lay according to claim 1, wherein the member (30) is compliantly mounted. 10
7. A side-lay according to claim 1, wherein the member (30) is both pivotally and compliantly mounted.
8. A side-lay according to any one of the preceding claims, wherein movement of the member (30) is damped. 15
9. A side-lay according to any one of the preceding claims, wherein the support means (50) comprise a straight line of bearings. 20
10. A side-lay according to any one of the preceding claims, wherein the member (30) is mounted on a carriage (26) reciprocable by power-operated means along fixed guides (28) at right angles to the direction of travel of the sheets. 25
11. A side-lay according to any one of the preceding claims, said side-lay having a fixed registration position and the sheets being pulled, pushed or guided into contact therewith. 30

#### Patentansprüche

1. Seitenanschlag (36) für eine Bogenmaschine, umfassend ein Glied (30), das Bogenseitenhaltemittel (50) einschließt, die im allgemeinen in der Laufrichtung der Bogen verlängert sind, **dadurch gekennzeichnet, daß** das Glied zwischen seinen Enden beweglich befestigt ist, um zu ermöglichen, daß seine Haltemittel Stoßkontakt mit schrägen Bogenseiten herstellt. 40
2. Seitenanschlag nach Anspruch 1, wobei das Glied (30) drehbar befestigt ist. 45
3. Seitenanschlag nach Anspruch 2, wobei eine Drehbewegung des Glieds (30) mittels Stoppvorrichtungen (52) begrenzt ist. 50
4. Seitenanschlag nach Anspruch 3, wobei die Stoppvorrichtungen (52) regulierbar sind.
5. Seitenanschlag nach einem der Ansprüche 2 bis 4, wobei das Glied (30) durch regulierbare Federmittel (56) zentriert oder winklig eingespannt ist. 55

6. Seitenanschlag nach Anspruch 1, wobei das Glied (30) nachgiebig befestigt ist.
7. Seitenanschlag nach Anspruch 1, wobei das Glied (30) sowohl drehbar als auch nachgiebig befestigt ist.
8. Seitenanschlag nach einem der vorhergehenden Ansprüche, wobei eine Bewegung des Glieds (30) gedämpft ist.
9. Seitenanschlag nach einem der vorhergehenden Ansprüche, wobei das Haltemittel (50) eine gerade Linie von Lagern umfaßt.
10. Seitenanschlag nach einem der vorhergehenden Ansprüche, wobei das Glied (30) auf einem Wagen (26) befestigt ist, der durch kraftbetriebene Mittel entlang starren Führungen (28) in rechten Winkeln zur Laufrichtung der Bogen hin- und herbeweglich ist.
11. Seitenanschlag nach einem der vorhergehenden Ansprüche, wobei der Seitenanschlag eine starre Registrierungsposition aufweist und die Bogen in Kontakt damit gezogen, geschoben oder geführt werden.

#### Revendications

1. Guide de bord (36) pour presse à feuilles, comprenant un élément (30) comprenant des moyens de support des bords des feuilles (50) qui sont allongés globalement dans la direction de déplacement des feuilles, **caractérisé en ce que** cet élément est monté mobile entre ses extrémités afin de permettre à ses moyens de support d'établir un contact d'extrémité à extrémité avec les bords désalignés des feuilles. 35
2. Guide de bord selon la revendication 1, dans lequel l'élément (30) est monté pivotant.
3. Guide de bord selon la revendication 2, dans lequel le pivotement de l'élément (30) est limité par des butées (52). 40
4. Guide de bord selon la revendication 3, dans lequel les butées (52) sont réglables. 50
5. Guide de bord selon l'une quelconque des revendications 2 à 4, dans lequel l'élément (30) est centré ou déplacé angulairement par des moyens formant ressorts réglables (56). 55
6. Guide de bord selon la revendication 1, dans lequel l'élément (30) est monté élastiquement.

7. Guide de bord selon la revendication 1, dans lequel l'élément (30) est monté à la fois pivotant et de façon élastique.
8. Guide de bord selon l'une quelconque des revendications précédentes, dans lequel le déplacement de l'élément (30) est amorti. 5
9. Guide de bord selon l'une quelconque des revendications précédentes, dans lequel les moyens de support (50) comprennent une ligne droite de paliers. 10
10. Guide de bord selon l'une quelconque des revendications précédentes, dans lequel l'élément (30) est monté sur un chariot (26) susceptible d'effectuer un déplacement alternatif commandé par moteur le long de guides fixes (28) à angle droit par rapport à la direction de déplacement des feuilles. 15  
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11. Guide de bord selon l'une quelconque des revendications précédentes, ce guide de bord ayant une position d'alignement fixe et les feuilles étant tirées, poussées ou guidées en contact avec lui. 25

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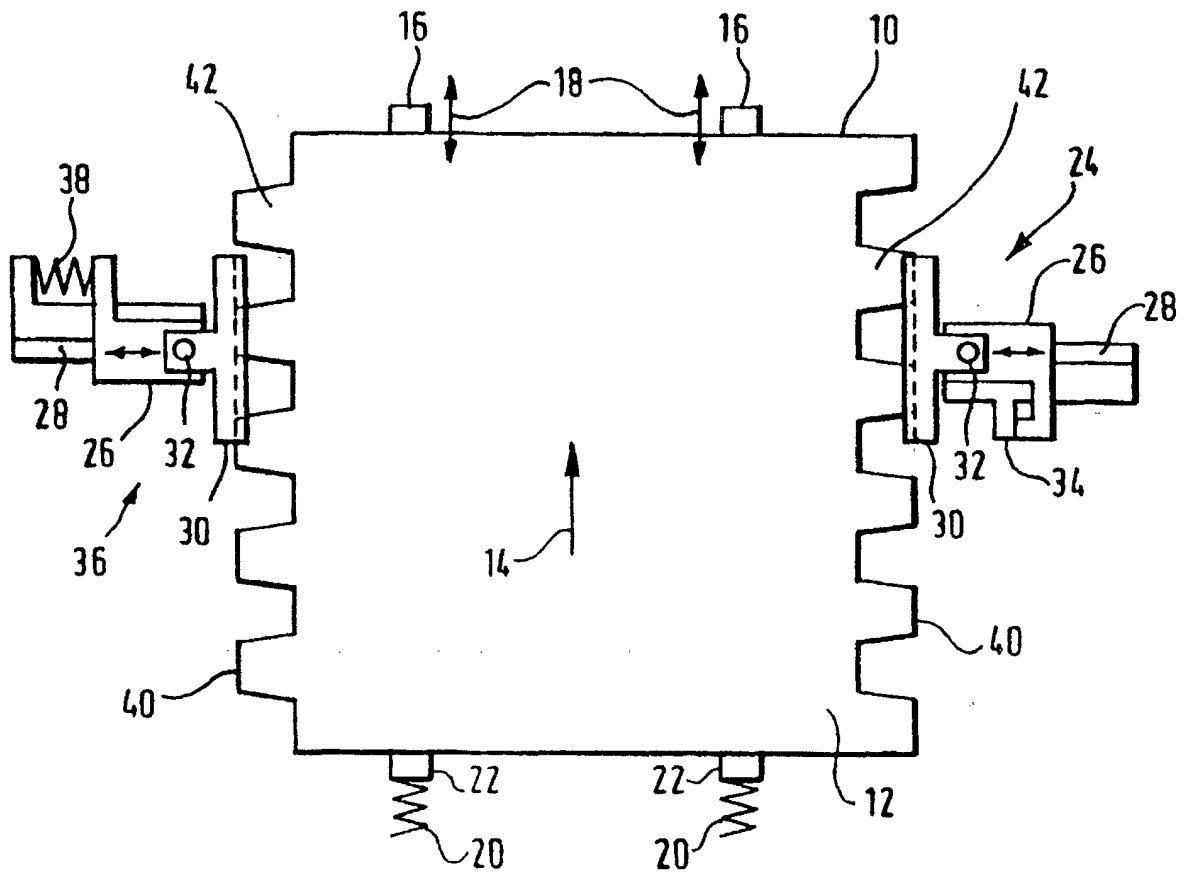


Fig.1.

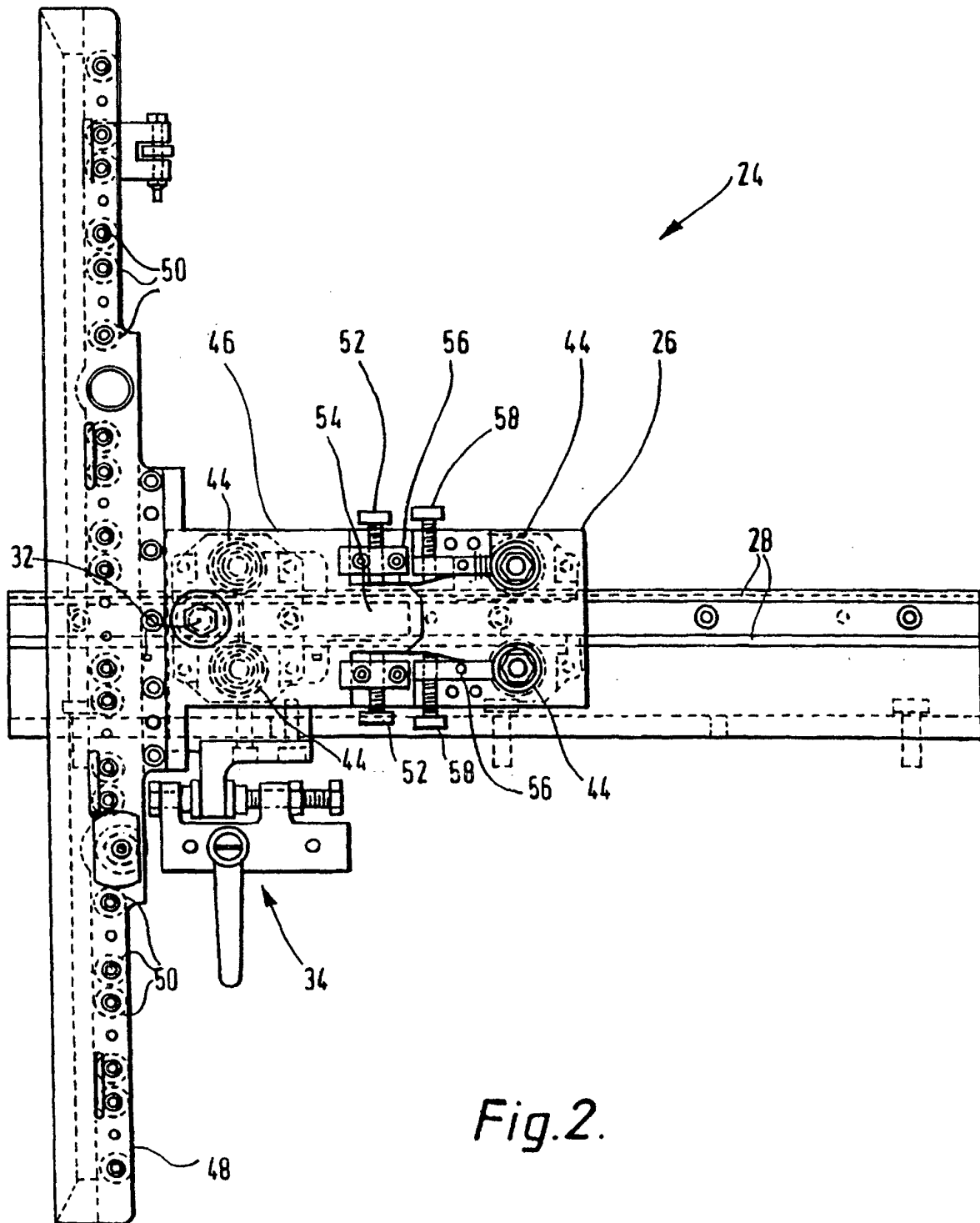


Fig. 2.