June 29, 1965 G. COTT ETAL 3,191,605

BINDING FOR LOOSE SHEETS, INCLUDING PIVOTAL OPEN LINKS

Filed Sept. 19, 1963 4 Sheets-Sheet 1

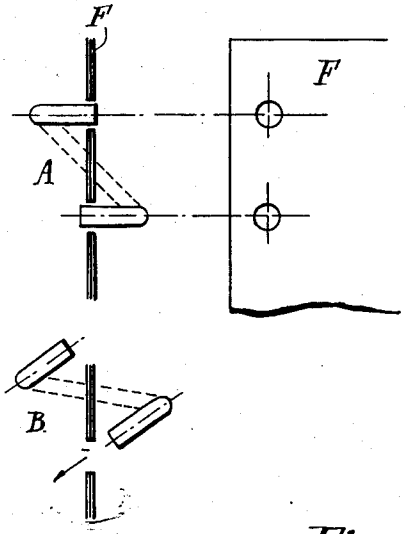



Fig. 1

Fig. 2

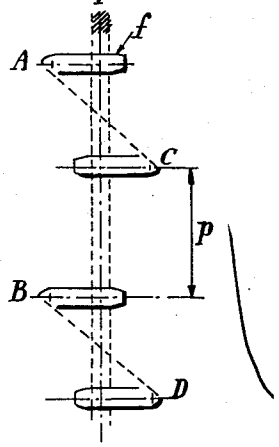
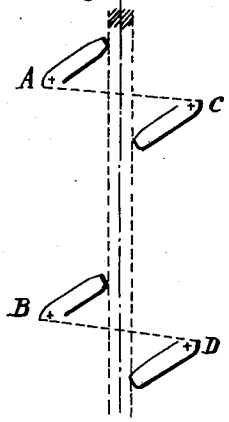



Fig. 3.



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BINDING FOR LOOSE SHEETS, INCLUDING PIVOTAL OPEN LINKS

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Fig. 4.

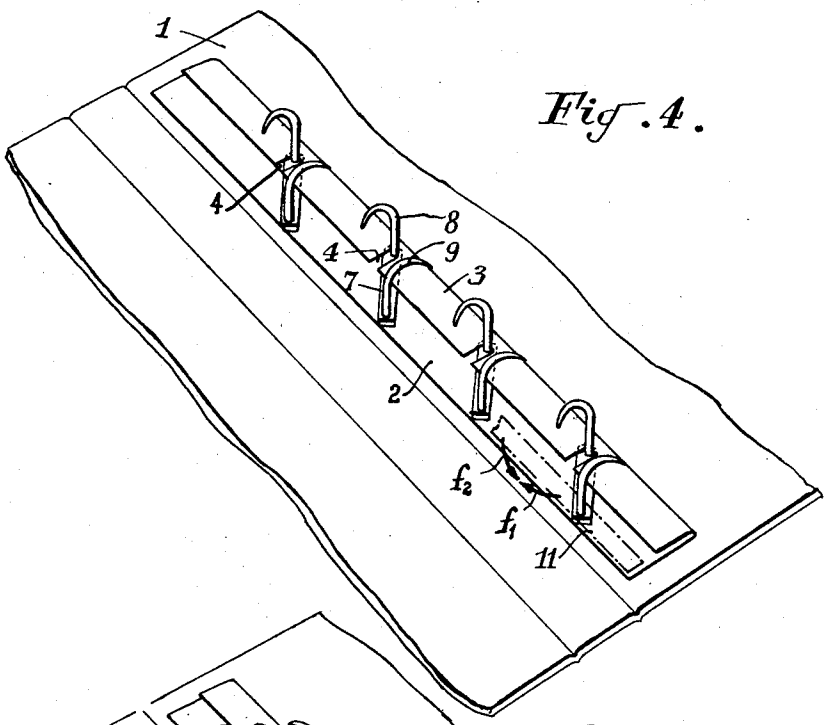
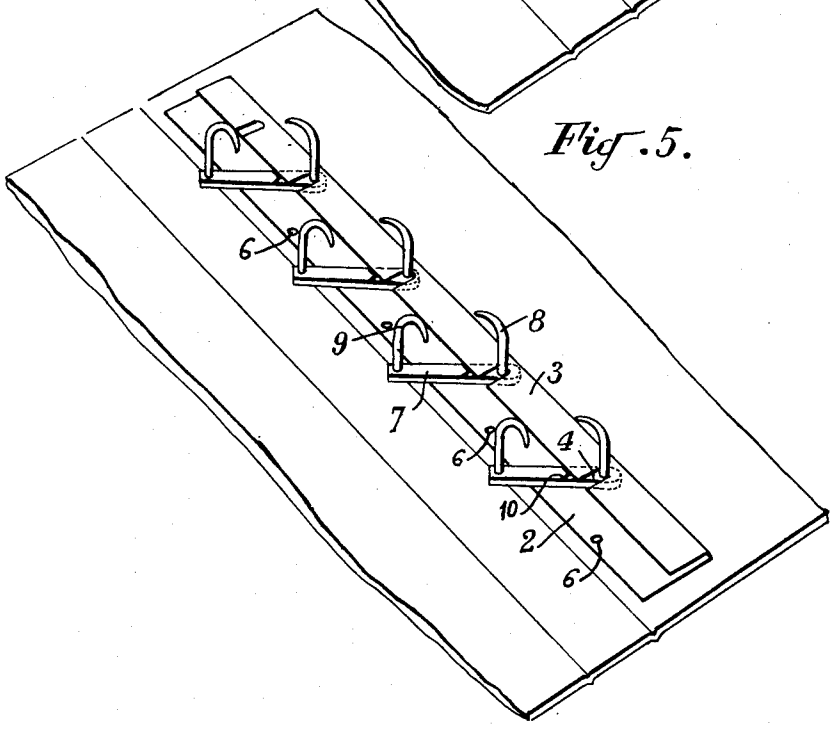



Fig. 5.



BINDING FOR LOOSE SHEETS, INCLUDING PIVOTAL OPEN LINKS

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Fig. 6.

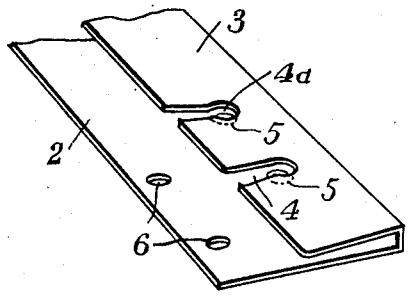



Fig. 7.

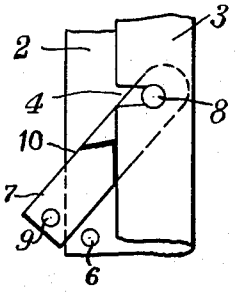
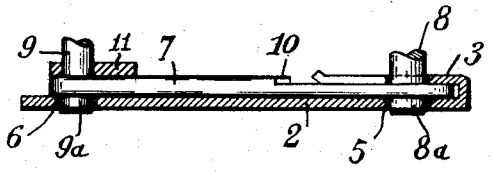



Fig. 8.



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BINDING FOR LOOSE SHEETS, INCLUDING PIVOTAL OPEN LINKS

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Fig. 9.

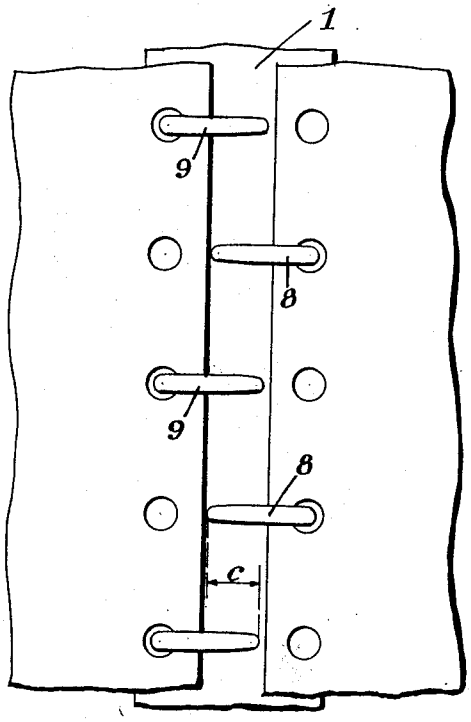
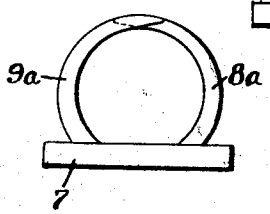



Fig. 12.

Fig. 10.



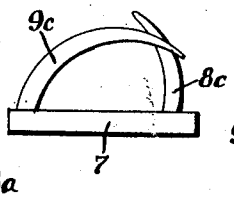
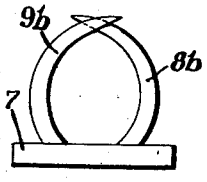




Fig. 11.



United States Patent Office 3,191,605 Patented June 29, 1965



3,191,605

# BINDING FOR LOOSE SHEETS, INCLUDING PIVOTAL OPEN LINKS

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5 Claims. (Cl. 129—10)

This invention relates to binding for loose sheets.

Our invention has for an object to provide an improved binding including pivotal open links constituted by a plate carrying twin pins.

Each open link is provided with two preferably crook-shaped or curved pins at the ends of a plate, the crooks or curves formed by said pins lying in parallel planes which are oblique with reference to the longitudinal axis of the plate.

When the open links are suitably positioned, the planes defined by the crook-shaped pins are substantially perpendicular to the axis of the binding and said pins then form guides for the continuous insertion of the sheets to be bound, one series of perforations in said sheets disengaging the corresponding pins of a series of links only when the other pins of said series of links have engaged another series of perforations arranged in staggered relationship with reference to the perforations of the second series.

The opening of the binding and consequently the release of the sheets carried by said binding are effected by a pivotal movement of the whole link system forming the binding whereby, at the end of the pivotal movement, the crook-shaped pins are no longer substantially perpendicular to the axis of the binding and an uninterrupted free space provided between the cooperating ends of the two series of pins corresponding to the two series of perforations so that the sheets may be taken out of the binding through said free space.

Our invention covers in particular a very simple and advantageous embodiment of a binding exhibiting the above features and including a strip of somewhat elastic material preferably such as extruded plastic material, said strip being folded along a longitudinal line of fold, and the edge of one of the folded flaps thus formed being provided at predetermined uniform intervals with notches while perforations are provided in accurate registry with said notches in the other flap which is secured to the body of the binding. Thus we may insert in each notch the foot of a pin of a corresponding open link while the plate of the latter fits between the two flaps of the strip and the perforations in the second flap are engaged by studs formed on the lower surfaces of the plates. In this embodiment, a perforated strip fitted over those pins of the open links which are not inserted in the notches is adapted to control, through a translational movement, the pivotal movement of said links around the first mentioned pins inserted in the notches.

Our invention allows furthermore obtaining an accurate centering of the ends of the pins with reference to the perforations to be engaged by them, said centering being effective to improve the smooth shifting of the sheets from one series of pins of a succession of links onto the other series. According to our invention, the outline of the pins is such that, when they are viewed endwise, their projection on a common plane parallel with their planes does not form a closed annulus, but a loop constituted by two free strands crossing each other.

Further features and advantages of our invention will



appear from the following description, reference being made to the accompanying drawings given by way of example and wherein:

FIG. 1 is a diagrammatic showing of the operation of our improved binding,

FIGS. 2 and 3 illustrate diagrammatically the operation of different embodiments of our invention,

FIG. 4 is a perspective view of a complete binding assembly with the links in their closed position,

FIG. 5 is a perspective view of the same complete binding as FIG. 4, showing the links in their open position,

FIG. 6 is a perspective view of part of a folded yielding strip,

FIG. 7 illustrates a detail associated with said strip,

FIG. 8 is a partial sectional view showing a pin-carrying plate fitted between the flaps of a folded yielding strip,

FIG. 9 is a diagrammatic plan view, as seen from above of our improved binding,

FIG. 10 is an elevational end view of an open link of a conventional type,

FIGS. 11 and 12 are elevational end views of open links incorporated with our improved binding.

The link forming part of our improved binding is constituted by an open member, of metal or any other suitable material. As shown in FIG. 1, the links when in the position illustrated at A the sheets F during their shifting by guiding them continuously over the open sections of the links. For the position illustrated at B, the continuity of the guidance is interrupted and the removal or the insertion of one or more sheets F through the opening between the links becomes thus possible.

The actual binding includes at least two rings so that the sheets may be held during their shifting by as least two perforations.

FIG. 2 illustrates an embodiment with alternating pins, wherein the ends of the pins of each link overlap as shown by the area *r* while the shape of the pins at *f* facilitates the shifting of the sheets from one pin of a link onto the other. In this embodiment, the spacing *p* between successive links may be selected as desired. FIG. 3 shows the pins in open position.

Suitable actuation means (not shown in FIGS. 1–3) are provided for pivotally moving the links about points AB and CD considered pairwise. The opening of the binding is obtained by imparting to such means a translational movement which is oblique with reference to the axis of the binding, which leads to a simultaneous pivotal movement of all the links.

The pivotal movement of the links from the position of FIG. 2 to that of FIG. 3 displaces the ends of the pins and allows introducing or removing one or more sheets through the open area O. The binding is closed by a reverse translational movement of the actuation means.

FIGS. 4 to 8 illustrate in detail a preferred embodiment of our invention.

On the inner surface of the boarding 1 of the binding, there is secured a strip 2 of a slightly elastic material provided with a lateral flap 3 formed by longitudinally folding the strip 2. The edge of said flap 3 is provided at uniform intervals with notches 4 the bottom of which opens into a broader circular opening 4*a* (FIG. 6).

As particularly apparent from inspection of FIG. 6, the body of the strip 2 is provided with perforations 5 registering with the corresponding circular openings 4*a* of the notches 4 and in the section which is not covered by the folded flap 3, one or more ports 6 is provided for a purpose which will be disclosed hereinafter.

Each open link includes, as already mentioned, a plate 7 rigid with two crook-shaped or curved pins 8 and 9. The plate 7 is provided on its upper surface with a V-shaped step 10, the function of which will be disclosed

hereinafter. The pin 8 projects slightly at 8*a* beyond the lower surface of the place 7 as shown in FIG. 8.

In the embodiment illustrated, the number of open links is equal to the number of notches 4. Other embodiments may include a number of links which is smaller than the number of notches. The plate of each link is fitted between the body of the strip 2 and the flap 3, the lower end of each of the pins 8 extending through the circular opening 4*a* of a corresponding notch 4 while the lower projection 8*a* of the pin is engaged in corresponding perforation 5 (FIG. 8).

It is apparent, when thus positioned, that each link is rigidly held by the yielding strip 2 and is adapted to pivot around the vertical axis of the lower end of its pin 8.

The simultaneous pivotal movement through a uniform angle of all the open links is obtained by operating a strip 11 having perforations 6 which are engaged by the pins 9 of the different links. An annular translational movement of said strip 11 in the direction of the arrows *f*1 or *f*2 produces a pivotal movement of all the links around the axes of the corresponding pins 8 (FIG. 4).

Considering the so-called closed position illustrated in FIG. 4, it is apparent that when the perforated sheets are fitted for instance over the pins 8 and said sheets are shifted from one side of the binding to the other, the sheets are guided over said pins 8 during their pivotal movement at least up to the point at which the pins 9 engage the free intermediate perforations of the sheets so as to guide said sheets in their turn towards their final position.

When, upon shifting of the control strip 11 in the direction of the arrow *f*1, the links have been caused to pivot into the position illustrated in FIG. 5, it is apparent that the ends of the crook-shaped pins have moved away from the axis of the binding. This results in that the sheets are allowed to be disengaged from the pins extending through their perforations since the sheets may be readily removed when they have reached the ends of said pins without the other pins on the links resisting the removal of the sheets.

Each flat lateral surface of the V-shaped step 10 on the plate of each link abuts, at the end of the pivotal movement of the links in the corresponding direction, against the edge of the flap 3. Thus, in FIG. 4, the lateral surfaces of the steps facing in one direction abut against the flap 3 and the other lateral surfaces abut against the flap in the configuration in FIG. 5. This arrangement allows limiting between two suitably selected extreme positions, the amplitude of the pivotal movement of the links. When the binding is in its closed position, the port or ports 6 formed in the strip 2 can cooperate with a stud on the lower surface of the corresponding plate or plates (FIG. 7) and this arrangement ensures a locking of the binding in said closed position. The elasticity of the strip 2 allows releasing without any difficulty said stud or studs whenever the binding is to be released and opened.

According to the preferred embodiment, the locking studs are constituted by lower projecting sections 9*a* of the pins 9 (FIG. 8). In such a case, the number of ports 6 may be equal to the number of links.

A further object of our invention consists in the execution of links the outline of which promotes the passage of the sheets from one pin of each link onto the other pin.

FIG. 9 shows diagrammatically in plan view the binding of FIG. 4 in closed position with the two series of pins 8 and 9. It is apparent that each pin in each series or row registers transversely with a point of the gap separating two pins of the other row. Furthermore, the pins of both series overlap transversely of the carrier member as shown at *c*. A perforated sheet transferred from one row to the other is held, while it lies in this overlapping area, by the pins of both series.

In bindings provided with links of a known type, the shape of the pins 8*a*, 9*a* is such that when viewed endwise as illustrated in FIG. 10, the two rows of pins form



in elevational view, a perfectly closed annulus, the ends of the pins of each row registering accurately with the outline defined by the pins of the other row.

Surprisingly, such an arrangement is not very favorable as concerns a smooth and accurate shifting of the sheets from one row or series to the next whereas experiments made by applicants have led to pins 8*b*, 9*b* of the novel shape illustrated in FIG. 11, which shape provides the best results.

It is apparent that the pins viewed endwise as shown in FIG. 21 are not projected in accurate superposition, while the ends of the pins in each row project slightly outside the general outline defined by the pins of the other row. Obviously the amount of such a projection may be more or less considerable, depending on the shape of the perforations, the curvature of the pins, the grade of the paper and the like.

The advantage of said arrangement resides in that when a sheet is shifted over the overlapping area *c*, those perforations which are not engaged by the pins feeding the sheets and which are about to engage the pins which are to receive them enter, by reason of the deformation produced by the tractional stress exerted on the sheet, a position which is slightly above the location of the perforations still engaged by the feeding pins and held fast by the latter. It is apparent that the ends of the receiving pins lying slightly outside the outline of the feeding pins are thus correctly positioned and ready to engage the corresponding free perforations, as may be provided possibly by a preliminary sliding along the sloping sheet before engagement of the said pins inside the perforations.

Other embodiments incorporating the same feature of a crossing of the projecting ends of the pins lie obviously within the scope of our invention. In particular, as illustrated in FIG. 12 the pins 8*c*, 9*c* are of unequal lengths and their slope is different, while the ends of the pins 8*c*, 9*c* show a relative arrangement which retains the above disclosed advantages.

What we claim is:

1. A binding for loose sheets comprising a plurality of open links including each a plate, crook-shaped pins rigid with corresponding ends of the plate and extending on the same side of the latter in parallel planes oblique with reference to the axis of the plate, the incurved ends of the pins facing inwardly of the plate, and means interconnecting said links and adapted to make the latter pivot simultaneously each around a pivotal axis registering with the axis of the end of one predetermined pin on the plate to shift the plates between an operative angular position for which the pins cross a predetermined longitudinal line registering with the medial position of a sheet in the binding and an inoperative angular position for which the pins lie to either side of said medial position.

2. A binding for loose sheets comprising a strip of elastic material including a body provided with uniformly distributed perforations and a longitudinal flap folded over said body and provided with uniformly distributed marginal notches registering with said perforations, a boarding to which said body is rigidly secured, a series of open links distributed uniformly along the strip and including each a plate inserted between the body and the flap of the strip, crook-shaped pins rigid with the corresponding ends of the plate and extending on the same side of the latter in parallel planes oblique with reference to the axis of the plate, the ends of the pins facing inwardly of the plate, and a short extension rigid with one of the pins projecting outwardly of the plate on the side opposed to the pins and fitted in a corresponding perforation of the strip, the pin rigid with said extension extending through the notch registering with said perforation, and a perforated strip fitted over those pins which are not rigid with an extension and adapted to be translationally shifted to shift the plates between two angular positions to wit an operative angular position for which the pins cross a predetermined longitudinal line registering with

the medial position of a sheet in the binding and an inoperative angular position for which the pins lie to either side of said medial position.

3. A binding for loose sheets comprising a strip of elastic material including a body provided with uniformly distributed perforations and a longitudinal flap folded over said body and provided with uniformly distributed marginal notches registering with said perforations, a boarding to which said body is rigidly secured, a series of open links distributed uniformly along the strip and including each a plate inserted between the body and the flap of the strip and provided with a V-shaped step having two edges adapted to engage selectively the notched edge of the flap, crook-shaped pins rigid with the corresponding ends of the plate and extending on the same side of the latter in parallel planes oblique with reference to the axis of the plate, the ends of the pins facing inwardly of the plate, and a short extension rigid with one of the pins projecting outwardly of the plate on the side opposed to the pins and fitted in a corresponding perforation of the strip, the pin rigid with said extension extending through the notch registering with said perforation, and a perforated strip fitted over those pins which are not rigid with an extension and adapted to be translationally shifted to shift the plates between two angular positions defined by the selective abutment of the edges of the V-shaped step against the notched edge of the flap, to wit an operative angular position for which the pins cross a predetermined longitudinal line registering with the medial position of a sheet in the binding and an inoperative angular position for which the pins lie to either side of said medial position.

4. A binding for loose sheets comprising a strip of elastic material including a body provided with uniformly distributed perforations and with ports arranged in staggered formation with reference to the perforations and a longitudinal flap folded over said body and provided with uniformly distributed marginal notches registering with said perforations and leaving the ports in the body uncovered, a boarding to which said body is rigidly secured, a series of open links distributed uniformly along the strip and including each a plate inserted between the body and the flap of the strip and provided with a V-shaped step having two edges adapted to engage selectively the notched edge of the flap and with a stud adapted to engage a corresponding port in the body for a predetermined angular position of the plate, crook-shaped pins rigid with the corresponding ends of the plate and extending on the same side of the latter in parallel planes oblique with reference to the axis of the plate, the ends of the pins facing inwardly of the plate, and a short extension rigid with one of the pins projecting outwardly of the plate on the side opposed to the pins and fitted in a corresponding perforation of the strip, the pin rigid with said extension extending through the notch registering with said perforation, and a perforated strip fitted over those pins which are not rigid with an extension and adapted to be translationally shifted to shift the plates between two angular positions defined by the selective abutment of the edges of the V-shaped step against the notched edge of the flap, to wit an operative angular position for which the studs engage the corresponding ports and the pins cross a predetermined longitudinal line registering with the medial position of a sheet in the binding and an inoperative angular position for which the pins lie to either side of said medial position.

5. A binding for loose sheets comprising a plurality of open links including each a plate, crook-shaped pins rigid with the corresponding ends of the plate and extending on the same side of the latter in parallel planes oblique with reference to the axis of the plate, the incurved ends of the pins facing inwardly of the plate, the free ends of the pins seen as projected on a plane parallel with the planes containing them crossing each other and projecting outside the general outline defined by the remainder of the pins, and means interconnecting said links and adapted to make the latter pivot simultaneously each around a pivotal axis registering with the axis of the end of one predetermined pin on the plate to shift the plates between an operative angular position for which the pins cross predetermined longitudinal line registering with the medial position of a sheet in the binding and an inoperative angular position for which the pins lie to either side of said medial position.


**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 863,888 | 8/07 | Wheildon | 129—1 |
| 868,683 | 10/07 | Morden | 129—10 |
| 2,031,373 | 2/36 | Lexow | 129—1 |
| 2,579,253 | 12/51 | Fogel | 129—9 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 365,520 | 1906 | France. |


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