

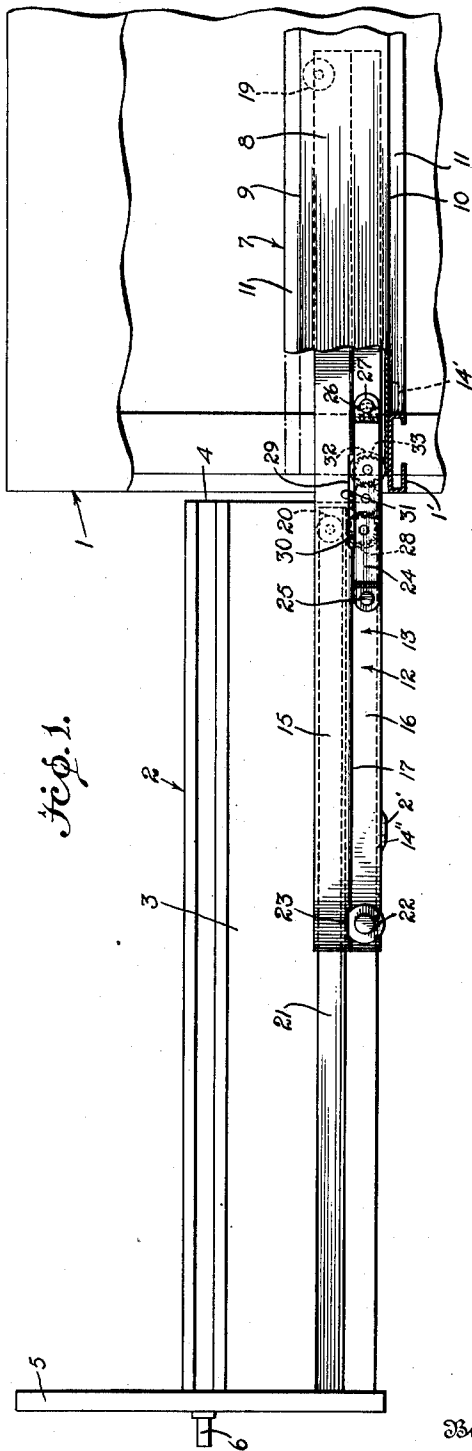
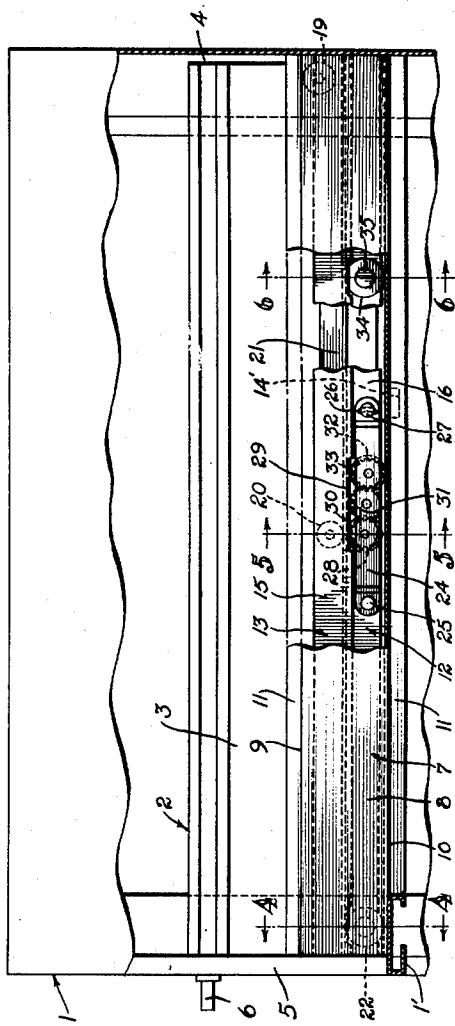
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OVERTRAVEL DRAWER SUPPORT

2,174,181

Filed Nov. 5, 1938

5 Sheets-Sheet 1



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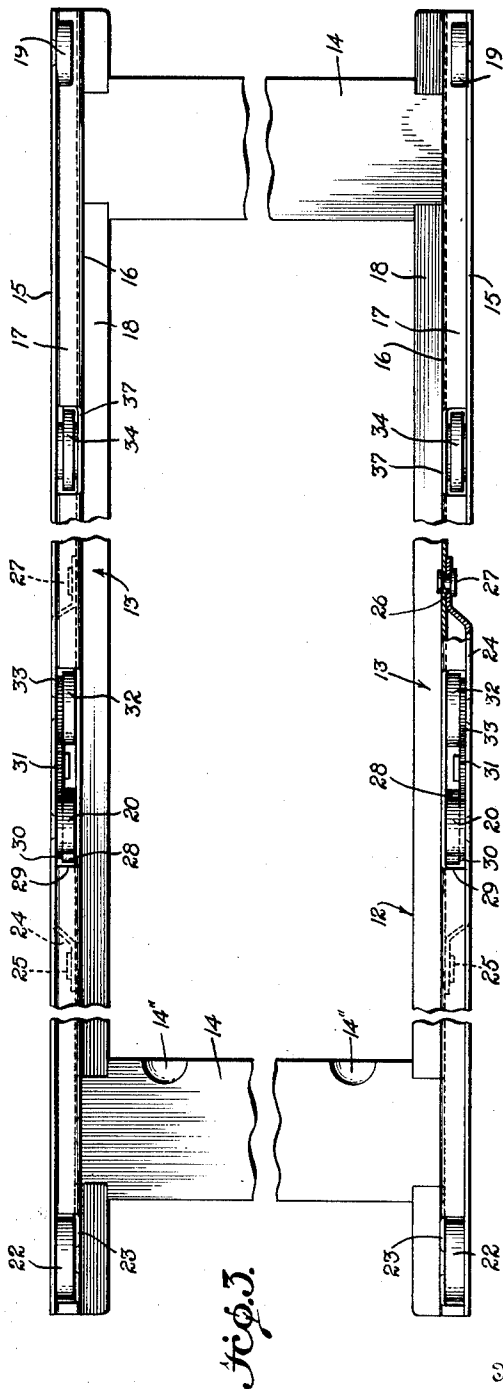
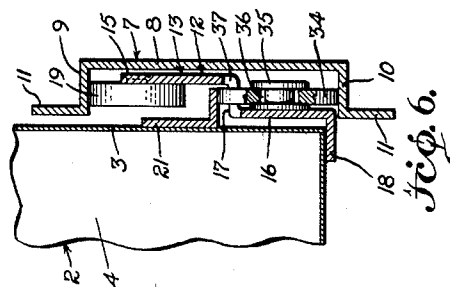
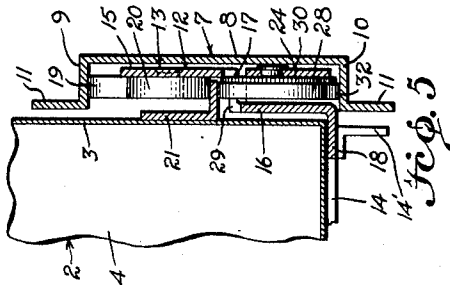
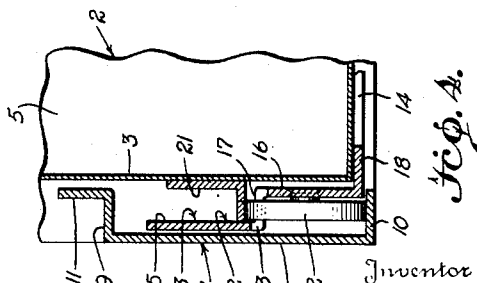
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OVERTRAVEL DRAWER SUPPORT

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5 Sheets-Sheet 2



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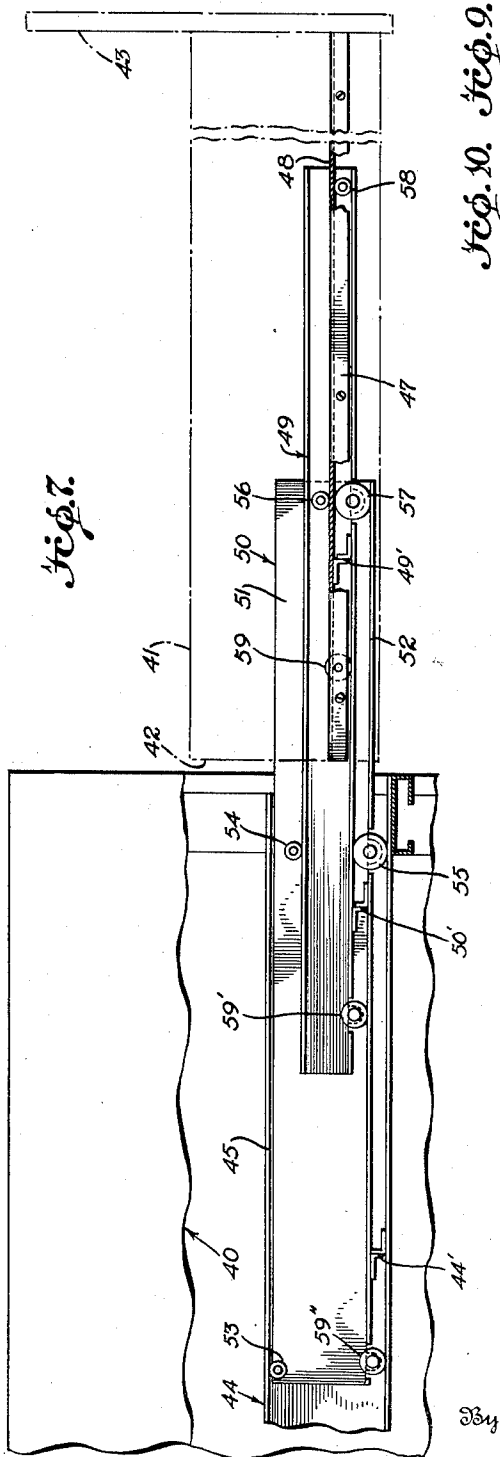
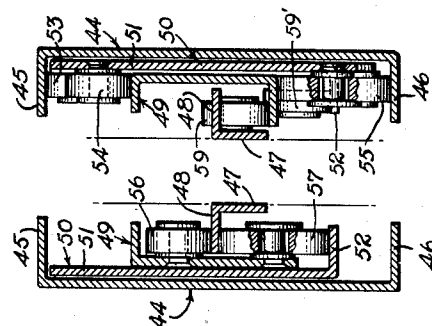
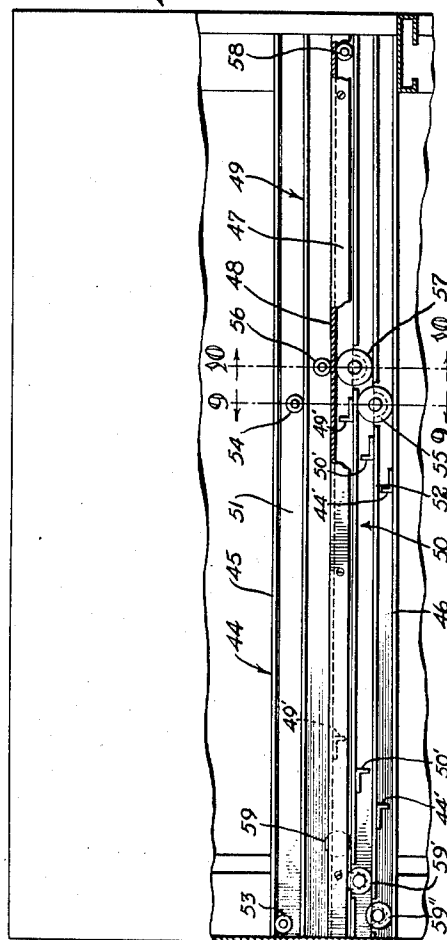
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5 Sheets-Sheet 4



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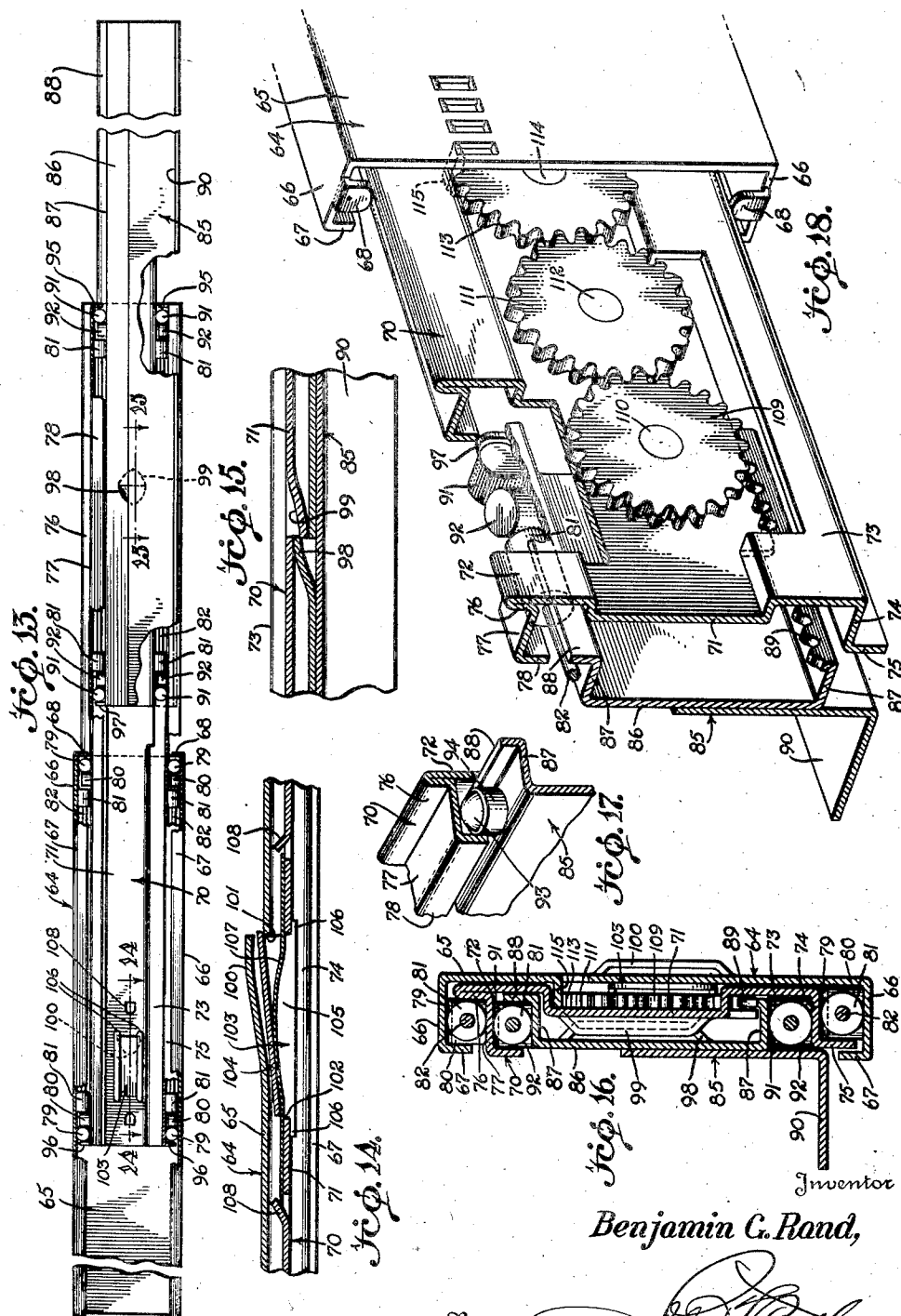
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OVERTRAVEL DRAWER SUPPORT

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5 Sheets-Sheet 5.



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OVERTRAVEL DRAWER SUPPORT

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11 Claims. (Cl. 45-77)

This invention relates to improvements in drawer guides or supports, particularly adapted for supporting the drawers of filing cabinets in which correspondence, cards and the like are usually filed in vertical position.

The invention comprehends the provision of a positive progression type of drawer supporting structure that will provide for the free suspension of a drawer in a cabinet or casing for movement from a housed position in the cabinet to a forwardly extending position in which the rear end of the drawer is spaced outwardly in front of the front end of the cabinet for providing unobstructed access to the filed material at the rear of the drawer.

Heretofore, in progressive drawer suspension devices, the rear end of the drawer track has been supported in contact with a bearing or supporting roller in the forwardly extending position that has the opposite portion of its periphery engaged with the front end of the casing track, while the intermediate member has the forward end projecting outwardly beyond the casing track to cooperate with the drawer track and the casing track in supporting and distributing the weight of the drawer between several tracks and bearings, so that the drawer is freely movable into and out of its compartment in the cabinet. This bearing or supporting roller provides for the progressive feed of the suspension mechanism. Heretofore, it has not been possible to move the rear end of the drawer outwardly beyond the front end of the cabinet or casing in a progressive drawer suspension due to the necessity of having the supporting wheel or bearing contacting the rear end of the drawer track, also supported on and contacting the front end of the casing track, since it would not be possible without this relation between the drawer track and casing track to secure a progressive movement of the intermediate member in proportionate relation to the movement of the drawer track into and out of the cabinet between its forward and rear limits of movement. Therefore, a practical smooth operating progressive drawer suspension, meeting these requirements has not been made heretofore, except where the rear end of the drawer projects partially into the casing in the open or forward position of the drawer.

This invention overcomes this difficulty with prior art structures by providing a structure wherein the drawer track can have its rear end moved to a position spaced outwardly in front of the casing track, as well as in front of the casing,

and yet have a driving mechanism that will uniformly and progressively operate or feed the intermediate carrying means in proportionate relation to the movement of the drawer track.

The invention comprehends an improvement in the art by providing an operating means that has parts engaging the rear end of the drawer track in its forwardly extending position beyond the front end of the casing and casing track, and at the same time other parts associated therewith and driven thereby that contact the forward end of the casing track and through this engagement secure uniform progressive operation of the intermediate carrying means relative to the drawer track throughout movement thereof from the forwardly extending position in front of the cabinet to a rear position where the drawer is housed in the cabinet.

In the drawings:

Fig. 1 is a side elevation of a drawer and a fragmentary portion of a cabinet or casing therefor, broken away and illustrating the drawer supporting mechanism in side elevation, the drawer being shown in the open or forwardly extending position with the rear end spaced outwardly beyond the front of the cabinet.

Fig. 2 is a view similar to Fig. 1, showing the drawer in the rear or housed position in the cabinet or casing.

Fig. 3 is an enlarged fragmentary plan view of the intermediate carrying member for the drawer.

Fig. 4 is an enlarged cross section taken on line 4-4 of Fig. 2.

Fig. 5 is an enlarged cross section taken on line 5-5 of Fig. 2.

Fig. 6 is an enlarged cross section taken on line 6-6 of Fig. 2.

Fig. 7 is a view similar to Fig. 1 showing a modified form of construction.

Fig. 8 illustrates the construction shown in Fig. 7 in the closed or housed position of the drawer in the cabinet.

Fig. 9 is an enlarged cross section taken on line 9-9 of Fig. 8.

Fig. 10 is an enlarged cross section taken on line 10-10 of Fig. 8.

Fig. 11 is a view similar to Fig. 1 showing still another modified construction of drawer support.

Fig. 12 shows the drawer and supporting mechanism shown in Fig. 11 in the rear position when the drawer is housed in the cabinet.

Fig. 13 shows the drawer supporting mechanism in enlarged fragmentary side elevation constructed as shown in Figs. 11 and 12, with por-

tions broken away to illustrate details of construction.

Fig. 14 is a cross section taken on line 14—14 of Fig. 13.

5 Fig. 15 is a cross section taken on line 15—15 of Fig. 13.

Fig. 16 is a cross section taken on line 16—16 of Fig. 12.

Fig. 17 is an enlarged fragmentary perspective showing the relation of a ball and roller assembly providing a bearing between the drawer track and the intermediate supporting member.

Fig. 18 shows an enlarged fragmentary perspective of the drawer supporting mechanism at one side of a drawer illustrating the central portion of the intermediate supporting member to show the construction and relation between the drawer track, the intermediate member and the casing track, together with the pinion feed mechanism 20 for the purpose of illustrating the details of construction and relation of the parts.

Referring to Figs. 1 to 6 inclusive, 1 indicates a conventional form of filing cabinet or casing, constructed in a well known manner to receive one or more drawers 2, only one drawer and a fragment of the casing for housing said drawer being shown. The drawer 2 is of conventional form having sides 3, a rear end 4 and a drawer front 5 provided with the usual handle 6 projecting forwardly from front 5 to be manually gripped for moving the drawer into and out of the cabinet or casing.

The drawer support including the features of this invention has a casing track 7 formed of sheet metal having a central portion 8 formed at the upper and lower edges with laterally extending flanges 9 and 10 terminating in oppositely projecting edge portions 11 offset in spaced parallel relation to central portion 8.

Two casing tracks 7 are provided for each drawer, one mounted on the inside of the cabinet or casing, at each side thereof, and located adjacent each side wall of drawer 2, the track at one side of each cabinet being arranged in opposed relation to the track on the opposite side.

An intermediate carrying means or member indicated by numeral 12 has a pair of oppositely formed side members 13 arranged one at each side of the cabinet, to fit in casing tracks 7 for longitudinal movement back and forth therein. Each side member 13 is joined together by transverse strips 14 to provide a carriage member bodily movable as a unit in casing tracks 7.

Each side member 13 is formed of sheet metal having the upper portion 15 offset outwardly from lower portion 16, while the upper edge of lower portion 16 is joined to the lower edge of upper portion 15 by a laterally extending portion 17. The lower edge of lower portion 16 is provided with a lateral inwardly directed flange 18 to which opposite ends of cross bars 14 are secured.

A bearing roller 19 is rotatably mounted on upper portion 15 of each side member 13 on the inside face at the rear end, as clearly shown in Figs. 3 and 5. The periphery of roller 19 projects above the upper edge of side member 13 and has peripheral engagement with the under face of lateral flange 9 of casing track 7. Forwardly of the central portion of each member 13 is mounted bearing 20 on upper portion 15, as clearly shown in Figs. 3 and 5.

The drawer track 21 of angular form in cross section, has one flange portion suitably secured to side wall 3 of drawer 2, one drawer track being mounted on each side wall, and the other

flange portion projecting laterally outward from the side wall as shown in Figs. 4 to 6 and arranged to have the upper face of the laterally projecting portion of each drawer track 21 engage with the periphery of bearings 20 below the mounting for said bearing on the intermediate carrying member. Bearings 20 are positioned on intermediate carrying member 12 so they will have peripheral contact with the rear end of drawer track 21 at a position spaced outwardly in front of casing 1 as shown in Fig. 1.

Drawer tracks 21 also have bearing engagement with the periphery of bearing rollers 22 at the uppermost peripheral portion. Bearing rollers 22 are rotatably mounted at the forward end of side members 13 of carriage 12 on the lower portion 16 thereof. The upper peripheral portion of each bearing roller projects through slot 23 in laterally extending portion 17 of the side member, so the upper peripheral portion may engage the bottom face of the laterally extending part of drawer track 21, as shown in Fig. 4. The opposite peripheral portion of each bearing roller 22, from that engaged with drawer track 21, projects below the lower edge of side sections 13 and is arranged on intermediate carriage 12 for peripheral engagement with the upper face of flange 10 on casing track 7, as shown in Fig. 4, when intermediate carrying member 12 has been moved into the cabinet to such an extent that bearing roller 22 will ride onto the end of flange 10. This relation of the parts is also shown in Fig. 2. When intermediate carrying means 12 is extended outwardly of the casing, bearing roller 22 provides a freely rolling support for the drawer through the medium of drawer tracks 21 and bearings 20.

A lever 24 is provided for each side member and is pivotally mounted on lower portion 16 at 25. The central portion of each lever 24 is offset outwardly from lower portion 16, and the end opposite that pivoted at 25, is formed with a slot 26 to receive a limiting pin 27 carried by lower section 16 for limiting the floating movement or pivotal movement of lever 24 relative to carriage 12. The central offset portion of lever 24 carries a wheel 28 rotatably mounted thereon in any suitable manner, that has peripheral engagement with the underface of the laterally extending flange of drawer track 21 at a position immediately below bearing 20. Wheel 28 is located between the offset portion of lever 24 and lower section 16 as shown in Fig. 5, and the upper peripheral portion thereof engaging with drawer track 21 extends through slot 29 in section 17 of side member 13. A pinion 30 of smaller diameter than wheel 28 is secured on the outer side thereof as shown in Fig. 5 and meshes with an idler pinion 31 rotatably mounted on lever 24.

Each lever 24 carries another wheel 32 rotatably mounted thereon at a position spaced rearwardly from wheel 28 and provided with a pinion 33 intermeshed with idler 31, so that in the rotation of wheel 28, rotary motion is transmitted by pinion 31 to wheel 32. Wheel 32 is arranged on lever 24 to have peripheral engagement in all positions of intermediate carrying member 12 with the upper surface of lateral flange 10 of casing track 7.

Wheel 28 is arranged forwardly of the central portion of carriage 12 for support forwardly of the front end of casing 1 for engagement with the rear end of drawer track 21 in the manner illustrated in Fig. 1 when the drawer is at its forward limit of movement, while wheel 32 is arranged rearwardly of the center of intermediate carry- 75

ing means 12 to have peripheral engagement at the forward limit of movement of the drawer with the forward end of casing track 7.

Lever 24 provides a free floating mounting for wheels 28 and 32 so that the weight of the drawer and any material filed in the drawer is exerted downwardly on intermediate carriage member 12 which causes the roller 32 to have peripheral engagement with the upper surface of flange 10 of casing track 7 thereby moving lever 24 about its pivot to bring the periphery of wheel 28 into engagement with the under surface of drawer track 21 and cause the upper surface to firmly engage the periphery of bearing 20. This causes a distribution of the weight in the drawer through intermediate carriage 12, wheels 28 and 32, and levers 24 to casing tracks 7. A firm peripheral engagement of roller 28 with drawer track 21 is obtained so that upon movement of the drawer manually from the open position as shown in Fig. 1 toward the closed position of Fig. 2, drawer track 21 will cause wheel 28 to rotate and through the medium of the gear connection between wheel 28 and wheel 32, wheel 32 will be caused to rotate and will drive intermediate carriage 12 at substantially half the rate of speed of drawer track 21. This will secure a continuous progressive movement in a proportionate relation between drawer track 21 and carriage member 12, as the drawer moves into the cabinet so they will assume the position shown in Fig. 2 in the closed position of the drawer, where the drawer and its supporting means are entirely housed in overlapping relation with each other and casing track 7 within the casing. The above described structure for obtaining this progressive movement may hereinafter be referred to as feed means or operating means.

A bearing roller 34 is rotatably mounted on stud 35 carried by lower portion 16 of side member 13 and has a central opening 36 larger than said stud, as shown in Fig. 6, one bearing roller being mounted on each side member 13. Bearing roller 34 has free vertical movement relative to intermediate carrying member 12. The upper peripheral portion of bearing roller 34 projects through slot 37 in lateral section 17 of side member 13 and engages with the under face of the laterally projecting portion of drawer track 21 as shown in Fig. 6 during a portion of the movement of the drawer track relative to the carriage. The lower peripheral portion of roller 34 rides on casing track flange 10. When the drawer is moved into the casing to a sufficient extent, the rear end of the drawer track will engage roller 34 for support thereon during continued movement into the cabinet in conjunction with support afforded through wheels 28 and bearings 22. The relative free movement of bearing rollers 34 and lever 24 carrying wheels 28 compensate for variations in the intermediate carriage 12 and casing track 7 so that the drawer will have a free rolling movement between its outer position as shown in Fig. 1 and the closed position illustrated in Fig. 2.

In order to limit the outward movement of the drawer from the cabinet, intermediate carrying member 12 has the rearmost strip 14 provided with stop 14' depending below strip 14 to engage strike bar 1' at the front of the cabinet to arrest the forward movement thereof, as illustrated in Figs. 1 and 5. The outward movement of the drawer on carriage 12 is limited by stops 2' in the form of two small pieces of sheet metal mounted on the bottom of the drawer that

engage the rear edge of depression sections 14'' formed on front strip 14, as shown in Figs. 1 and 3. The use of stops for limiting the outward movement of the drawer is a common expedient in the art and it is to be understood that any arrangement that will limit movement of the drawer in conjunction with the particular drawer guide structure may be used in place of the stop mechanism above described, so long as it will allow the rear end of the drawer to move outwardly beyond the front face of the cabinet.

A modified form of construction is illustrated in Figs. 7 to 10 inclusive. The cabinet or casing 40 is constructed to receive a drawer 41 having a rear end 42 and a drawer front 43. The drawer support or suspension mechanism includes a pair of channel shaped casing tracks 44 mounted one on each side of cabinet 40. The channels are arranged to have the flanges project inwardly in opposed relation to provide upper and lower tracks 45 and 46 respectively.

A pair of drawer tracks 47 are detachably mounted on opposite sides of the drawer and have one flange thereof projecting laterally from the sides of the drawer to provide a trackway 48.

An intermediate carrying means provides primary and secondary track members 49 and 50, respectively. Primary track member 49 is of channel shape in cross section, there being a pair of these primary track members arranged one on each side of the drawer to cooperate with drawer tracks 47. Secondary track members 50 are used in pairs, one at each side of the drawer and have an angular structure in cross section, as shown in Figs. 9 and 10. Track members 50 have an upright strip portion 51 arranged adjacent and parallel to bottom track 46 of casing track 44, and a laterally extending flange forming a trackway 52 along the lower edge. A bearing 53 is mounted on the rear upper end of side portion 51 of track member 50 and has the upper portion of its periphery extending above the upper edge of section 51 for rolling engagement on the under face of upper track flange 45 of casing track 44.

A bearing 54 is mounted in the central portion on strip section 51 above the upper edge of primary track member 49 for rolling engagement therewith. A wheel 55 is rotatably mounted below bearing 54 for lateral movement relative to secondary member 50 toward and from bearing 54. Wheel 55 has the upper portion of its periphery engaging the lower face of channel member 49 for rolling engagement with said channel member in opposed relation to bearing 54, while the lower portion of the periphery of wheel 55 projects below the lower edge of secondary member 50 and has bearing engagement on bottom track flange 46 of casing track 44. Secondary track member 50 has flange 52 cut away to accommodate wheel 55.

The rear end portion of primary track member 49 of the intermediate carrying means has rolling engagement in the manner above described between bearing 54 and wheel 55 while primary member 49 has a bearing 56 mounted in the central portion thereof provided with peripheral rolling engagement with the upper face of track flange 48 of drawer track 47. A wheel 57 rotatably and loosely mounted on channel 49 immediately below bearing 56 has the upper portion of its periphery provided with rolling peripheral engagement on the under surface of track flange 48 in opposed relation to the periphery of bearing 56, while the lower portion of its periphery

has rolling engagement on track flange 52 of secondary track member 50. The forward end of primary member 49 is provided with a bearing 53 having rolling engagement with the under surface of track flange 48 for supporting the front end of the drawer for free rolling engagement on primary track member 49. Wheel 57 has the same type of mounting and operates in the same manner as described above in connection with wheel 55.

With this construction, the weight of drawer 41 is applied to bearings 56 and 58 together with wheel 57 and through the weight of the drawer exerts a downward force on primary member 49 causing lost motion in wheel 57 to be taken up so that track flange 48 is gripped between the periphery of wheel 57 and bearing 56. Any movement forward or rearward movement of track flange 48 between bearing 56 and wheel 57 produces a positive movement of wheel 57 to rotate the same on its mounting which will result in the proportionate and progressive movement of primary track member 49 at a proportionate speed to drawer track 47.

The weight transmitted to primary track member 49 is likewise transmitted to secondary member 50 through wheel 57, bearing 54, and wheel 55. Secondary track member 50 thereupon receives the weight of the drawer and lost motion in wheel 55 is taken up through the operation of the weight applied to member 50. Primary member 49 is gripped between bearing 54 and wheel 55 and movement of primary member 49 longitudinally will be transmitted through the positive driving of wheel 55 on member 50 to provide a proportionate progressive movement of member 50 relative to drawer track 47 and primary member 49 of the intermediate carrying means.

The weight applied to secondary member 50 of the intermediate carrying means is transmitted to casing track 44 by means of wheel 55 and bearing 53. Idler bearing rollers 59, 59' and 59'' are mounted on the rear end portions of drawer track 47, primary track member 49 and secondary track member 50 respectively, to provide added bearing support for carrying the drawer weight as the drawer is moved into housed position in the casing.

By reason of the structure described above in Figs. 7 to 10, it will be noted that the rear end of the drawer can be moved to a position where it is spaced forwardly beyond the front of the casing and yet supported for free movement from the forwardly extended position to a housed position within the cabinet. In the manual operation of the drawer from the fully extended position as shown in Fig. 7 to the closed position of Fig. 8, wheels 55 and 57 will operate to transmit the motion from drawer track 47 to primary track 49 and secondary track 50 of the intermediate carrying means to produce a relative proportionate movement of each track to the other and to the drawer track to produce continuous positive progressive movement of each of the track members proportionately to one another, so they will be fully overlapped as shown in Fig. 8 when the drawer reaches the closed position. This provides a structure similar to the first described drawer support, in that the track members are not longer than the length of the drawer and have no portion thereof projecting beyond either the front or the rear end of the drawer or casing in the closed position, when the drawer is housed in its compartment in the cabinet. Yet, the parts are operated by the feed or operating

means above described to provide free rolling progressive movement from the housed position of the drawer to its extended position with the rear end beyond the front wall of the cabinet where the drawer is efficiently supported so that access can be had to all of the files within the drawer particularly those at the rear end, without difficulty. Suitable means for limiting outward travel of drawer 43 on the drawer guides is provided and shown in Figs. 7 to 10 includes stop members indicated by numerals 44', 49' and 50'.

Another form of the invention is illustrated in Figs. 11 to 18. A cabinet or casing 60 of conventional construction receives a drawer 61 having the rear end indicated at 62 and the drawer front at 63. The drawer support or suspension mechanism comprises supporting members arranged at each side of the drawer, the supporting structure at one side of the drawer being formed in an opposite manner to that of the other side, but otherwise identical. Therefore, the drawings illustrate the structure mounted at only one side of the drawer, since it will be obvious how the structure will be applied to the opposite side.

A casing track 64 is mounted on the inside of the side wall of the casing in the usual manner such as by bolts, screws or equivalent means, not shown. Each casing track is formed of sheet metal and has a vertical central section 65 formed at the upper and lower edges with laterally extending track flanges 66 terminating at the free edges in inwardly directed guide flanges 67 arranged in spaced parallel relation with central section 64 and forming channels at the upper and lower edges of section 65. Bearing retainer tongues 68, see Fig. 18, are formed at the front ends of track flanges 66 and extend laterally to close the upper and lower channels to retain bearings in the channels from becoming disengaged therefrom at the ends.

An intermediate carrying member 70 is formed of sheet metal and arranged to telescope into casing track 64. Intermediate carrying member 70 has a longitudinal side section 71 having upper and lower edge portions 72 and 73 offset laterally in spaced parallel relation. Lower edge portion 73 has a laterally extending bearing flange 74 formed on the lower edge thereof and extending in the same direction therefrom as central section 71. The free edge of bearing flange 74 has a depending guide flange 75, shown in Figs. 16 and 18.

Upper offset portion 72 is provided with a return bend section 76 forming an upper lateral guide flange and has the free edge terminating in a laterally extending upper track flange 77. A depending guide flange 78 is formed at the other edge of flange 77 and extends in spaced parallel relation to upper edge section 72. Upper edge section 72 and section 76 project into the upper channel portion of casing track 64 while lower guide flange 75 projects into the lower channel portion thereof. A plurality of rollers 79 are positioned in the upper and lower channels of casing track 64 above and below intermediate member 70 so that their peripheries ride at the upper portion of casing track 64 on upper track flange 66 of the casing track and upper track flange 77 of intermediate member 70. At the lower portion of casing track 64 rollers 79 have peripheral engagement on lower track flange 66 and support the intermediate track member through rolling engagement on lower track flange 74 thereof. These rollers support the intermediate member for free rolling engage-

ment in casing track 64 between the forward and rear limits of movement of intermediate member 70 relative to the casing track.

Another set of rollers 80 are positioned adjacent to rollers 79 and arranged in the channels at the upper and lower portions of casing track 64 above and below intermediate member 70 for the purpose of providing lateral thrust bearings for intermediate member 70. The peripheries of rollers 80 at the upper portion of casing track 64 ride on the inner face of upper bearing flange 67 and on the face of return bend section 76 of intermediate member 70. At the lower portion of casing track 64, rollers 80 have peripheral engagement with bearing flange 75 of intermediate member 70 and with the inner face of vertical section 65 adjacent to lower track flange 66 of casing track 64. Rollers 79 and 80 are provided with suitable retainers 81 to hold them in spaced relation in their respective guideways. Retainers 81 have enlarged end portions in the form illustrated in the drawings connected by rod sections 82 of reduced diameter. Any other suitable means that provides roller retainer and spacing means for holding rollers 79 and 80 in proper spaced relation for free rolling movement in the guideways along the track flanges so that intermediate member 70 is freely guided in its movement back and forth relative to track member 64, may be used.

A drawer track is indicated at 85 and is constructed of sheet metal having a central section 86 formed at the upper and lower edges with laterally extending track flanges 87. Upper track flange 87 terminates in an upwardly extending guide flange 88 while lower track flange 87 terminates in an upwardly extending flange formed to provide a rack gear 89. A drawer supporting angle member 90 is secured to central section 86 in the manner indicated in Figs. 16 and 18, one flange thereof extending laterally inward from central section 86 as shown in Figs. 16 and 18 to receive the bottom side portion of the drawer for supporting the drawer on the drawer track. A plurality of rollers 91 are arranged between the drawer track and intermediate carrying member 70. Some of the rollers are arranged to have peripheral engagement on the upper face of track flange 87 of drawer track 85 and the under face of track flange 77 of intermediate member 70, while the remaining rollers 91 have peripheral engagement with the under face of track flange 87 of drawer track 85 and the upper face of track flange 74. This provides a mounting for drawer track 85 in intermediate carrying member 70 so it may be freely moved from one limit to the other relative to and in carrying member 70. It will be noted that drawer track 85 has interfitting relation with intermediate carrying member 70 so as to telescope therein between flanges 74 and 77.

A plurality of rollers 92 are arranged to extend laterally relative to drawer track 85 adjacent to rollers 91 for peripheral engagement at the upper edge of drawer track 85 with guide flange 88 of drawer track 85 and guide flange 78 of intermediate member 70. The remaining rollers 92 have peripheral bearing engagement between the lower inner edge of offset section 73 and the outer face of angle member 93 where it extends below lower track flange 87 as shown in Fig. 16. Rollers 92 carry the lateral thrust applied on drawer track 85 and in conjunction with rollers 91 carrying the weight applied to drawer track

85, provide for free movement of the drawer track in intermediate carrying member 70.

Bearing spacers 81 are used to retain and space bearing rollers 91 and 92 to secure the proper smooth operation of drawer track 85 in intermediate member 70 and relative thereto.

Fig. 17 discloses a modified type of roller bearing arrangement to substitute for rollers 91 and 92 as well as rollers 79 and 80 in mounting the drawer track in the intermediate slide and the intermediate slide in the casing track. This substitute bearing structure uses a ball bearing 93 arranged within a tubular roller 94. The ball bearing carries the weight and vertical thrust distributed from drawer track 85 to intermediate member 70 while tubular roller 94 provides a bearing for the lateral thrust. A plurality of bearings 93 and 94 may be arranged in the same manner as rollers 91 and 92, and 79 and 80, in providing for the free bearing support for the drawer track and intermediate carrying member relative to each other and the casing track.

The forward ends of lower and upper track flanges 74 and 77 of intermediate member 70 are provided with bearing retainer tongues 95 as shown in Fig. 13 to retain the bearing rollers against disengagement from their operative positions. The rear end of lower and upper track flanges 74 and 77 are formed with laterally directed roller retaining tongues 96 extending into the casing track 64 to retain rollers 79 in engagement with tracks 74 and 77 and casing track 66.

The rear end of upper and lower track portions 87 of drawer track 85 are provided with bearing retaining tongues 97 to retain bearings 91 and 92 in engagement with drawer track flanges 87.

A stop shoulder 98 is formed by offsetting a portion of central section 86 of drawer track 85 to the rear of the central portion thereof for engagement with a stop projection 99 offset to the opposite side of central section 71 from sections 72 and 73, so that it will be aligned with stop projection 98 as shown in Fig. 16 for engagement therewith to limit outward travelling movement of drawer track 85 in intermediate carrying member 70.

Casing track 64 is formed with an offset portion 100 to provide a stop shoulder 101 thereon in the forward central portion of vertical section 65. The rear end portion of central section 71 of intermediate member 70 is formed with an opening 102 receiving a stop member 103. Stop member 103 is formed of sheet metal having a central stop section 104 formed at the upper and lower edges with laterally extending flanges 105 terminating at the inner edges in outwardly extending retaining lips 106. Retaining lips 106 are formed to extend in acute angular relation to central section 104 as shown in Fig. 14 with the forward ends spaced laterally from the forward end of section 104 a distance sufficient to provide for the engagement of the forward end of section 104 in the opening formed by offset portion 100 in casing slide 64, with the front edges of lateral flanges 105 engaging stop shoulder 101 in the manner shown in Fig. 14.

Stop member 104 is loosely arranged in opening 102 and retained therein by leaf spring 107 having its central portion extending along the inner face of central section 104 between flanges 103 with the opposite end portions extending beyond stop member 103 and overlying the outer face of central section 71 of intermediate carrying member 70 beyond opening 102. Struck-out

tongues 108, retain spring strip 107 in position so that the central portion is flexed outwardly for normally urging stop member 103 outwardly into the position shown in Fig. 14 for engaging stop shoulder 101. This structure limits the forward travelling movement of intermediate carrying member 70 relative to casing member 64.

The stops above described for limiting relative movement of drawer track 85 and intermediate carrying member 70 relative to each other and case track 64 are arranged to allow the rear end of drawer track 85 to move outwardly beyond the front end of casing 60 so that when drawer 61 supported by drawer track 85 is moved to the outward limit of movement controlled by said stops, the rear end 62 of the drawer will be spaced outwardly in front of the cabinet or casing 60 in the manner shown in Fig. 11.

A feed or operating means is provided that will now be described. A gear 109, see Fig. 18, is rotatably mounted on stud 110 carried by central section 71 of intermediate carrying member 70 for rotation thereon with the teeth of said gear intermeshing with rack 89 on drawer track 85. Stud 110 mounts gear 109 at a position slightly forward of the central portion of intermediate member 70 so that when drawer track 85 is in its fully extended position to support the drawer with rear end 82 spaced outwardly beyond the front of the cabinet, the teeth of said gear will intermesh with the rear end portion of rack 89 on the drawer track. An idler pinion 111 is rotatable on stud 112 mounted on central section 71 of intermediate carrying member 70 to the rear of stud 110, with the teeth of pinion 111 intermeshing with the teeth on pinion 109 so that idler pinion 111 will be driven by pinion 109.

A gear 113 is rotatably mounted on stud 114 carried by central section 71 of intermediate supporting member 70 with its teeth intermeshing with idler pinion 111 as shown in Fig. 18. The teeth of gear 113 also intermesh with rack 115 extending longitudinally of casing track 64. Rack 115 is formed by cutting a plurality of projections to provide rack teeth out of central section 65 of the strip forming casing track 64 and extending the same laterally inward in the manner illustrated in Figs. 16 and 18 so that the projections are arranged in the same horizontal plane to form a plurality of spaced teeth to provide rack 115. Gear 113 is mounted to the rear of idler pinion 111 as shown in Fig. 18 and is arranged so that when drawer track 85 is extended to its outer limit of movement, the teeth on gear 113 will intermesh with the projections forming the front portion of rack 115.

These gears 109 and 113, through the medium of pinion 111, provide a means for transmitting motion from drawer track 85 to casing track 64, and also to intermediate carrying member 70, so that when drawer track 85 is moved inwardly from its outward limit of movement in front of cabinet 60, it will progressively drive intermediate carrying member 70 at approximately half the speed of the drawer track so as to obtain a continuous progressive movement of intermediate member 70 with drawer track 85 into the housed position of the drawer in the cabinet when the drawer track and intermediate carrying member will be substantially fully telescoped within casing track 64, as shown in Fig. 12. When the drawer is withdrawn from the casing the reverse action takes place and intermediate carrying member 70 is progressively moved outwardly until

the drawer reaches the position shown in Fig. 11 with rear end 62 spaced outwardly in front of the front end of cabinet 60. For this entire movement the operation of drawer track 85 secures positive progressive feeding of intermediate member 70 outwardly therewith to the position shown in Fig. 11 through the medium of racks 89 and 115 and gears 109, 111, and 113.

It will, therefore, be seen that in each of the constructions described above, the intermediate carrying means is positively driven in progressive relation with the drawer track between the open and closed positions wherein the open position provides a support for the drawer with its rear end spaced outwardly beyond and in front of the cabinet. This provides free access to the filed material at the rear end of the drawer overcoming a substantial disadvantage occasioned with structures where the rear end of the drawer does not move entirely out of the cabinet.

The invention in addition provides a bearing structure in combination as illustrated in the form of the invention shown in Figs. 11 to 18, and a mounting for the drawer track and intermediate carrying means that is applicable to each of the forms shown in the drawings, as well as the one illustrated, and thereby provide a structure wherein both the vertical and lateral stresses are distributed through cooperative roller bearings for securing free movement of the drawer track and intermediate bearing members relative to each other in the casing track with a very low percentage of friction.

The invention claimed is:

1. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearing supporting said drawer track for free movement on said intermediate carrying means and said carrying means for free movement on said casing track, and feed means carried by said intermediate carrying means engaged with the drawer track in advance of the center of said carrying means and with the casing track in the rear of said center, operable to drive said intermediate carrying means progressively on said casing track with and by movement of said drawer track from a forward position wherein the rear end of said drawer track is spaced forwardly of the front end of said casing track, and the rear end of the drawer is spaced in front of its casing, to a rearward position wherein the drawer track and intermediate carrying means are moved into overlapping relation on the casing track and the drawer is housed in its casing and vice versa.

2. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track, to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and the front of said casing, and said drawer track supported by said means with the rear end spaced outwardly beyond the front end of said casing track and casing, to support said drawer with the rear end spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, and operating means for moving said intermediate carrying means in proportionate rela-

tion to the movement of said drawer track and in progressive relation therewith between the forward and rear positions.

3. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings cooperating with said means and casing track mounting said drawer track and means for free relative movement to each other and said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and casing, and said drawer track supported by said means with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with the rear end spaced outwardly beyond the front end of said casing, and to a rear position having said means and said drawer track housed in the casing with said drawer, and operating means carried by said intermediate carrying means for moving said intermediate carrying means in proportionate relation to the movement of said drawer track and in progressive relation therewith between the forward and rear positions, having a wheel engaging the rear end portion of said drawer track and another wheel engaging the front end portion of said casing track in said forwardly extending position, the wheel engaging said drawer track being operable in the movement thereof to transmit motion from said drawer track to the wheel engaging said casing track during the operation of said operating means in producing the progressive movement of said intermediate carrying means.

4. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and casing, and said drawer track supported by said means with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with the rear end spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a wheel supported by said intermediate carrying means having peripheral engagement with the rear end of said drawer track in the forward position, a second wheel having peripheral engagement with the forward end of said casing track in the forward position, and means for transmitting motion from the first-mentioned wheel to the second wheel operable in the movement of the drawer track to produce the progressive movement of said intermediate carrying member and movement of said wheels along said tracks until they reach the opposite ends of said tracks in the rear position.

5. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and the front end of said casing, and said drawer track supported by said means with the rear end spaced

outwardly beyond the front end of said casing track and casing to support said drawer with the rear end spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a wheel carried by and movable relative to said intermediate carrying means having peripheral engagement with the rear end of said drawer track in said forwardly extending position, a second wheel movably mounted relative to said intermediate carrying means having peripheral engagement with the forward end of said casing track in said forwardly extending position, and means associated with said intermediate carrying means and connected with both of said wheels for transmitting motion from the first-mentioned wheel to the second-mentioned wheel for moving said intermediate carrying means in proportionate progressive relation to said tracks in the operation of said drawer track from said forwardly extending position to said rear position and vice versa.

6. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and the front end of said casing, and said drawer track supported by said means with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with the rear end spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a wheel mounted for relative movement on said intermediate carrying means having peripheral engagement with one side of said drawer track, a bearing on said intermediate carrying means engaging the opposite side of said drawer track in opposed relation to said wheel, said wheel and oppositely engaging bearing cooperating through the weight of the drawer on said drawer track and intermediate carrying means to move said wheel toward said drawer track for gripping said drawer track between said wheel and opposed bearing, a second wheel associated with said intermediate carrying means having peripheral engagement with the front end of said casing track in said forwardly extending position, means for transmitting motion from said first wheel to said second wheel in the movement of said drawer track, said first wheel and opposed bearing cooperating to provide a positive feed of said intermediate carrying means in progressive relation to said drawer and casing track through cooperation thereof with said drawer track and the cooperation thereof with said second wheel throughout movement of said drawer track from said forwardly extending position to said rear position, and vice versa.

7. An over-travel drawer support for supporting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and the front end of said casing, and said drawer track supported by said means with the rear end spaced outwardly beyond

the front end of said casing track and casing to support said drawer with the rear end spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a floating member adjacent said intermediate carrying means, a wheel rotatable on said floating member having peripheral engagement with said drawer track, a bearing mounted on said intermediate carrying means opposed to said wheel and engaging said drawer track on a side opposite said wheel whereby said drawer track has a portion gripped between said opposed bearing and said wheel for rotating said wheel in movement of said drawer track, said wheel engaging the rear end of said drawer track in the forwardly extending position, a second wheel carried by said floating member having a peripheral engagement in the forwardly extending position with the front end of said casing track, and driving means for said second wheel operable in the movement of said drawer guide from said forwardly extending position to the rear position to progressively move said intermediate carrying member continuously and proportionately to the movement of said drawer track.

8. An over-travel drawer support for supporting a drawer in its casing, comprising a track on the drawer, a track on the casing, intermediate carrying means, bearings mounting said drawer track and means for free relative movement to each other on said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward end of said casing track and the front end of said casing, and said drawer track supported by said means with the rear end spaced outwardly beyond the front end of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a lever pivoted on said intermediate carrying means, an intermediate bearing on said carrying means, a wheel on said lever, having peripheral engagement with one side of said drawer track while the opposite side engages said intermediate bearing to effect a gripping of the drawer track between said intermediate bearing and wheel obtained through the weight of the drawer operating on said lever and wheel, a second wheel rotatably mounted on said lever and having peripheral engagement with said casing track, and an idler wheel having peripheral engagement with the two wheels aforementioned for transmitting motion from one to the other, said first-mentioned wheel having its periphery engaging the rear end of said drawer track in said forwardly extending position and said second wheel having its periphery engaging the forward end of said casing track in said forwardly extending position, said wheels cooperating to progressively move said intermediate carrying member in the operation of said drawer track from said forwardly extending position to said rear position, and vice versa.

9. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, an intermediate carrying member, bearings between said intermediate carrying member and said drawer and casing tracks supporting said drawer track and intermediate member for free movement relative to each other and said casing track to a forwardly extending position with said means having one end projecting outwardly beyond the forward

end of said casing track and the front of said casing and said drawer track supported by said intermediate member with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with its rear end spaced outwardly beyond the front of said casing, and to a rear position having its intermediate member and drawer track housed in the casing with said drawer, a lever pivoted on said intermediate member, a wheel rotatable on said lever having peripheral engagement with said drawer track at the rear end thereof in said forwardly extending position in opposed relation to a bearing on said intermediate member whereby the weight of said drawer causes said wheel to grip said drawer track, a second wheel rotatably mounted on said lever having peripheral engagement with the front end of said casing track in said forwardly extending position, an idler wheel rotatable on said lever and having peripheral engagement with the other two wheels thereon for transmitting motion from one wheel to the other, whereby movement of said drawer track from said forwardly extending position produces substantially positive progressive movement of said intermediate member with said drawer track during movement into said rear position, and vice versa.

10. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, an intermediate carrying member, bearings on said intermediate member normally mounting said drawer track and intermediate member for free relative movement to each other and said casing track to a forwardly extending position with said member having one end projecting outwardly beyond the forward end of said casing track and the front end of said casing, and said drawer track supported by said member with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with the rear end thereof spaced outwardly beyond the front of said casing, and to a rear position having said means and drawer track housed in the casing with said drawer, a rack on said drawer track, a rack on said casing track, a pinion rotatable on said intermediate member having its periphery intermeshed with the rear end of the rack on said drawer track in said forwardly extending position, a pinion rotatable on said intermediate member in spaced relation to said first mentioned pinion and having its periphery intermeshed with the forward end of the rack on said casing track in said forwardly extending position, and an idler pinion rotatable on said intermediate member having its periphery intermeshed with the peripheries of said first two mentioned pinions for transmitting motion from one pinion to the other, said pinions cooperating in the movement of said drawer track from said forwardly extending position to said rear position to positively move said intermediate member in proportionate relation to the motion of said drawer track.

11. An over-travel drawer support for mounting a drawer in its casing, comprising a track on the drawer, a track on the casing, a pair of intermediate carrying members, bearings on said intermediate carrying members mounting said drawer track and said members for free relative movement to each other and said casing track to a forwardly extending position with said members having one end of each projecting outwardly beyond the forward end of said casing

track and casing and said drawer track supported by said members with the rear end spaced outwardly beyond the front end of said casing track and casing to support said drawer with the rear end thereof spaced outwardly beyond the front of said casing, and to a rear position having said members and drawer track housed in the casing with said drawer, a wheel rotatable on one of said members normally having its periphery retained in engagement with the rear end of said drawer track in said forwardly extending position for rotation by said drawer track

in the movement thereof between said forwardly extending and rear positions, a second wheel rotatably mounted on the other member normally having peripheral engagement with the first mentioned member and said casing track, said wheels being operable in the operation of said drawer track to produce continuous progressive and relative proportionate movement of each of said members relative to each other and said drawer track between said forwardly extending position and said rear position.

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