Aug. 30, 1955 S. J. O'HARA 2,716,410

FILING MECHANISM

Filed June 18, 1952 3 Sheets-Sheet 1

FIG. 1

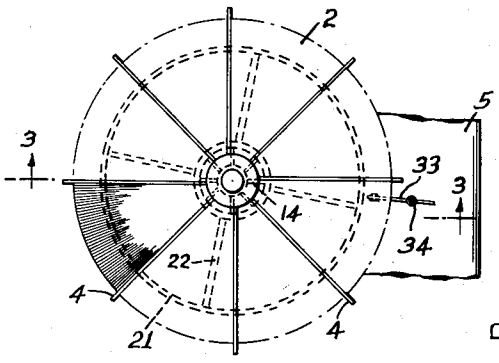


FIG. 2

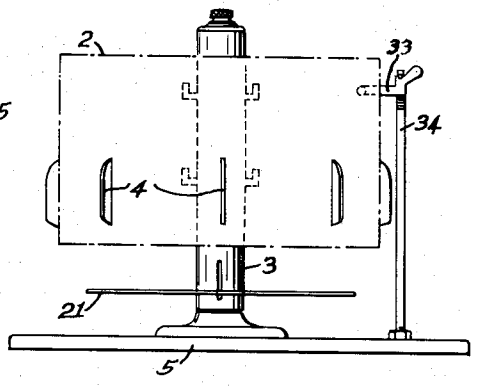


FIG. 3

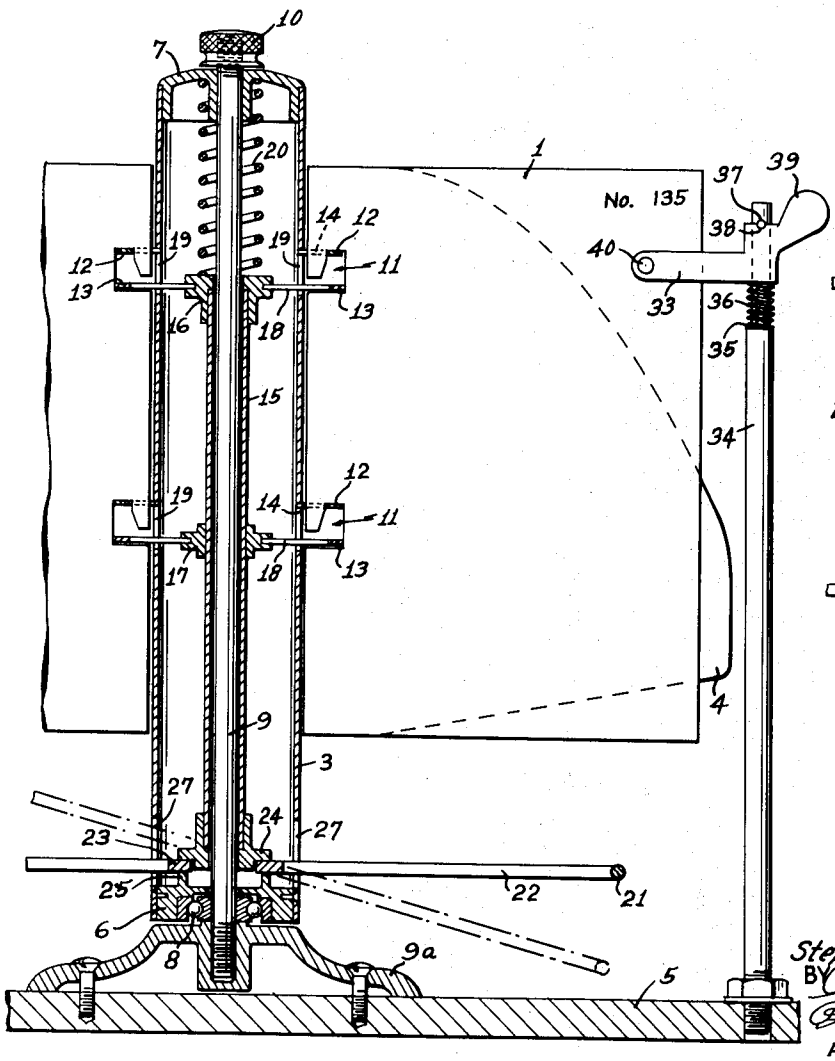
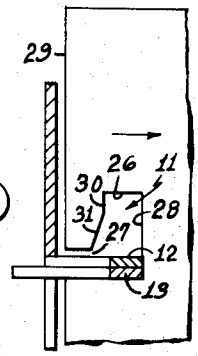


FIG. 5



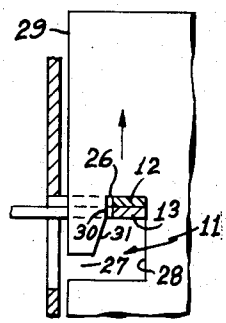


FIG. 4

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Aug. 30, 1955 S. J. O'HARA 2,716,410

FILING MECHANISM

Filed June 18, 1952 3 Sheets-Sheet 2

FIG. 9

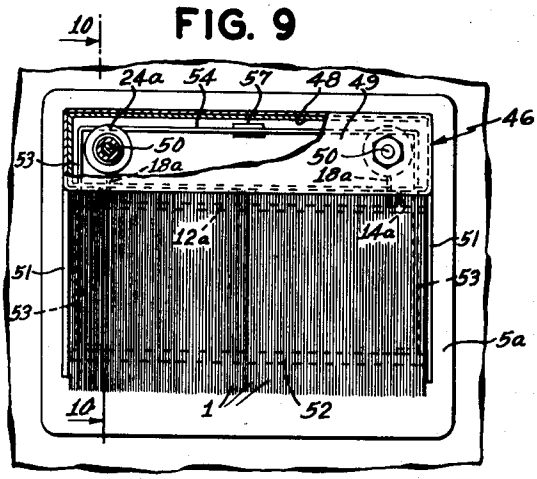


FIG. 7

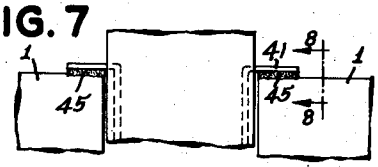


FIG. 6

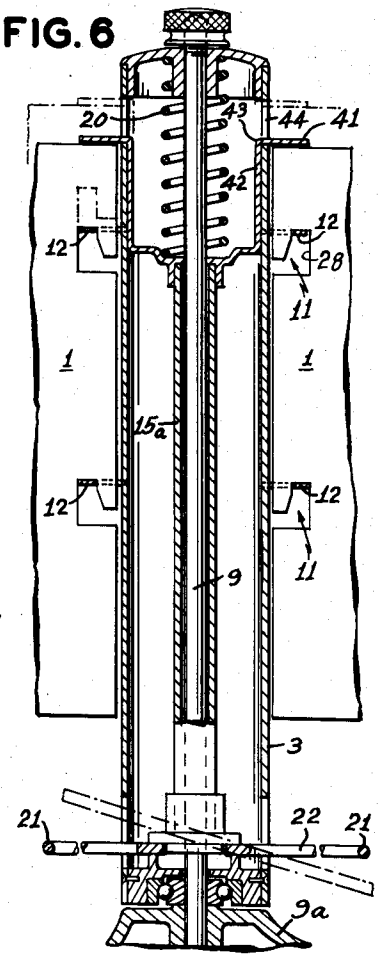


FIG. 8

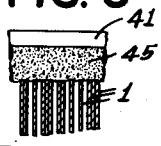
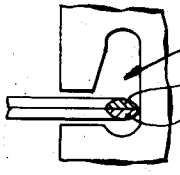


FIG. 10

FIG. 11



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FILING MECHANISM

Filed June 18, 1952 3 Sheets-Sheet 3

FIG. 12

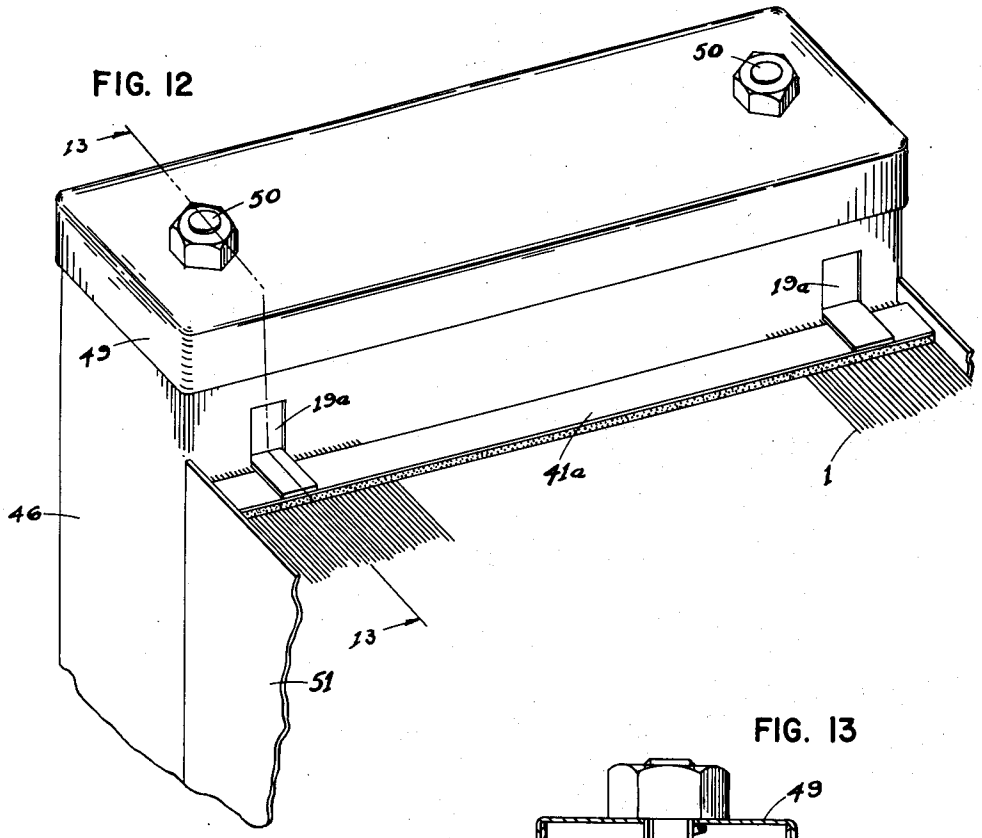


FIG. 13

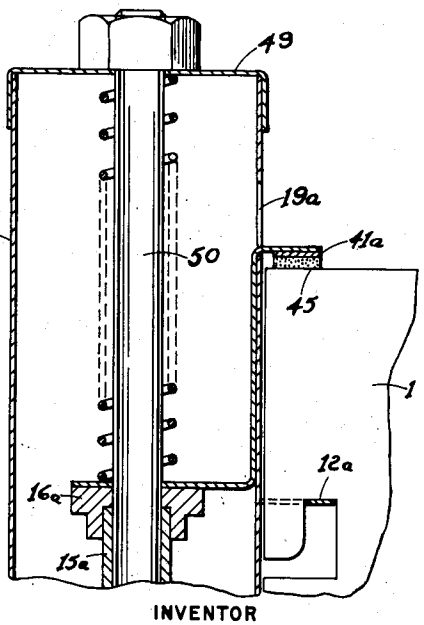
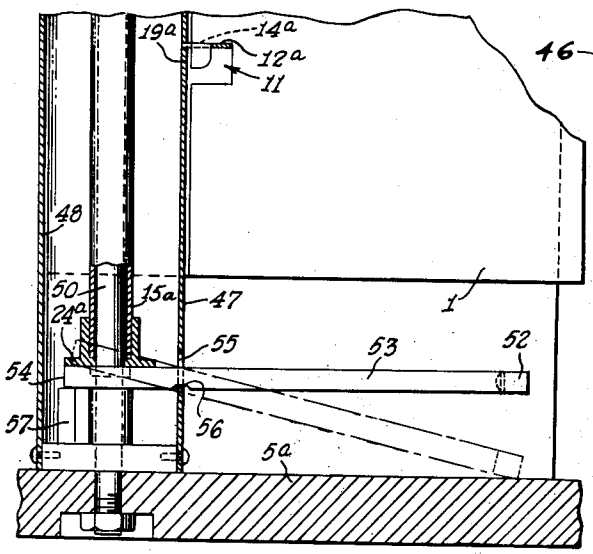


FIG. 14



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United States Patent Office 2,716,410 Patented Aug. 30, 1955

2,716,410

FILING MECHANISM

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Application June 18, 1952, Serial No. 294,157

4 Claims. (Cl. 129—18)

This invention relates to filing apparatus, and particularly to the construction of a filing device or unit for holding a quantity of sheets which are relatively flexible as compared with the usual filing cards, the latter being relatively stiff and strong, and which will support such sheets in edgewise, vertical position for inspection, and for removal if desired.

By utilizing the improved filing unit numerous accounting systems can be simplified, resulting in substantial reduction in accounting costs.

The primary object of the invention is to provide a construction of filing unit by means of which sheets in any desired quantity, from a hundred or less to several thousand, may be readily placed in the filing unit and, by the manipulation of which, individual sheets may be readily and quickly located and removed, or additional sheets may be inserted, without interfering with the arrangement and support of the remaining sheets.

Another object of the invention is to provide a device of this kind which is so arranged that it can be manipulated over a considerable period of time without causing the operator undue fatigue.

A further object of the invention is to provide a filing unit of this kind capable of operating with sheets of thin paper that are comparatively fragile and which are provided merely with two notches or slots in one vertical edge thereof forming downwardly projecting tongues, and no reinforcement at such areas being required.

A still further object of the invention is to provide as an article of manufacture, a sheet having two slots as described, and preferably substantially L-shaped, in one vertical edge thereof for supporting the sheet in a vertical position in the filing unit.

The invention will be understood from a consideration of the accompanying drawings wherein several embodiments of the filing unit construction are illustrated by way of example. In these drawings:

Fig. 1 is a plan view, drawn to a small scale, of the filing unit with a cylindrical or circular mass of sheets supported thereby;

Fig. 2 is a view in elevation of the device shown in Fig. 1 and drawn to the same scale;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1 and drawn to a very much larger scale;

Figs. 4 and 5 are detail sections drawn to a still larger scale and showing an individual sheet in two different positions, illustrating the two steps required in removing a sheet;

Fig. 6 is a view similar to Fig. 3 showing a modified form of the filing unit with major portions of the sheets broken away;

Fig. 7 is a fragmentary elevational detail showing a modification of a part of the structure of Fig. 6;

Fig. 8 is a fragmentary side elevation looking in the direction of the arrows 8—8 of Fig. 7;

Fig. 9 is a plan view of another modification of the filing unit drawn to about the same scale as Figs. 1 and 2;

Fig. 10 is a vertical section taken on line 10—10 of Fig. 9 drawn to the same scale as Figs. 3 and 6;

Fig. 11 is a sectional detail view showing a modified form of the supporting notch and its cooperating supporting members.

Fig. 12 is a perspective view of the upper portion of the modification shown in Figs. 9 and 10 incorporating the locking plate of Fig. 6;

Fig. 13 is a vertical sectional view taken on line 13—13 of Fig. 12; and

Fig. 14 is a vertical sectional view of the lower portion of the modification shown in Figs. 12 and 13.

Referring now to these drawings, the improved filing unit supports the sheets in vertical position by engagement only with the rear edge portions of the individual sheets, and in the device of Figs. 1–3, the individual sheets 1 are supported in a mass 2 in a form of a hollow cylinder, the inner edges of each sheet being adjacent a supporting post 3 and projecting outward in an approximately radial direction. The quantity or mass of sheets 2 may and preferably is divided into groups or blocks by means of permanent separators 4 which may project beyond the outward edges of the sheets.

Post 3 is rotatably mounted in any suitable manner upon a base 5. As shown, post 3 is a hollow tube or sleeve which is closed at its lower end by a bearing support 6 and at its upper end by means of a cap 7. Support 6 carries a friction-reducing bearing 8 of the ball thrust type whose inner or stationary race member makes a force fit with a stationary rod 9 threaded at its opposite ends, and the lower end of which is firmly screwed into a standard 9a attached to base 5. Rod 9 extends centrally of tube 3 and is provided at its upper end with a knurled nut 10 which is slightly spaced from cap 7 to allow sleeve 3 to turn freely.

The sheets used in the filing unit as shown are preformed with two spaced tongue-forming substantially L-shaped slots 11 spaced from one another along the inner edge of each sheet, and the sheets are supported by means of two pairs of sheet retaining members 12 and 13. The spacing of slots 11 and their location, as well as their configuration, will be described further on. The pairs of members 12 and 13 are spaced from one another to correspond with the location of slots 11, and one member of each pair, the upper member 12 is fixed in position while the lower member 13 of each pair is movable.

In the form of the invention under consideration these members 12 and 13 consist of annular rings of substantially the same diameter, width and thickness and have flat substantially parallel upper and lower surfaces. The two upper rings 12 are fixed to the revolvable post 3 by any suitable means such as the short radial rod-like fingers 14 which are thin enough to extend between the sheets without noticeably separating them. These fingers 14 are permanently united to the inner edge of the two upper rings 12 at one end, and at the other, to post 3 in any suitable manner as by brazing, welding, or the like.

In order to support the two lower and movable rings 13, an inner tubular member or sleeve 15 is mounted in slidable position on rod 9 and is provided with two collars 16 and 17. These collars are fixed to tube 15, one at the level of upper ring 13, and the other below at the level of the lower ring 13. Upper ring 13 is supported on collar 16 by a number of radial rod-like fingers 18 which are similar to fingers 14 but longer, and which extend through vertical slots 19 in the wall of tubular post 3. The lower movable ring 13 is similarily supported on collar 17 previously referred to.

For the purpose of maintaining movable rings 13 in their lower, normal and locking position, rod 15 is urged downwardly by means of a compression spring 20 which

surrounds the upper portion of rod 9. This spring forces sleeve 15 downwardly against a stop device presently to be described which determines the lower or locking position of rings 13.

In order to actuate sleeve 15 to elevate rings 13 to their release position, to be described, and, at the same time, afford means by which the post 3 and cylinder 2 of sheets can be revolved, the following arrangement is provided. A light circular wheel having a rim 21 and a number of radial spokes 22, four being shown, is mounted on the lower part of post 3 at a convenient elevation above the surface of base 5 so it can be manipulated by the fingers of the operator while the hand rests upon the surface of this base. Spokes 22 of this wheel project outwardly from a hub in the form of a flat collar 23. Just above this is a radially flanged collar 24 which is mounted on the lower end of shiftable sleeve 15.

In the normal or locked position of rings 13 the flange rests upon collar 23, which in turn is seated upon a cylindrical flange 25 which projects upwardly from bearing support 6. Suitable slots 27 are provided in tubular post 3 to permit the spokes 22 to swing vertically when the wheel rim 21 is depressed at any point along its periphery. Such depression of the wheel to the dot and dash position, shown in Fig. 3, causes collar 23 to tilt about the upper edge of flange 25 as a pivot lifting the opposite side of collar 23 away from the opposite side of flange 25 to cause the desired upward movement or shaft of sleeve 15.

The arrangement is such as this shifting movement causes the lower sheet support rings 13 to be moved upwardly into close proximity with, and preferably in contact with, the upper rings 12 of each pair. This places the two rings of each pair in the position approximately as shown in Figs. 4 and 5. Wtih the rings in this position all of the sheets of the entire cylindrical mass or block 2, are still firmly and positively supported in their original position on the filing unit, the upper flat surfaces 26 of the two slots 11 resting upon the upper flat surfaces of the upper stationary rings 12.

When the lower rings are shifted upwardly to the release position, however, any individual sheet of the group, or a number of sheets simultaneously, can be removed from the filing unit. This is done by a two step movement, first by raising from the position shown in Fig. 4 to that shown in Fig. 5, and, second, by outward movement of the sheet or sheets. Removal is permitted because the distance between the upper and lower surfaces of rings 12 and 13 of each pair, when in this position, is less than the width of the horizontal leg portions 27 of the two L-shaped slots 11. It will be understood that if desired the same sheets can be repositioned in the filing unit, or additional sheets may be added to the filing unit, by a reverse procedure.

When the wheel rim 21 is released, the two shiftable lower rings 13 return to their lower position in spaced relation to the fixed upper rings 12, as shown in Fig. 3, whereby the sheets of the cylindrical mass 2 are again locked to the revolvable post 3. In this position, however, rings 13 do not bear against the respective lower surfaces of slots 11 but are held in slightly spaced relation therefrom so as to prevent placing the sheets under stress. This would do no harm when a large quantity of sheets are on the filing device, but with only a few sheets in position, it would tend to tear them.

In the form of sheet illustrated in Figs. 1–5 and also in Figs. 6 and 8, the upper and lower edges of slots 11 are straight and parallel with one another and are at substantially right angles to the outer edge 28, which is parallel with the inner edge 29 of the sheet. The upper portions 30 of the inner edges of slots 11 are parallel with the outer edges 28, but the lower portions of these inner edges diverge from parallelism inwardly widening the vertical leg portions of the slots towards the bottom. Such lower portions may have a straight line formation, as indicated at 31 in Figs. 4 and 5, or a suitably curved formation, as indicated at 32 in Fig. 10. By widening the vertical portion of the slot adjacent the horizontal portion in this manner, the lifting of the sheets is prevented when movable rings 13 are raised. If any sheet is out of place, instead of lifting it, the edges of rings 13 by engaging the cam-like edges 31 and 32, shift such sheet into the correct position. By having the upper portion of slots 11 parallel, however, and only slightly wider than the width of stationary rings 12, the outer edges of the sheets are maintained even so as to facilitate manipulation of the edges of the sheets to find or locate any particular sheet desired.

This locating of particular sheets can be done by the thumb or finger of, for example, the right hand of the operator, the left hand being used to spin or turn the post 3 and its mass of sheets, and release or unlock the sheets by depressing wheel rim 21. If desired, however, a pivoted sheet finder finger 33 (Fig. 3) may be provided. This finger is pivoted to swing horizontally at the top of a vertical supporting rod 34, which is mounted on and projects upwardly from base 5. Near its upper end it has a shoulder 35 on which rests a compression coil spring 36, which engages the hub portion of finger 33 and urges it upwardly into engagement with a pin 37 mounted crosswise of the upper end of rod 34. One or more grooves 38 may be provided in the upper surface of the hub into which cross pin 37 will fit to maintain the finger in operating or in retracted position, as shown. Finger 33 is also provided with a thumb wing 39 by which the finger can be manipulated. The finger is preferably provided with a button 40 of friction material, such as rubber, for contacting the sheets.

In the modified form of the filing device, shown in Fig. 6, the construction is the same as previously described in connection with Figs. 1–5, except that the shiftable locking rings 13 are omitted and in place of them a shiftable annular locking plate 41 is arranged to be engaged by the upper edges of the sheets adjacent the revolvable post 3 if an attempt is made to remove sheets while plate 41 is in its lower or locking position. The sheets are supported entirely by the fixed rings 12 in the same manner as they are in the device of Figs. 1–5, rings 13 of that device serving only as locking members.

In this modification the vertical shiftable sleeve 15*a* is actuated by mechanism which is identical with that described in connection with Fig. 3. However, in order to support the annular locking plate 41 and connect it with sleeve 15*a*, a short sleeve 42, which is connected at its lower end to the upper end of sleeve 15*a*, is arranged to slide vertically on the inside surface of post 3. Locking plate 41 may be provided with a series of tangs 43, which are struck from the metal of the plate and turned inwardly so as to project through a series of vertical slots 44 arranged in the upper portion of post 3, and tangs 43 may be attached to inner sleeve 42 by soldering, welding or other appropriate manner.

The operation or manipulation of this modified form of filing device of Fig. 6 is substantially the same as that of the device previously described. The operator turns or spins the cylindrical block of sheets 2 on the filing device by manipulating wheel 21 with one hand, and finding the particular sheet desired with the other hand. When the sheet has been found wheel 21 is depressed, thus lifting locking plate 41, whereupon the sheet can be raised vertically until it engages plate 41 in the raised position, in which position the horizontal leg portions of slots 11 will be horizontally opposite the stationary supporting rings 12. Thus, by outward movement of the sheet, it can be removed from the filing device.

This modified form of the apparatus is somewhat easier to manipulate than the form shown in Fig. 3, inasmuch as the locking plate 41, when in raised position, serves as a stop to indicate when the sheet has been raised suffi-

ciently for its removal. Plate **41** then serves as a guide for removing the sheet horizontally, and it also may be used as a guide for introducing sheets into the filing device. The upper edge of a sheet is first brought against the lower surface of plate **41** and then slid inwardly until it is stopped by the engagement by the outer edges of rings **12** with the edges **28** of the slots **11**, whereupon the wheel rim **21** can be released, thus lowering plate **41** to locking position.

It will be understood from Fig. 6 that when plate **41** is in locking position, it is spaced somewhat from the upper edges of the sheets **1** so as not to apply pressure to the sheets which might cause them to buckle or to be deformed. It is preferable, however, to have the plate **41** engage the upper edges of the sheets when in locking position and for this reason the lower surface of plate **41** may be provided with a cushion facing **45**, as shown in Figs. 7 and 8. Such cushion facing may be made of any soft, flexible, resilient material, such for example as foam rubber. With such a facing, when plate **41** is at locking position, the lower surface of facing **45** lightly engages the upper edges of the sheets **1**, as shown in Fig. 8.

Referring now to Figs. 9 and 10, a further modification of the apparatus is here illustrated which, instead of being of a rotary type, is of the straight line or cabinet type. In this form of the apparatus a narrow upright rectangular chamber **46** is mounted at the rear of the rectangular base member **5***a*. Chamber **46**, which is preferably of metal, has front and rear vertical walls **47** and **48** and a rectangular cover **49**. Near the opposite ends of chamber **46** are two vertical stationary rods **50** by which the chamber may be attached to the base **5***a*, these rods being threaded at both ends and provided with nuts, as shown. Secured to the ends of chamber **46** are two end plates **51** between which and the front wall of the chamber the filing space is formed, which is open at the front and top and within which is a group of sheets **1**, which are provided with the slots **11**, previously described. It will be understood that either type of slot may be used in any of the forms of the filing apparatus described.

The sheets are supported in substantially the same manner as previously described except that the rings **12** and **13** are now in the form of straight, horizontal parallel strips or bars **12***a* and **13***a*, arranged in two pairs, upper and lower, as before, and supported in much the same manner. The stationary upper bars **12***a* are supported by fingers **14***a*, which are mounted on the front wall **47** of chamber **46**. The vertically shiftable bars **13***a* are supported by fingers **18***a*, which project through slots **19***a* in wall **47** and are mounted at their inner ends on collar **16***a* and **17***a*, which in turn are carried on two vertically shiftable tubular members **15***a*, which are arranged to slide, one on each of the stationary rods **50**. Compression springs **20***a* are arranged on each of these rods to urge the two sleeves **15***a* downwardly.

The operating mechanism for raising the shiftable bars **13***a* is somewhat different from that of Figs. 3 and 6. It comprises a horizontal depressible bar **52** mounted slightly above the surface of base **5***a* and extending substantially between the end walls **51** below the sheets **1**. This bar is supported near its opposite ends by the legs **53** of a U-shaped member **54**. The rear horizontal body of this U-shaped member is within chamber **46** and the two legs project forwardly through two apertures or slots **55** in front wall **47**. The lower edges of legs **52** are notched, as shown at **56**, to form pivots for the U-shaped member at the lower edges of slots **55**.

The body of U-shaped member **54** extends beneath the flanges of the two flanged members **24***a*, which are mounted at the lower ends of sleeve members **15***a*, so that when bar **52** is depressed the body of the U-shaped member, which is at the rear of the pivots **56**, is raised, and this in turn raises the two sleeves **15***a* simultaneously thereby elevating the locking bars **13***a*. In order to maintain the bars **13***a* in the correct locking position with respect to the bottoms of the slots **11** when actuating bar **52** is released, a stop member **57** is arranged within chamber **46** and in position to be engaged by the lower edge of the body of U-shaped member **54**.

It will be understood that the operation of this form of the filing device is substantially the same as previously described in connection with the rotary type, except for the fact that it is a straight line file instead of a rotary file.

It will be further understood that if desired, instead of employing the lower locking bars **13***a*, a shiftable locking plate **41***a* (Fig. 12) may be arranged at the upper edges of the sheets in a manner similar to annular locking plate **41** in Fig. 6. In that event such plate assumes a straight form and is mounted in horizontal position and actuated by the two vertically shiftable sleeves **15***a*, one on each of the two posts **50** (Figs. 13 and 14).

Referring now to Fig. 11, there is here shown a still further modification, this however consisting of a slight change in the shape of the substantially L-shaped slot **11**, as shown at **11***a* in this figure, and also a slight change in the cross-sectional shape of the supporting rings **12** and **13** or bars **12***a* and **13***a*. Instead of having parallel, flat upper edges or surfaces, the modified form of slot **11***a* has grooved or rounded upper and lower edges, the remainder of the slot being similar to slot **11**. Also, the upper or stationary ring or bar **12***b*, is provided with the correspondingly curved or rounded upper surface, and the lower or shiftable ring or bar **13***b*, is provided with a correspondingly rounded lower surface. The contiguous surfaces of these two members **12***b* and **13***b* are, however, preferably flat so as to allow the bars to approach close to one another thereby keeping the width of the horizontal leg portion of slot **11***a* as narrow as possible.

While a number of embodiments of the improved filing mechanism have been disclosed, it will be understood that further changes may be made without exceeding the spirit of the invention, and it is therefore intended that the scope of the invention is to be limited only by the appended claims.

I claim:

1. A rack for supporting flexible sheets in vertical edgewise position and in contact with one another, the sheets having two spaced substantially L-shaped notches in one vertical edge forming upper and lower downwardly projecting edge tongue portions, said rack comprising a fixed frame constructed to rest upon a supporting surface to support said rack, a vertical post rotatably supported upon said frame, upper and lower vertically spaced sheet supporting rings on said post to be engaged by the tops of said respective notches to support the said sheets, a movable plate disposed adjacent the top edges of said sheets to lock said sheets on said rings by preventing lifting of said sheets, spring means for urging said plate to said locking position, mechanism for lifting said plate to allow removal of said sheets, a wheel operatively connected to rotate said post and to actuate said lifting mechanism by the tilting of said wheel, said wheel having a rim disposed below and adjacent the outer periphery of said mass of sheets, said wheel being operable to turn said mass of sheets to aid in locating a desired sheet thereof, and also being operable by depressing the rim thereof to raise said locking plate to sheet-releasing position.

2. A rack for supporting flexible sheets in vertical edgewise position and in contact with one another, the sheets having two spaced substantially L-shaped notches in one vertical edge forming upper and lower downwardly projecting edge tongue portions, said rack comprising a fixed frame constructed to rest upon a supporting surface to support said rack, upper and lower vertically spaced sheet supporting members on said frame to be engaged by the tops of said respective notches to support the said sheets, locking means disposed to engage the top edges of said sheets to lock them on said supports by prevent-

ing lifting thereof, means yieldingly urging said locking means against the top edges of the sheets, said locking means being moveable upwardly, and manually-operated lever means operable, upon actuation, to forcibly raise said locking means against the force exerted by said yieldingly-urging means a distance greater than the vertical length of said tongue portions so as to allow the removal of individual sheets by consecutive lifting and outward horizontal movements thereof.

3. A cabinet for supporting flexible sheets in vertical edgewise position and in contact with one another, the sheets having two spaced substantially L-shaped notches in one vertical edge forming upper and lower downwardly projecting edge tongue portions, said cabinet comprising a housing constructed to rest upon a supporting surface, upper and lower vertically spaced horizontal bars mounted within said housing to be engaged by the tops of said respective notches to support the said sheets, a locking bar disposed to engage the top edges of said sheets to lock them on said bars by preventing lifting thereof, means yieldingly urging said locking means against the top edges of the sheets, said bar being moveable upwardly, and manually-operated lever means operable, upon actuation, to forcibly raise said bar against the force exerted by said yieldingly-urging means a distance greater than the vertical length of said tongue portions so as to allow the removal of individual sheets by consecutive lifting and outward horizontal movements thereof.

4. A rack for supporting flexible sheets in vertical edgewise position and in contact with one another, the sheets having two spaced substantially L-shaped notches

in one vertical edge forming upper and lower downwardly projecting edge tongue portions, said rack comprising a fixed frame constructed to rest upon a supporting surface to support said rack, upper and lower vertically spaced sheet supporting rings on said frame to be engaged by the tops of said respective notches to support the said sheets, a circular locking plate means disposed to engage the top edges of said sheets to lock them on said supports by preventing lifting thereof, means yieldingly urging said locking means against the top edges of the sheets, said locking plate being moveable upwardly, and manually operated lever means for forcibly raising said locking plate against the force exerted by said yieldingly-urging means a distance greater than the vertical length of said tongue portions so as to allow the removal of individual sheets by consecutive lifting and radial horizontal movements thereof.

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