As above-discussed, according to the conventional technique, the position of the opened half rings is not stable, it is necessary to hold the half rings with fingers when the loose leaf or leaves are to be inserted or removed, and thus it is not easy to insert or remove the loose leaf or leaves.

In addition, in the conventional technique, the free ends of the half rings are in the form of hooks and accordingly when the user wants to open the rings it is necessary to relatively move the half rings for a substantial distance in opposite directions to unlock the locks at the free ends of the half rings.

[0005]

Accordingly, an object of the present invention is to provide a binder having half rings with no hook at their free ends, wherein both of the half rings can be securely kept closed, but can be easily opened when necessary.

Another object of the present invention is to provide a binder, wherein the free ends of the half rings can be easily opened and stably kept in the opened position.

A further object of the present invention is to provide a loose leaf binder, wherein each pair of the half rings are provided with a recess and a protrusion at the respective free ends which are adapted to be mutually engaged in vertical direction (not in the longitudinal direction as in the conventional half-rings) thereby to enhance the capability of retaining the loose leaf or leaves, and when necessary the half rings can be opened and immediately after their opening the half rings return to the position in alignment with each other. At the time of closing the half rings, the half rings are rotated, while keeping the mutual alignment, to the closed position and their recesses and projections are engaged with each other. Thus, the insertion and removal of the loose leaf or leaves can be stably and easily performed and the closure of the rings becomes more reliable.

In addition to these objects, the present invention further aims at solving other problems which will be explained in the followings.

[Means for solving the problem]

[0006]

The inventor has conducted an extensive study and has invented the following binder for loose leaf or leaves.

(1) A loose leaf binder comprising: a pair of elongated base plates (42, 44) arranged side-by-side; a plurality of half rings (20, 30) integrally supported respectively on these base plates, in such manner that half rings form closed rings when their respective pairs of the free ends abut each other; a plurality of bearings (14) formed integrally with rear surfaces of the respective base plates (42, 44) and having a common axis between the base plates, a gap formed between the bearings (~~44~~14) in such manner that the base plates can be relatively moved along the common axis between a first

around the axis of the shaft 100 by a predetermined angle to open and close the half rings 20, 30. It should be understood that the single shaft is one example and a plurality of shafts having a common axis may be used in place of common single shaft. More specifically, the bearing 14a may be integrally formed on the base plate 44 while the bearing 14b is integrally formed on the base plate 42 by molding.

[0015]

Preferably, a coil spring 102 is mounted on the shaft 100 and is installed between spring retainers 80, 90 (or between the end surfaces of the bearings 14a and 14b) formed on the respective base plates 42, 44, in such manner that the base plates 42, 44 are normally biased toward the first position where the both of the half rings 20,30 are in alignment with each other.

The legs 102a and 102b of the coil spring 102 are engaged with the inner surfaces of the base plates 42, 44 to normally urge the base plates 42, 44 toward their open directions.

Further, a tab 88a is provided at one end of the base plate (42 or 44) which is on the side of compressing the coiled spring (102) when the base plates are moved from the first position where the half rings (20, 30) are closed toward the second position where the half rings are opened. In the embodiment shown in Figs. 1-2, the tab 88a is provided on one end of the base plate 42. As shown in Fg.10, an arcuate guide groove ~~100~~ 110 is formed within the tab 88a to retain the arcuate end 107 of the other base plate 44 to allow rotation and translation of the other base plate 44. Similarly, another tab 88b and groove may be provided on the other end of the other base plate 44, too.

[0016]

Half rings

According to the embodiments depicted in the drawings (except for Figs. 14-17), the free ends of the half rings 20, 30 are of the same shape and when they are rotated by 180 degrees their free ends can be smoothly contacted with each other. Figs. 9 and 11 illustrate the details of the half rings. The free end of each half ring 20 or 30 is provided with oblique faces 23, a protrusion 26 projecting from between the oblique faces 23 along one side of the vertical surface 25 projecting from the oblique faces 23 along the center line of the half ring, a recess 24 formed on the other side of the vertical surface 25. The half rings 20 and 30 are not hooks but only contact each other, so that a smooth closing and opening of the half rings are made possible. The protrusion 26 of the free end of the half ring has the same curvature as the recess 24 of the other half ring and accordingly they can make a snug fit when they are closed. Also, as shown in Fig. 11, the half rings are opened when the base plates 42, 44 are displaced in the longitudinal direction indicated by the arrow, and are snug fit when the

ends of the half rings are dispensed with, while the engagement and disengagement of the lock is made possible by the relative positional relationship among the hooks 105 of the lock members 104, the lock release grooves 106 and the outer edges of the base plates.

Thus, the free ends of the half rings 20, 30 can be maintained in the closed condition without use of hooks at the ends of the half rings, and the free ends of the half rings can have any shape so long as they partly overlap each other. Also, with this configuration, the plastic molding mold is made simple.

More preferably, by adopting a coil spring 102 having legs 102a and 102b as shown in Figs. 4-6, the base plates 42, 44 will be immediately returned to the position where the open half rings 20, 30 are in line with each other.

[0019]

Open angle and stopper

Further, as shown in Figs.4, 5 and 12, when the coil spring according to the preferred embodiment is used, the both legs 102a and 102b function to urge the inner surfaces of the base plates 42, ~~43~~ 44 immediately upon release of the locks, thereby causing rotation of the base plates in the direction of opening of the half rings. In the depicted embodiment, the mutual opening angle is up to 180 degrees (90 degrees at the minimum) as shown in the A-A cross sectional view in Fig, 7 (that of the open condition). The opening angle can be adjusted to 90-180 degrees if an appropriate stopper is provided in the inner space of the tab 88 as sown in Fig. 10 or at any location. Also, the open angle may be maintained under the force of the coil spring 102. The open angle can be designed in such manner that the both base plates are brought into interference with each other at a certain angle. For example, in Fig. 10, an arc shaped groove 110 having a stopper 108 is formed within the tab 88 of one base plate and arc-shaped end 107 of the base plate of the other base plate is inserted in the groove 110. The stopper may have any structure if the both base plates are stopped with a given open angle.

[0020]

Coil spring

The coil spring is not necessarily required but preferred. An example of the coil spring 102 is explained by making reference to Figs. 5-6. In this example, the coil spring is capable of giving 90 degrees of opening angle to each base plate (180 degrees in total for both base plates) but any other opening angle larger than 45 degrees may be used by designing the coil spring with a smaller opening angle. The coil spring 102 is provided with legs 102a and 102b which extend in the opposite directions under non-stress condition. The total length of the coil spring is slightly larger than the distance L between the coil spring stops 80 and 90 when the half rings are mutually aligned. For this reason, the coil spring 102 is slightly compressed and accordingly the half rings 20, 30 are always biased in the