Jan. 11, 1938. C. J. STREETER 2,104,913

FILING EQUIPMENT

Filed Nov. 18, 1936 5 Sheets-Sheet 1

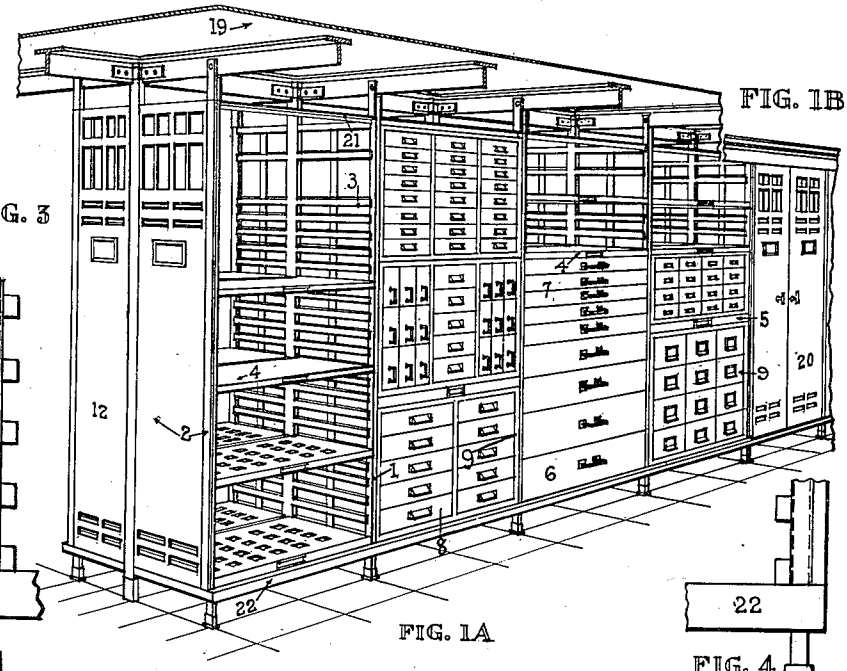


FIG. 1A

FIG. 1B

FIG. 2

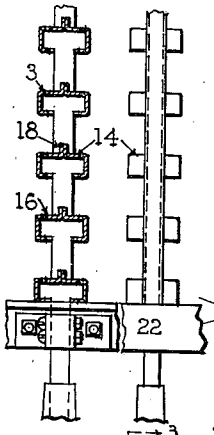


FIG. 3

FIG. 4

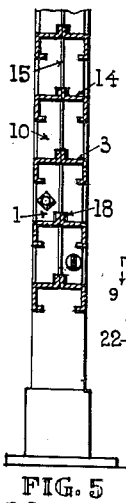


FIG. 5

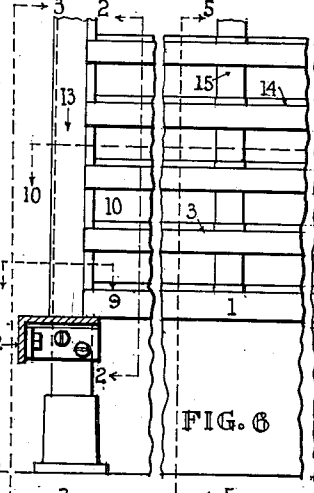


FIG. 6

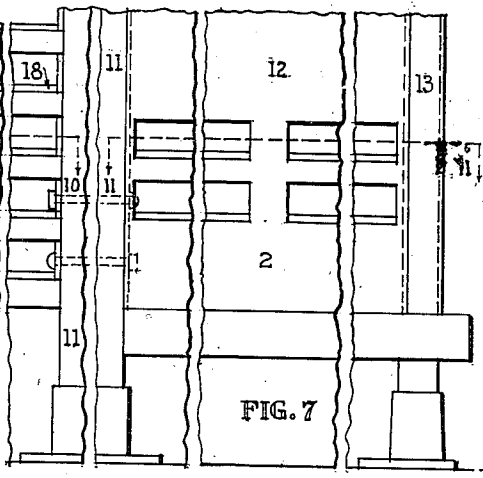


FIG. 7

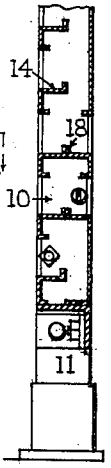


FIG. 8

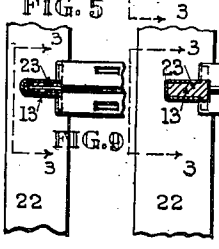


FIG. 9

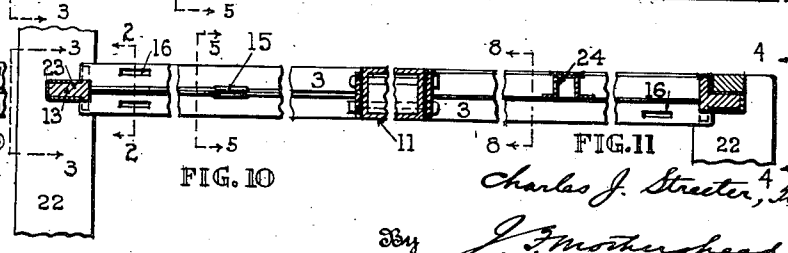


FIG. 10

FIG. 11

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By J. F. Mothershead

Attorney

Jan. 11, 1938. C. J. STREETER 2,104,913

FILING EQUIPMENT

Filed Nov. 18, 1936 5 Sheets-Sheet 2

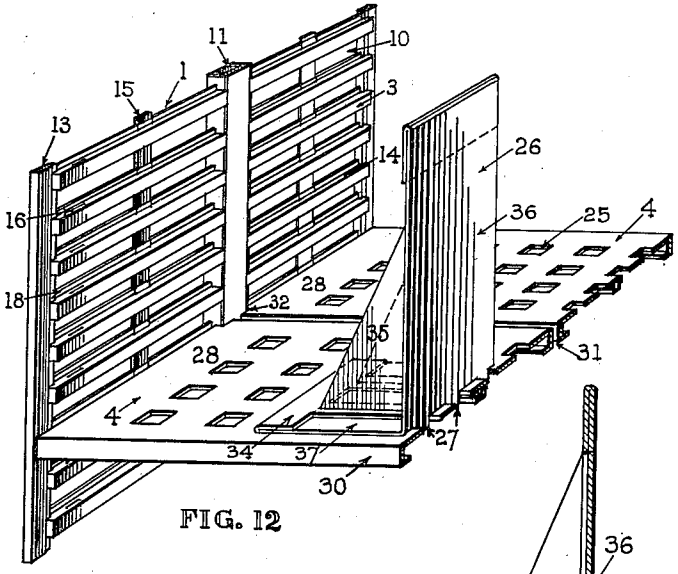


FIG. 12

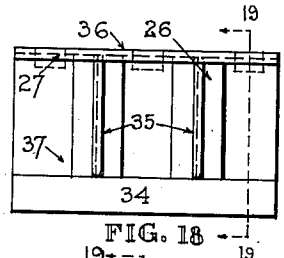


FIG. 18

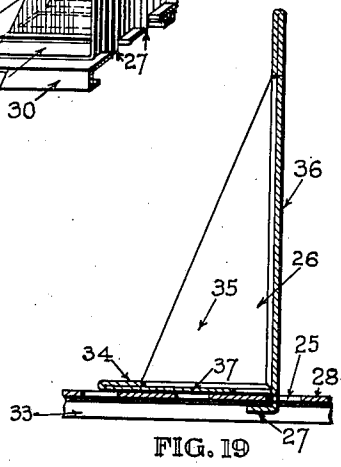


FIG. 19

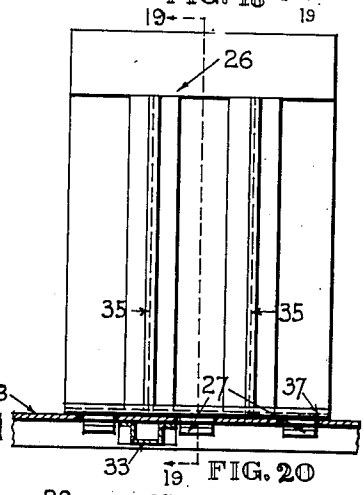


FIG. 20

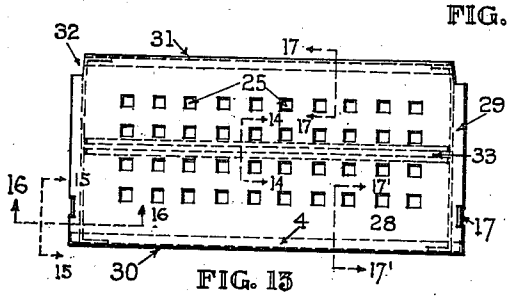


FIG. 13

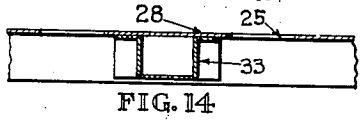


FIG. 14

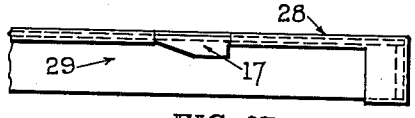


FIG. 15

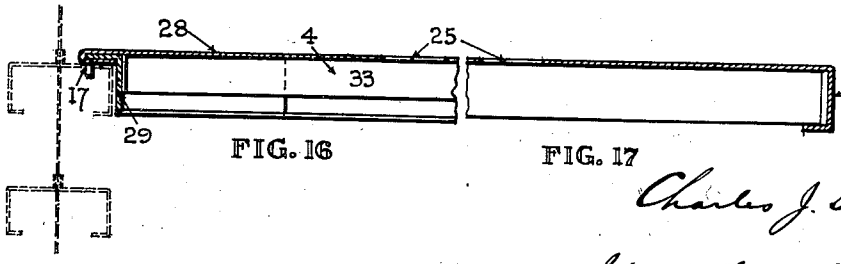


FIG. 16

FIG. 17

Inventor

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Attorney

Jan. 11, 1938. C. J. STREETER 2,104,913

FILING EQUIPMENT

Filed Nov. 18, 1936 5 Sheets-Sheet 3

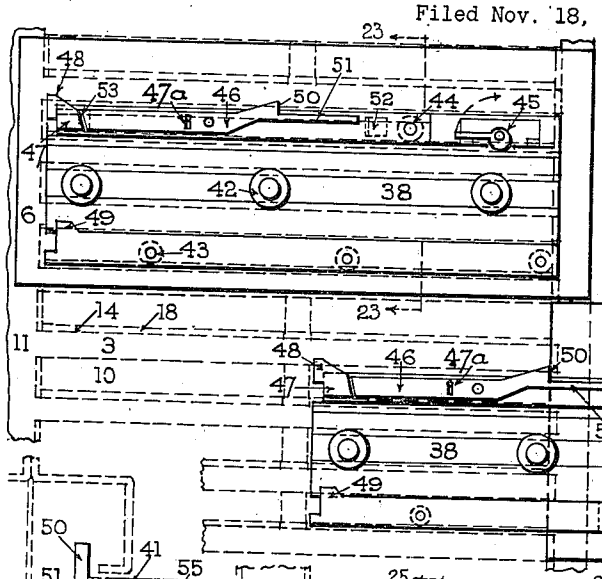


FIG. 21A

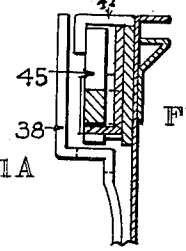


FIG. 22

FIG. 21B

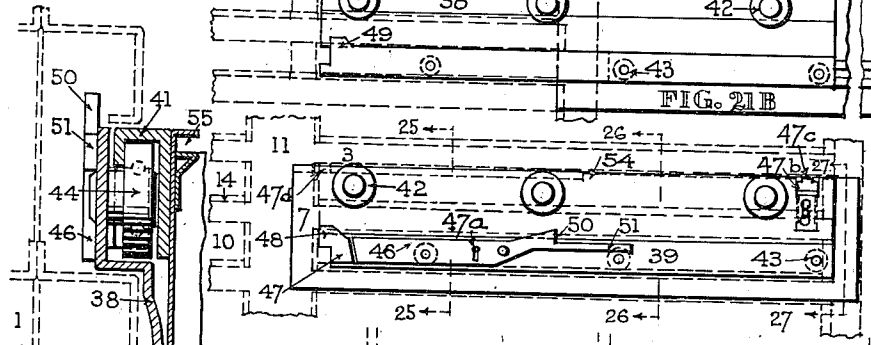


FIG. 24

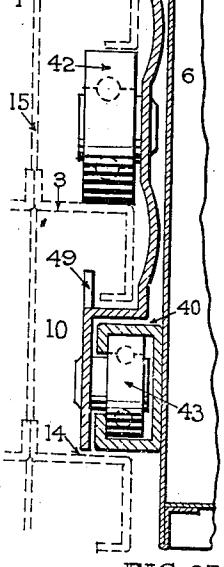


FIG. 23

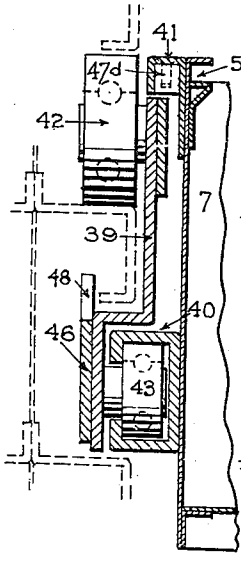


FIG. 25

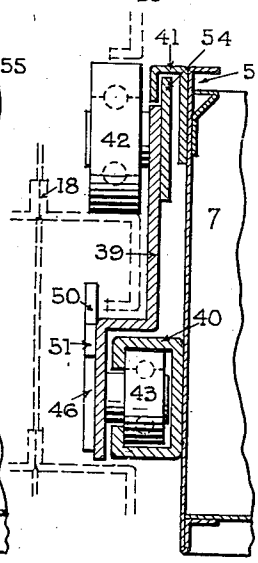


FIG. 26

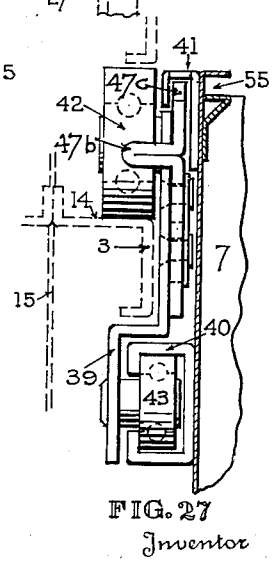


FIG. 27

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By J. F. McMorehead

Attorney

Jan. 11, 1938. C. J. STREETER 2,104,913

FILING EQUIPMENT

Filed Nov. 18, 1936 5 Sheets-Sheet 4

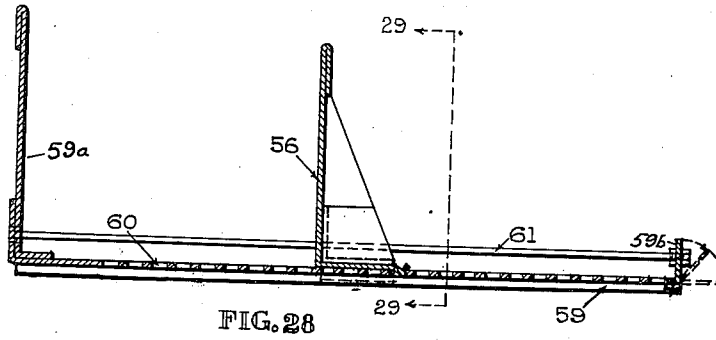


FIG. 28

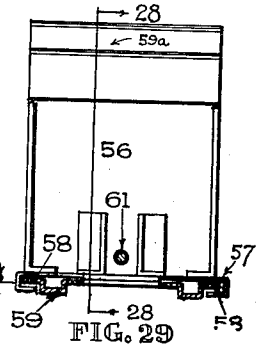


FIG. 29

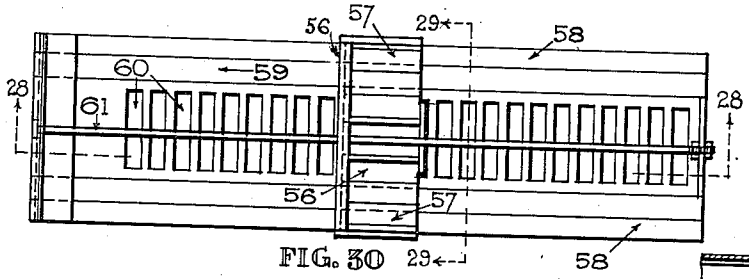


FIG. 30

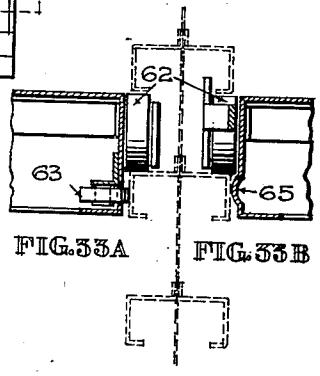


FIG. 33A FIG. 33B

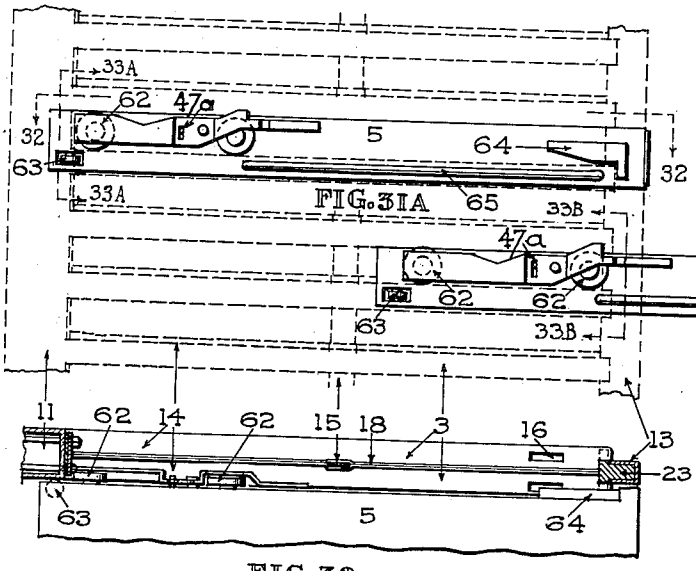


FIG. 31A

FIG. 31B

FIG. 32

Inventor

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By J. F. McMorrow

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FILING EQUIPMENT

Filed Nov. 18, 1936 5 Sheets-Sheet 5

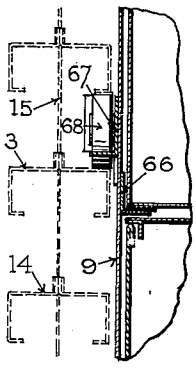


FIG. 36

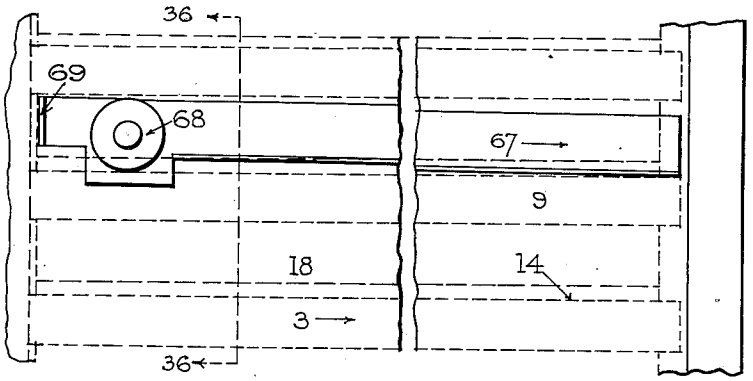


FIG. 35

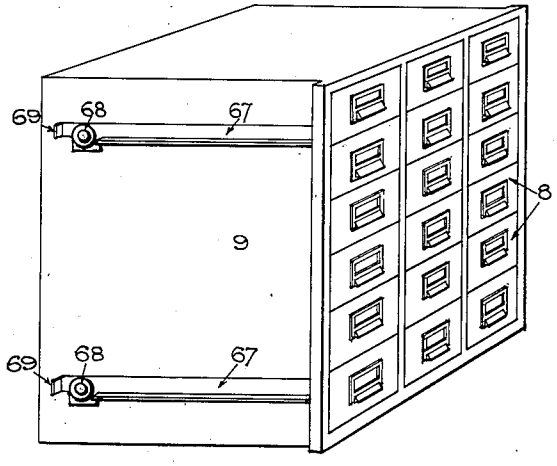


FIG. 34

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By J. F. Motherhead

Attorney

Patented Jan. 11, 1938 2,104,913

UNITED STATES PATENT OFFICE

2,104,913

FILING EQUIPMENT

Charles J. Streeter, Jersey City, N. J.

Application November 18, 1936, Serial No. 111,393

22 Claims. (Cl. 45—77)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon.

This is a continuation in part of my application for Filing and stacking equipment, Serial No. 17,291, filed April 19, 1935.

This invention pertains to filing equipment which may be considered as combining practically all of the requirements of the present so-called stock types of library, commercial and other forms of filing equipment into a single unit or series of units.

One object of this invention is the provision of filing equipment, having a heterogeneous group of cooperating and interchangeable portable filing units, such for example, as shelves, drawers, cases and trays, and a framework of partitions adapted to operatively and yet removably receive the same.

Another object of the invention is the provision of means on the cabinet or compartment forming partitions so spaced and arranged as to receive any one of the group of portable units described and claimed hereinafter, which portable units will constitute, when inserted into the framework, a multiple of the spaced means on the partitions.

Several embodiments of my invention are known to me, but according to that by means of which the invention may be practiced, I provided a cabinet comprising a framework or partitions having spaced runways and a heterogeneous group of portable filing units adapted to removably ride upon the runways of the partitions when the partitions are spaced to form cabinets or compartments. The runways preferably extend laterally along the sides of the partitions and are preferably spaced from each other at even intervals. These vertical compartment-forming partitions and their laterally-extending runways may be of any material and design. A suitable design and construction, which is an embodiment of my invention claimed in my copending application Serial No. 17,291, may be the formation of a partition or framework, including the runways, from a single and integral sheet of material incised or stamped, cut and folded about reinforcing members. I further provide and claim herein, a heterogeneous group of portable filing units, such as shelves and drawers which are preferably, but not necessarily so however, of such design and depth as to constitute, when placed upon the runways, a multiple or a division of the spaced runways in order that they may be interchangeable, and as such, will in no way interfere with the shelf or drawer next above or below, regardless of which of the unoccupied runways they may be placed upon.

If the portable filing units are of the preferred depth they may be placed on the runways so as to give any desired space between them or they may be so placed on the runways as to form an uninterrupted front or face on the compartment between adjoining partitions.

Upon the partition runways and upon the group of filing units, intended to ride upon the runways, are provided cooperative engaging means to retain or stop the filing units at predetermined positions upon the runways. Some of the filing units are provided with sliding or rolling members to facilitate their operation upon the runways. An embodiment of my invention is the formation of a double-action roller and extension slide on the sides of some of the filing units for suspending the units at predetermined open positions, the construction and arrangement of which will be described hereinafter.

Equipment, arrangement, and construction thereof, having the characteristics of the invention and by which the invention may be practiced is intended to be illustrated by the accompanying drawings in which—

Figures 1A and 1B illustrate perspective views of the assembled filing and stacking equipment. Figure 1A illustrating decks thereof and a form of the equipment suspended from overhead beams, and Figure 1B illustrating an unsuspended type of the equipment which, if desired, may be portable;

Figure 2, a vertical cross section of the runways of an intermediate partition, taken at 2—2 Figures 6 and 10;

Figure 3, an elevation of an intermediate partition, taken at 3—3, Figures 6, 9 and 10;

Figure 4, an elevation of an end partition, taken at 4—4 Figure 11;

Figure 5, a vertical cross section of an intermediate partition, taken at 5—5 Figures 6 and 10;

Figure 6, a part elevation of an intermediate partition or panel, a horizontal cross section of which is shown in Figure 10;

Figure 7, a part elevation of an end panel, or partition, a horizontal cross section of which is shown in Figure 11;

Figure 8, a vertical cross section of an end partition, taken at 8—8 Figure 11;

Figure 9, a horizontal section of the outer end of a runway of an intermediate partition, taken at 9—9 Figure 6;

Figure 10, a horizontal section of runways in an intermediate partition, taken at 10—10 Figure 6;

Figure 11, a horizontal section of runways in an end partition, taken at 11—11 Figure 7;

Figure 12, a perspective view, in section, showing shelves, intermediate partition and book-end;

Figure 13, a plan view of shelf;

Figure 14, a vertical cross section of the central portion of a shelf, taken at 14—14 Figure 13;

Figure 15, an elevation of a forward portion of an end of a shelf, taken at 15—15 Figure 13;

Figure 16, a vertical cross section of one end of a shelf, taken at 16—16 Figure 13;

Figure 17, a vertical cross section through the front and back of a shelf, taken at 17—17 or 17'—17' Figure 13;

Figure 18, a plan view of the book-end shown in perspective in Figure 12;

Figure 19, a vertical cross section of a book-end, taken at 19—19 Figures 18 and 20;

Figure 20, a rear view in elevation of a book-end;

Figure 21A, a side elevation of a drawer suspension and a drawer in closed position in a compartment;

Figure 21B, a side elevation of a drawer suspension and a drawer in open position in a compartment;

Figure 22, a section of a levered eccentric lock, taken at 22—22 Figure 21B;

Figure 23, a vertical section of a drawer and its suspension, taken at 23—23 Figure 21A;

Figure 24, a side elevation of a drawer suspension for a shallow drawer, in closed position;

Figure 25, a vertical section of a shallow drawer and its suspension taken at 25—25 Figure 24;

Figure 26, a vertical section of a shallow drawer and its suspension taken at 26—26 Figure 24;

Figure 27, an elevation of a shallow drawer suspension, taken at 27—27 Figure 24;

Figure 28, a vertical section, through drawer and compressor, taken at 28—28 Figures 29 and 30;

Figure 29, a sectional elevation of the rear of a drawer compressor, taken at 29—29 Figures 28 and 30;

Figure 30, a plan view of drawer compressor;

Figure 31A, a side elevation of a rolling shelf in closed position in a compartment;

Figure 31B, a side elevation of a rolling shelf in opened position;

Figure 32, a plan of one end of rolling shelf shown in position upon a runway, taken at 32—32 Figure 31A;

Figure 33A, a section through an end of a rolling shelf, taken at 33*a*—33*a* Figure 31A;

Figure 33B, a section through an end of a rolling shelf, taken at 33*b*—33*b* Figure 31B;

Figure 34, a perspective view of a tray case;

Figure 35, an end elevation of a tray case showing roller and sliding supports; and

Figure 36, a vertical section, through a tray case and roller support, taken at 36—36 Figure 35.

In order to fully understand those portions of the inventions which are claimed herein, namely, the filing units, it becomes necessary to also describe the cabinet structure, designed for use in connection therewith and claimed in my copending application, Serial No. 17,291, in which I provide a plurality of upright intermediate partitions 1 (see Figs. 1A, 2, 3, 5, 6, 9 and 10) and upright end partitions 2 (see Figs. 1A, 4, 7, 8 and 11) spaced to form compartments having a plurality of horizontal runways 3 upon which the heterogeneous group of portable filing units, such as sliding shelves 4, rolling shelves 5, deep drawers 6, shallow drawers 7, trays or drawers 8, tray cases 9, and other articles to be described hereinafter, may removably and operably ride. A preferred, but not limited, object of my invention is the spacing of the runways 3 upon the partitions 1 and 2 at predetermined equal intervals, as is indicated by character reference 10, or spacing them at a multiple of the predetermined intervals. Likewise, it is an object of my invention, though not a limited one, that the heterogeneous group of portable filing units embrace a multiple or a division of the spacings 10 and runways 3 when placed upon the runways.

The partitions 1 and 2 may be constructed to form a single tier or range, or, as shown in Figure 1A, a double tier or range in order that filing units may be inserted from either or both sides of compartments toward a rear or central column 11 of the partitions. In the construction of partitions 1, located intermediate the ends of a range of compartments, the partitions should preferably have runways extending laterally on both sides (see Figs. 2, 3, 5, 6, 9 and 10) and in the construction of a partition 2 (see Figs. 4, 7, 8 and 11) for the end of a range of compartments, it is preferable to have runways only on one side of the partition, the other side may be finished off by a panel 12, as shown in Figures 1A, 4, 7, 8 and 11.

The runways 3 may be an inegral part of or may be supported by a vertical member or members, such as front or edge posts 13 (see Figs. 1A, 2, 3, 4, 6, 7, 10 and 11), and a rear or central column 11. The column 11, of course, is intermediate the edge posts 13 of a double partition. The runways preferably extend laterally from the sides of the posts 13 and commence at a point rearward from the front edge of said post (see Figs. 9 and 10). The center post or column 11 is of such width that the runways finish or merge flush (see Fig. 10) with the sides thereof. There is thereby furnished a clear, unbroken surface free of all projecting lugs or other obstructions which may damage books, or other materials, and which permits such material to be pushed past the center column 11 and onto an adjacent shelf in the adjoining compartment in the rear. Thus, it will be understood from what has been stated that the width of the flat surface or surfaces 14 of the runways exceeds that of the thickness of the front edge portion of the post 13, but finish flush, in width, with the width of the wider center column 11.

One or more intermediate vertical reinforcing members 15 may be interposed between the posts 13 and 11 to support the central portions of the runways 3 and to distribute loads of filing units to the other runways in the partition.

The runways 3 are provided with means, such as lugs, holes, or slots 16, preferably upon their surfaces 14 (see Figs. 9 and 10) for engaging cooperative means 17 (see Figs. 13, 15 and 16) upon the shelves 4. These means are provided to hold the shelves 4 in operative position upon the runways and may be disengaged, for removal purposes, by slightly raising the front edge of the shelf.

The front ends of the runways 3 are enclosed, while their under portions are left open. The runways are so constructed in order that guiding

and stopping means to be described hereinafter on the filing units may be engaged thereby.

The portable filing units are of such size and shape as to fit substantially flush (see Fig. 1A) with the front edges of the posts 13 when the units are in closed position. The filing units are of such length as to extend from the runways of adjacent partitions which are spaced at predetermined intervals by spacing and aligning bars described hereinafter.

An upward flange 18 (see Figs. 2, 5 and 6) may be provided horizontally along the central portion of the runways to serve as a reinforcing member. These flanges 18, on abutting runways, are spot welded or otherwise secured together to hold the partitions together and also to provide means for transferring loads on one runway to other runways of the partition. The reinforcing members 15 are preferably interposed between these flanges 18.

The majority of the weight of the framework, and articles placed in the compartments, is preferably sustained from above, as indicated in Figure 1A, and for rigidity and placement purposes legs are provided at the base of the framework. These legs may also serve to assist in sustaining the framework when the cabinet is heavily loaded. The compartments or range of cabinets may also be constructed so as to provide for a plurality of decks 19, as indicated in Figure 1A.

Cabinets of the type herein described may be portable instead of stationary, and may be constructed by the elimination of overhead suspensions (see Figure 1B) and if desired, the substitution of a base, rollers, casters, or any anti-friction elements for the stationary legs.

Doors, such as indicated by 20 in Figure 1B for enclosing the compartment or cabinet, may also be provided. These doors may be pivotally attached to members such as angle iron members 21 and 22, extending along the top and bottom of the face of the compartment or range, as is shown in Figures 1A, 1B, 6, 10 and 11. These members 21 and 22 extend horizontally from one partition to another and serve also as heretofore mentioned, as means to retain the proper spacings, positions and alignments of the partitions. The base angle 22 may also serve as a guard rail to prevent injury to the equipment by trucks, etc.

If the partitions are formed of sheet material the sheet may be cut and folded about reinforcing T-irons or U-irons 23 (as shown in Figures 9 and 10), which irons have their two rear arm portions cut or punched out at intervals to form the spaces 10 between the runways. The engaging members of the portable units are thereby permitted to run back on the runways through these openings in the arm portions of the T or U-irons. The remaining arm portions and the leg of the T-irons, or yoke of the U-irons, form the posts 13 and interiorly support the front ends of the runways.

The sheet material partitions 2 at the end of the ranges, shown in Figures 1A, 7, 11, are built up in very much the same manner as the intermediate partitions 1, except that runways are only formed on one side of the partition. The portion of the sheet forming the end panel 12 of the partition 2 is left plain and only cut or stamped to provide ventilators, ornamental designs, etc., as may be desired. The inside of the end panel 12 may be reinforced by some appropriate reinforcing and securing members, such as is shown at 24 in Figure 11.

Slightly different designs of sheet metal partions are provided for in my copending application, Serial No. 17,291. These designs, however, are of similar purpose and function, the only particular difference being the type and shape of reinforcing members for the sheet metal partitions.

The intermediate and end partitions 1 and 2 may also be of cast material as shown in my copending application. While these castings are slightly different in design and construction than sheet metal, due to the different characteristics of the material, they are designed to accomplish the same results as sheet material partitions. The function and operation of the portable units upon the runways of the cast material partitions are similar as far as the characteristics of the material will permit, and in most cases may be arranged so as to be interchanged from cast material compartments to sheet material compartments.

In conjunction with the cabinet structure described, the inventions herein claimed comprise the heterogeneous group of portable filing units heretofore mentioned. The shelves 4 of this group are preferably constructed of sheet material and are often provided with uniformly spaced means 25, such as holes, for interchangeably, and yet operably, engaging book ends, rests, or compressors 26 having means 27, such as hooks or lugs for engaging the shelf at almost any desired position. Details of the sliding shelves 4 and book-ends 26 of preferred construction are shown on the second sheet of drawings, Figures 12 to 20. The sheet forming the surface portion 28 of the shelf is bent back underneath itself at the shelf ends where it embraces the horizontal flange of an inverted angle iron 29 and is secured thereto. (See Fig. 16.) The surface portion 28 also continues downward into a front edge portion 30 (see Figs. 12 and 17) substantially the width of a runway 3, and thence inward. The downward front edge 30 extends the full length of the surface portion 28, thereby enclosing the ends of the angle irons 29 (see Figs. 12 and 13). The angle irons 29, as shown in Figures 15 and 16, and in dotted lines in Figure 13, continue within the ends of the shelves to where they abut the downward front edge portion 30. At this point the horizontal flanges of the irons 29 are removed and the vertical flanges are bent at right angles (see Fig. 13) toward each other and are secured to the inner face of the front edge portion 30. The lug 17 is formed by cutting a portion of the sheet metal which embraces the horizontal flange, and/or a portion of the horizontal flange of the angle iron 29, and bending the same downwardly at right angles to the horizontal flange (see Figs. 15 and 16).

The rear edge portion 31 (see Figs. 12 and 13) of the shelf is formed similarly to that of the front edge portion, except that it terminates short of the full length of the shelf. Likewise, the horizontal flanges of the angle irons 29 terminate short of abutting the downward rear edge portion 31. Cut-away corners 32, or notches, are thereby provided at the rear corners of the shelf to receive a corner of the center or rear post 11 (see Figs. 12 and 13) of the partitions and act as stops to prevent the insertion of the shelf beyond a predetermined distance. Although the horizontal flanges of the angle irons 29 are cut away to form the notches 32, the vertical flanges thereof continue into abutment with the inner wall of the rear edge portion 31 where they are bent at right angles toward each other and are secured

to the inner face of the shelf portion 31. The center portion of the shelf may be reinforced by a member 33 such as is shown in Figure 14.

The book-ends 26 (Figs. 12, 18, 19 and 20) are preferably formed of sheet material cut and incised so as to provide lugs or hooks 27 and reinforcing members 34 and 35. Commencing at the top edge of the vertical or contact portion of the book-end, the material is bent sharply back upon or vertically downward past itself to form the contact or face portion 36 and continues a suitable distance where it is bent at a right angle and continues into the base or horizontal portion 37 of the book-end. At the latter angle the material is cut to provide lugs 27 which continue, in a plane with the vertical portion 36, a short distance below the plane of the base 37 and thence are bent at right angles underneath, toward, and substantially parallel to, the base. A portion of the base 37 is bent sharply back upon itself to form the reinforcing portion 34. Right-angled triangular reinforcing members 35 are vertically interposed within the right angle formed by the base and face portions 37 and 36, respectively. The edges which form the right angle of the member 35 are bent at right angles and are secured to the base and face portions 37 and 36.

The next of my filing units are the drawers 6 and 7, shown on the third sheet of the drawings, Figures 21A to 27. While I do not limit my invention to a particular type of drawer per se, I do claim as my invention the means described hereinafter for facilitating their operation upon the runways (shown in dotted lines in the latter figures) of the filing compartment and to support the drawers when in extended position, namely, the rolling suspensions 38 and 39, for the deep and shallow drawers 6 and 7, respectively, and their cooperating means on the sides of the drawers. As shown in Figure 21B, these especially designed suspensions will permit the full extension of the drawer from the compartment and will suspend the same in this position without binding or injury to either the drawer, suspension or compartment partitions, and yet operate with a maximum efficiency. These suspensions are operably yet removably attached to the sides of the drawers and are of such construction as to be readily removed from the compartments with the drawers in order to leave the runways entirely clear and free of obstruction for the insertion of other filing units in their stead.

The means for operably attaching the suspensions to the sides of the drawers comprise channel-shaped members 40 and angle-shaped members 41 (see Figs. 23, 25, 26 and 27), substantially the length of the drawers, attached horizontally to the outer sides of the drawers a predetermined distance from each other. The vertically positioned suspension members 38 and 39 are substantially the length of the drawers and operate, upon and within the members 40 and 41, horizontally along the outer sides of the drawers.

The suspension 38 for the deep drawers 6, Figures 21A, 21B and 23, are provided with vertical rollers in three horizontal planes. The rollers 42, of the center plane, are on the outside of the suspension 38 and operate upon the runways 3 of the partitions 1 and 2, while rollers 43 and 44 of the other planes are on the side of the suspension adjacent the drawer and operate within the drawer channel 40 and the drawer angle 41, respectively. The planes of the suspension rollers 43 and 44 and the drawer tracks 40 and 41 are spaced first so as to cooperate with each other respectively; and second, so as to extend within the spaces 10 between the runways, while the plane of the suspension rollers 42 is such that the rollers 42 ride upon the runways 3. The drawer 6 is of such depth, and the members 38, 40, 41, 42, 43 and 44 are so positioned with respect to the drawers that the drawer occupies a multiple of the spaces 10 between the runways and a multiple of the depths of the runways 3—i. e., the drawer is so carried upon the runways as to have its top edge on a plane with the bottom of one runway and its bottom edge on a plane with the bottom edge of another runway so as to cause no interference with the insertion of other drawers or other types of filing units on the runways immediately above and below the drawer. This will be found to be true regardless of where the drawer may be inserted into the compartment if the runways and spacings thereof are uniform.

Thus it will be seen that the members 40 and 41 act as tracks and guides for the rollers 43 and 44, and prevent lateral displacement of the suspension 38, the track 41 and roller 44 acting as guides and means for preventing a binding between the various members particularly when the drawer is in open or suspended position. The lower rollers 43 and the track 40, however, carry the weight of the drawer, and its load, which load is in turn transferred through the suspension 38 to the load-carrying rollers 42. The rollers 42, in turn, transfer the load to the runways 3 upon which the rollers operate.

The face portion of the drawers is wider than the drawer itself and projects into flanges having a length substantially that of the thickness of the suspensions when installed on the sides of the drawers. The face of the drawers and their facial flanges are of such width as to pass between the posts 13 of adjacent partitions and completely cover the end of the runways 3. By these flanges the suspensions are shielded and concealed from view and are prohibited from rolling forward there-beyond. When the drawer is being moved from an open position into the compartment, or closed position, the flanges push the suspension back into the compartment in a telescopic fashion along the sides of the drawer.

When a drawer with its suspensions is removed from the compartment, as described hereinafter, the suspensions may be locked in non-rolling positions along the sides of the drawer with their rear ends substantially flush with the back of the drawer. For this purpose a levered eccentric lock 45 is provided on the deep drawers 6, shown in detail in Figure 22, pivotally attached to the drawers on the vertical leg of the angle iron keepers 41. The eccentric portion of the lock projects through an opening in a horizontal portion of the suspension member 38 when locked. Figure 21A illustrates the suspension locked against horizontal movement by the eccentric 45, while Figure 21B illustrates the unlocked position of the eccentric 45.

The operation of the suspensions between the drawers and the runways may be termed telescopic in action. The suspensions lie along the sides of the drawers when in closed position and when the drawer is pulled outward the action of the rollers causes the suspensions to move outward with approximately half the speed and approximately half the distance as that of the drawer, so that when the drawer is fully opened the suspensions have traveled only half their length. The drawer in fully opened position is thereby suspended upon half of the suspensions, the

other half of the suspensions remaining within the compartment. In suspended position, an upward thrust is brought upon the rearmost rollers **42** which rollers are of such diameter as to immediately engage the under portion of the runways and thereby prevent a binding and tilting of the drawer.

Means for stopping the advance of the suspensions, after they have been withdrawn from the compartment by the drawer substantially half their length, are provided on the suspension members **38** and **39** (see Figs. 21A, 21B and 24). These means comprise arms **46** pivotally attached to the suspensions but having their pivotal point slightly forward of the longitudinal center of gravity in order that there will normally be a downward thrust on the rear end of the arm. This thrust on the rear portion of the arm normally causes the arm to rest in a horizontal position upon a pin **47***a* attached to the suspension **38**. The pin **47***a* projects through a slot in the arm **46**, which slot is of a predetermined length in order to limit the manual abnormal rotation of the arm beyond a predetermined movement.

The pivoted arm **46** is provided with an upward projection **50** which is located on the arm **46** at a point approximately the middle of the suspensions **38** and **39**. The purpose of the projection **50** is to engage the downward closure of the front ends of the runways **3** when the suspensions have traveled approximately half their length from the compartment and thereby stopping their advance. The pivoted arm **46** is also provided with a lever portion **51** which extends forward from the base of the projection **50** and normally passes underneath the closure on the front ends of the runways. Upon the depression of this lever **51**, to a point where it is stopped by pin **47***a*, the projection **50** is released from its engagement with the inner ends of the runways, and the drawer carrying the suspensions may be removed from the compartment.

Means to prevent any possibility of the rollers slipping laterally off of the runways are provided on the suspension members. These means comprise a block **47** provided with a flange **48** which projects up underneath the runways **3** and acts as a guide with respect to the lower inner edge of the runways. Flange guides **49**, similar to flanges **48** on blocks **47**, may also be provided at other planes on the suspensions to cooperate with other runways.

The flange guides **48** and **49** are positioned slightly to the rear of the rearmost rollers, and as these rearmost rollers drop off of the ends of the runways, in removing the drawer and suspensions from the compartment, the suspensions are thereby lowered sufficiently to permit the flanges **48** and **49** to pass outward underneath the closures on the ends of the runways.

In addition to the means for stopping the suspensions at a predetermined point upon the runways, means are also provided for stopping the advance of the drawer, upon the suspensions, at a fully opened position. Means for this purpose are shown in Figures 21A and 21B, and comprise an angle bracket, lug, or lip **52**, provided on the suspension **38**, which is engaged by a lug **53**, provided on the drawer angle **41**, when the drawer has traveled approximately half its length upon the suspensions. In other words, the drawer is stopped on the suspensions and the suspensions are stopped on the runways, respectively, when the drawer is fully opened and the suspensions are withdrawn from the compartment approximately half their length.

The shallow drawers **7** and their suspensions **39**, shown in Figures 24, 25, 26 and 27, are similar to the deep drawers **6** and suspensions **38**, heretofore described, except that it may not be desirable to provide more than two planes of rollers for the shallow drawers. As shown in the latter figures, the roller **44** is eliminated and in its stead a guide flange **54** is adapted to project up into the angle keeper **41** and act as a guide.

Another desirable modification for the shallow drawers **7** is the elimination of the eccentric lock **45**, as used in connection with the deep drawers **6**, and the substitution of a sliding lock **47***b* (Figures 24 and 27). This member **47***b* is mounted upon the inner face of the suspension **39** by means of bolts, rivets, or screws passing through a vertical slot in the slidable locking member, whereby the member may be pushed upward sufficiently to permit a prong or lug **47***c* thereon to pass into an opening in the horizontal portion of the angle iron keeper **41** on the side of the drawer and hold the suspension against horizontal movement after the drawer has been removed from the compartment. The slidable locking member is also provided with a transverse portion which projects through a slot in the suspension **39** and serves as means for manually sliding the member into and out of a locking position.

A still further desirable modification for use in connection with the shallow drawers **7** and suspensions **39** is the elimination of stops **52** and **53**, as used in connection with the deep drawers **6** and suspensions **38**, and the substitution of lugs or blocks **47***d* (Figs. 24 and 25) within the rear ends of the angle iron keepers **41** which lugs are engaged by the guide flanges **54**, on the suspensions **39**, when the drawer is extended approximately half its length from the suspensions.

The drawers in general may also be provided with sliding or hinged lids (not shown) so as to have the material within the drawers completely enclosed even when the drawers are removed from the compartments. For this purpose the drawers may be provided with inner side wall grooves **55** (Figs. 23, 25, 26 and 27). The drawer may also be provided with ventilators if desired.

Removable card or document rests or compressors **56** are also provided for the drawers **6** and **7**. These are illustrated in Figures 28, 29 and 30, and comprise a compressor somewhat similar in structure to that of the book-end **26** (Fig. 12) except that the compressor **56** is provided with horizontally disposed guideways **57** (Fig. 29) which are adapted to slidingly engage keeper flanges **58** provided on a base member **59**. The base member **59** and the compressor **56** constitute a unit in and of itself and is adapted to merely set within a drawer. The material filed therein may be removed, intact, with the base and compressor, leaving the drawer free for other material or for receiving another loaded or unloaded compressor unit. The base member **59** is provided with an end member **59***a* against which the material may be compressed by compressor **56**, and is also provided with stops **60** adapted to receive downwardly projecting lugs on the movable compressor **56** which hold the compressor at any desired position upon the base **59**. A removable retainer rod **61** may also be

provided upon which punched filing material may be threaded. This rod is attached to the end member 59*a*, passes through an opening in the compressor, and is removably connected to another end member 59*b* which is hinged to the base member 59. The end member 59*b* is hinged in order that it may be lowered to permit punched material, or the compressor 56, to be threaded on the rod 61. The rod 61 may be removably connected to the hinged end member 59*b* in any desirable manner, such for example, as is illustrated in Figures 28 and 30, as by one or more nuts threaded onto the rod 61 fore and aft of the end member 59*b*.

Another filing unit adapted to be used in connection with my filing equipment is the rolling shelf 5, shown in Figures 31A, 31B, 32, 33A and 33B, which is intended primarily for a working and ready-reference table when in an extended position. This type of shelf is provided with rollers 62 and 63 to facilitate its operation, rollers 62 being adapted to carry the weight upon the runways 3, and rollers 63 to prevent a binding between the shelf and the side of the runways. Means somewhat similar to members 46, 50 and 51 provided on the suspensions 38 and 39 (Figs. 21 and 24) are provided on this type of shelf for engaging the front enclosed ends of the runways so as to stop the shelf when withdrawn a predetermined distance. The operations of the stopping members are as described heretofore in connection with the drawers. An L-shaped member 64, Figures 31A and 31B, is provided on the sides of the shelf 5 for engaging the ends of the runways and thereby preventing the insertion of the shelf into the compartment beyond a predetermined position. A portion of this member 64 is provided with a declining under edge which, when the shelf is being pushed back into the compartment, engages the surface 14 of the runways and causes the shelf to be adjusted into proper alignment upon the runways, as well as to provide support for the outer edge of the shelf when in position in the compartment. The sides of the shelf may also be provided with a bulged portion 65 to act as a guide and also prevent a binding between the shelf and side of the runways.

Another filing unit of my equipment is the open-faced drawer-like case 9, shown in Figures 34, 35 and 36, which is adapted to carry a plurality of small drawers or trays 8 upon brackets or angle irons 66 on the inner walls of the case 9 and the partitions thereof. The case 9 is provided with an angle iron 67 attached horizontally along the outer sides of the case. A rearward portion of the horizontal flange of the angle iron 67 is cut free and bent into a plane with that of the vertical flange and in this opening in the horizontal flange is mounted a roller 68. A portion of the horizontal flange of the angle iron 67 and the roller 68 are adapted to ride upon the runways 3. The angle iron 67 is positioned on the side of the case 9 so as to slightly decline toward the front of the shelf thereby placing the contact portion of the roller 68 on a plane with the forward end of the horizontal leg of the angle iron 67. This affords a frictional engagement between the supports 67 and the runways 3 for the purpose of preventing the case 9 from being pulled outward by the withdrawal of drawers 8. By slightly raising the front of the case 9 the rollers 68 make the case 9 readily movable. Stops 69 are also provided on the sides of the case 9 and are adapted to abut the posts 11 of the partitions and thereby prevent insertion of the case into the compartment beyond a predetermined position.

It will be understood from the foregoing that various modifications may be adaptable and yet come within the scope of my invention as set forth in the appended claims.

Having thus described my invention, what I claim is:—

1. A shelf comprising a plurality of angle irons, one leg of each of which lies in a horizontal plane, a sheet of metal carried by said angle irons secured to the horizontal legs thereof, the ends of the vertical legs of said angle irons continuing beyond the ends of said horizontal legs, said continuing ends of the vertical legs being bent at right angles to the remainder of the vertical legs and in a direction opposite from the projection direction of said horizontal legs, said metal sheet being underlapped around the bent continuing portion of said vertical legs to form the front and rear faces of the shelf.

2. A shelf comprising a pair of angle irons, one leg of each of which lies in a horizontal plane across the respective ends of said shelf, a sheet of metal carried by said angle irons and underlap joined to the respective horizontal legs thereof, the vertical legs of said angle irons having their ends bent at right angles to the intermediate portions of the vertical legs in a direction opposite the projection direction of the horizontal legs, said metal sheet being underlapped around the bent portion of said angle irons to form the front and rear faces of the shelf, the front face of the shelf extending to cover the ends of said horizontal legs.

3. In combination with upright sections of a book stack having laterally extending runways, a shelf comprising a pair of angle irons, one leg of each of which lies in a horizontal plane across the respective ends of the shelf in the manner of an inverted L, a sheet of metal carried by said angle irons and underlap joined to the horizontal legs thereof, the vertical legs of said angle irons having front and rear ends bent at right angles, said metal sheet being underlapped around the bent portion of said angle irons to form the front and rear faces of the shelf, said sheet of metal being provided with spaced apertures adapted to receive engaging members of book ends, compressors and the like.

4. In combination with upright sections of a book stack having laterally extending runways, said shelf comprising a pair of conversely inverted L-shaped irons, one leg of each of which lies in a horizontal plane and form shelf end projections adapted to support the shelf upon said runways, a sheet of metal carried by said angle irons and underlap joined to the horizontal legs thereof, and vertical legs of said angle irons continuing from the shelf end at right angles into the sides of said shelf, said metal sheet being underlapped around the bent portion of said angle irons to form the front and rear faces of the shelf, said sheet of metal being provided with spaced apertures adapted to receive engaging members of book ends, compressors and the like.

5. In combination with upright sections of a bookstack having laterally extending runways, a sheet metal shelf having conversely inverted L-shaped ends formed by portions of a horizontal shelf surface-forming member extending laterally over and beyond substantially vertical ends on said shelf, said laterally extending portions and vertical ends cooperating respectively with the

horizontal surfaces and sides of said runways to support the shelf and tending to prevent a sagging thereof, and a depending integral face extending over the ends of said laterally extending portions and the vertical ends, whereby the shelf in operative position conceals said runways.

6. In combination with upright sections of a bookstack having laterally extending runways, a sheet metal shelf having conversely inverted L-shaped ends formed by portions of a horizontal shelf surface-forming member extending laterally over and beyond the ends of said shelf, said laterally extending end portions cooperating with said runways, means carried by said laterally extending portions for locking said shelf to said runways, and a depending front integral face, whereby the shelf in operative position conceals said runways.

7. In combination with upright sections of a cabinet having spaced laterally extending runways, a shelf, anti-friction means carrying said shelf operably upon said runways, means on the ends of the shelf located beneath said anti-friction means cooperating with said runways tending to prevent a bending of the shelf under load stresses and to prevent a binding between the ends of said shelf and the sides of said runways, and a detent pivotally attached to said shelf adapted to engage a stop on said runways and limit the travel of the shelf on said runways, said detent being normally rotatably inoperative during travel and engagement yet manually rotatable whereby the shelf may be removed from said runways, said detent having means projecting upwardly therefrom adapted to laterally engage an under-portion of said runways and prevent lateral displacement of said shelf.

8. In combination with spaced upright sections of a cabinet having spaced laterally extending superposed runways, a shelf movably suspended between runways of adjacent upright sections and between and upon the superposed runways of said adjacent uprights with its upper surface on a plane immediately below that of the plane of the bottom of the runways next above the runways upon which the shelf is suspended and with its lower edge on a plane with that of the bottom of the runways upon which the shelf is suspended, and means on the ends of said shelf adapted to engage the sides of the runways upon which the shelf is suspended.

9. In combination with spaced upright sections of a cabinet having spaced laterally extending superposed runways, a shelf movably suspended between runways of adjacent upright sections and between and upon the superposed runways of each of said adjacent uprights with its upper surface on a plane immediately below that of the plane of the bottom of the runways next above the runways upon which the shelf is suspended and with its lower edge on a plane with that of the bottom of the runways upon which the shelf is suspended, shelf-suspending means on the ends of the shelf within the confines of the latter planes operably engaging the surfaces of said runways, and other means on the ends of the shelf and within the confines of the latter planes operably engaging the sides of said runways.

10. In combination with spaced upright sections of a cabinet having spaced laterally extending runways, a shelf, vertically positioned rollers on a transverse axis on the lateral ends of said shelf operable upon the surface of said runways to suspend said shelf, and horizontally positioned rollers on a vertical axis beneath said vertical rollers positioned as a downward cantilever with respect to the upper surface of the shelf and operable between said shelf and the sides of said runways to resist a bending of the shelf and a binding between said shelf ends and said runway sides under load stresses and also to prevent lateral displacement of the shelf when free of load stresses.

11. A book-end having an upright contact face portion continuing into a base portion at an angle thereto, and having shelf gripping means continuing from the base of and on a plane with said face portion into an angle beneath the plane of the base portion and terminating underneath said base portion.

12. A book-end having face and base portions at an angle to each other, one end of each portion terminating at said angle, shelf gripping means projecting downwardly from the base of said face portion and terminating underneath said base portion, and means to prevent angular displacement between said face and base portions.

13. The combination of a cabinet having runways for supporting portable units, a drawer, and suspension members for said drawer, said drawer suspension members being mounted horizontally movable along the sides of said drawer, means on the sides of said drawer for retaining said suspensions, said suspensions having anti-friction devices carried thereby for engaging said runways, and other anti-friction devices also carried by said suspensions for engaging the suspension-retaining means on the sides of the drawer, stationary detents on the sides of the drawer for automatically engaging abutments on the drawer suspensions and stopping the advance of the drawer from said suspension members at a predetermined length of travel, pivotally mounted detents on the drawer-suspensions which detents in their normal position of rest are adapted to automatically engage abutments on the runways and stop the advance of the drawer suspensions from said cabinet at a predetermined length of travel, said pivotally mounted detents being normally rotatable whereby they may be released from said runway-abutments for removing the drawer with its suspension members from said cabinet, and manually rotatable levered eccentric locks mounted on the sides of the drawers and adapted to engage said suspensions upon manual rotation for locking said suspension members horizontally inoperable to the sides of the drawer when removed from the cabinet.

14. A cabinet comprising compartments the side members of which are provided with equally spaced laterally extending runways, portable units each having a suspension element slidable along the side thereof, means for operably attaching said suspension element to the portable unit, said suspension element carrying anti-friction devices engaging with said runways and also carrying other anti-friction means for engaging said attaching means, and means for locking said suspension element immovably along the sides of said units when removed from the cabinet.

15. A cabinet comprising compartments the side members of which are provided with equally spaced laterally extending runways and portable units, said units each having a suspension element slidable along the side thereof, manually rotatable eccentric locks mounted on the sides of the portable units for locking said suspension element inoperatively to the portable unit when

removed from the cabinet, said suspension element carrying anti-friction devices engaging with said runways, and means upon said runways to allow said anti-friction elements predetermined lengths of travel on said runways.

16. In combination with spaced upright sections of a cabinet having spaced laterally extending superposed runways, a drawer, and suspension members therefor, a guideway member and a track member superposed horizontally on and fixed to each side of the drawer, guiding means on said suspensions cooperating with said drawer guideways to prevent binding between said suspensions and drawer and to prevent excessive tilting of said drawer upon said suspensions, anti-friction means on the inner sides of said suspensions operably engaging said drawer-side track members for carrying said drawer, other anti-friction means on the outer sides of said suspensions operable upon said runways for suspending and carrying said suspensions and the drawer carried thereby, and locking means carried by said drawer guideways, said locking means being manually operable to prevent relative longitudinal movement of said suspensions with respect to said drawer.

17. In a portable filing unit comprising an open-faced drawer-like case adapted to operably house a plurality of containers, means on the sides of said case adapted to support the same upon runways of a cabinet which means comprise a rearwardly positioned anti-friction element and a forwardly declining frictional element adapted to progressively engage the end of the runway surface.

18. In combination with spaced upright sections of a cabinet having spaced laterally extending superposed runways, a portable open-faced drawer-like unit having supporting means on the sides thereof operable between and upon the superposed runways of adjacent uprights, said supporting means comprising a member having a laterally extending flange portion progressively declining toward the front of the unit whereby the forward end of said flange frictionally engages the surface of said runways when the unit is in a closed position, and whereby the intermediate portion of the declining flange frictionally engages the uppermost forward corner of said runway when the unit is in any open position, said supporting means also comprising an anti-friction element having its runway contacting surface on the same horizontal plane as that of the forward end of said declining frictional support.

19. A portable filing unit adapted for use in combination with upright members having spaced laterally extending superposed runways comprising an open-faced drawer-like case adapted to house a plurality of smaller drawers, trays and the like, case-supporting means on the sides of said case comprising an obliquely positioned laterally projecting flange member adapted normally to frictionally cooperate with the surfaces of the runways whereby the case is frictionally retained at desired positions upon the runways, anti-frictional supporting means on the sides of said case adapted to operate upon the surface of the runways and anti-frictionally carry the case to and from said upright members when said frictionally-engaging members are manually separated from contact with said runways.

20. A sideless compressor and retainer unit adapted to sit disengagingly within a drawer, said unit comprising a base having a fixed upright head-end member, a pivotally attached foot-end member, an upright member carried upon said base movable longitudinally with respect to said base, means on said upright member cooperating with said base whereby said upright member is retained at desired positions upon said base, and means for engaging material to be placed within said retainer comprising a rod-like member fixed to said head-end member and detachably engaging said foot-end member whereby the foot-end member may be pivoted away from said rod-like member to free the end thereof for insertion of material.

21. In combination with a drawer, a removable compressor and retainer unit adapted to fit disengagingly within a drawer, said unit comprising a base having a fixed upright end, an upright member upon said base movable longitudinally with respect to said base, means on said upright member cooperating with said base whereby said upright member is retained against vertical and lateral displacement, other means on said upright member releasably cooperating with said base whereby said upright may be retained against longitudinal displacement with respect to said base, and a hinged end on said base capable of being swung free of the base end to which it is attached to permit the removal and replacement of said upright member upon the cooperative engaging means on said base.

22. A compressor and retainer unit adapted to removably sit within a drawer, said unit comprising a base having upright ends, an upright member carried by said base movable longitudinally with respect to said base, guideways upon said upright member adapted to slidingly engage said base, manually releasable means on said upright member cooperating with said base whereby said upright member may be retained at desired positions upon said base, a material retaining member adapted to have material threaded thereon suspended between said upright ends and passing through said upright member, one of said ends being hinged whereby it may be lowered to free one end of said retaining member for the receipt and removal of said upright member and material.

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