The present invention relates to a drawer locking device in chests of drawers and the like in which a plurality of drawers are slidably arranged in one or more rows which usually are vertical but may be horizontal, each of the said drawers being provided with a swingable locking hook adapted to engage a locking member which is common to a plurality of drawers, in order to lock the drawer in its closed position by such engagement.

In known devices of this kind the said common locking member can be rotated from outside the chest of drawers or the like about an axis which is parallel to the axis about which the locking hooks of the drawers are swingable, in order to disengage from a central point the said locking hooks of all the drawers from their common locking member. It is also known to provide each of the locking hooks with a spring tending to swing that hook into an active position in which it engages the common locking member provided that the latter is in its locking position, so that the locking hook automatically snaps into engagement with the common locking member, thus locking the drawer, as soon as the latter is shifted into its closed position. Each of the hooks has a nose adapted to engage from behind a locking surface of the common locking member.

Known centrally operatable locking devices of this kind have the inconvenience that a considerable force may be required to rotate the common locking member into its unlocking position, if this locking member is in engagement with a large number of locking hooks and if moreover the drawers are occupied by heavy objects such as tools. For this reason, the number of drawers which could be centrally locked or unlocked from a single point has been very limited. The said considerable force required was due to the nature of relative motion between the common locking member and the locking hooks in the unlocking operation. Up to now, the common locking member usually was shaped and supported in such a manner that when it was rotated into its unlocking position, its locking surface had to slide along the cooperating surfaces of the several locking hooks, in which sliding motion comparatively high frictional forces depending on the number of locking hooks and the weight of the contents of the drawers, i.e. on the pressure exerted on the said cooperating surfaces of the common locking member and of the locking hooks had to be overcome.

It is an object of the present invention to avoid the described drawbacks of the known centrally operatable locking devices of this kind. According to the invention, the common locking member is rotatable about such an axis that on its rotation into its unlocking position its locking surface adapted to cooperate with the noses of the locking hooks passes from a position at right angles from the sliding direction of the drawers to a position at such an angle to said direction that the said locking surface is lifted off the cooperating surfaces of the hook noses and causes the locking hook of each drawer to slide off from the said locking surface of the common locking member when this drawer is drawn to open it.

Preferably, the common locking member has an edge bounding its said locking surface and so disposed that on rotation of the common locking member into its unlocking position, it moves towards the locking hooks and swings them into a position in which they are at least partially disengaged from the locking surface of the common locking member.

Moreover, the axis of rotation of the common locking member may be arranged in such a position with respect to that occupied in closed condition of the drawers by the axes about which their locking hooks are swingable and by the noses of these hooks, that when a drawing force is exerted on any drawer, this force does not result in any appreciable couple on the common locking member which would tend to rotate the latter into its unlocking position.

The common locking member may be a prismatic shaft, preferably of square cross-section, which is rotatable by an angle approximately equal to half the angle formed by two adjacent faces of the shaft.

Further objects and advantages of the invention will become apparent from the description now to follow of a preferred embodiment thereof, given by way of example only; in this description, reference will be had to the accompanying drawing in which:

Fig. 1 shows, in perspective view from the rear, a chest of drawers in which part of the chest walls have been broken away to show the drawer locking device according to the invention;

Fig. 2 is a longitudinal vertical section through the common locking member and its bearings;

Fig. 3 is a cross-section taken on line III--III of Fig. 2;

Fig. 4 shows the said common locking member in cross-section and the rear part of a drawer with its locking hook in plan view, the said common locking member being in its locking position; and

Fig. 5 is a view corresponding to that of Fig. 4 but showing the parts in unlocking position.

As shown in Fig. 1, a plurality of drawers 11 are arranged one above the other in a chest 10 in which they are slidably supported each on a pair of angle rails 12. The rails 12 may be secured, for instance, to the side walls of the chest 10. Obviously, the drawers could as well be supported in known manner on a set of rollers to facilitate their drawing and closing. Each of the drawers can individually be drawn out of the chest 10 at the front thereof which is on the remote side as seen in Fig. 1.

At its rear end, each drawer 11 carries an extension 13 rigidly fixed to it, on which extension a locking hook 14 is swingably supported by means of a vertical pin 15. This locking hook has a nose 16 and an extension 17 which forms an abutment co-operating with the rear wall of the drawer 11 for limiting the angle by which the hook 14 may be rotated in the direction of the arrow P in Fig. 4. Further, each locking hook is actuated upon by a tension spring 18 one end leg of which engages the rear wall of the drawer 11 and the opposite end leg of which engages the locking hook 14 itself. This spring 18 tends to rotate the locking hook in the direction of the arrow P of Fig. 4 so far as permitted by the extension 17. The outer or rear face 19 of the hook nose 16 is shaped as an oblique gliding surface.

Near the rear wall of the chest 10, a prismatic shaft 20 of square cross-section is supported so that its axis is vertical, that is, parallel to the axes of the pins 15 on which the locking hooks 14 are pivoted. This shaft 20 forms a common locking member which cooperates with the locking hooks 14 of all the drawers 11. End pieces 21 and 22 are inserted into the ends of the hollow square shaft 20 and welded or soldered to it. The por-
tions of the end pieces 21 and 22 which project from the hollow shaft are shaped as bushings 23 and 24, respectively, of annular cross-section.

In the top and in the bottom of the chest 10, metal strips 25 are mounted, each of which supports a pin 26 and 27, respectively. These pins are in alignment with each other and engage the bushings 23 and 24 to support rotatably the shaft 20. Owing to its own weight, the lower end of the bushing 24 rests on a flange 28 carried by pin 27. Between the upper end of the bushing 23 and a corresponding flange 29 of pin 25 there is an interval which permits to slide the shaft 20 upwards by such height that the bushing is disengaged from the lower pin 27, which is shorter than the upper pin 26. In order to mount the shaft 20 in its place, its upper bushing 23 is first slid over the longer upper pin 26, whereupon the lower end of the shaft is swung in so as to bring the lower bushing 24 into alignment with the lower pin 27, whereupon the shaft 20 is slid downwards to engage the bushing 24 over pin 27. Removal of the shaft 20 can be effected by displacing it in the opposite way. To retain the shaft 20 in the position in which it has been mounted, a pin 30 or a cotter pin is removably fitted into a cross-bore of the longer upper supporting pin 26.

The shaft or common locking member 20 carries an arm 31 rigidly connected to it and provided with a hole 32 in which a link rod 33 is pivoted. The opposite end of this rod 33 engages an arm 34 carried by a horizontal shaft 35 which is rotatably supported in the chest 10 and carries a key-receiving member 36 at the front face of the chest. A key 37 can be introduced into member 36 for rotating the shaft 35 whereby the common locking member 20 is actuated. However, the shaft 35 could be provided with a handle instead of the key-receiving member 36 at the front face of the chest 10.

Preferably, the rotation of the common locking member 20 is limited, by means of abutments (not shown) co-operating with the arm 34 or by any other known means, to an angle which is equal to one half of the angle between two adjacent faces of the shaft 20, that is, to $45^\circ$ in the present example, or to approximately that angle. In one end position of the locking member 20 its faces are parallel to the walls of the chest 10, as shown in Fig. 4. The face 38 of the locking member which then is at the rear and extends perpendicularly to the direction in which the drawers 11 are slideable in this case serves as locking surface adapted to be engaged by the locking hooks 14 of the drawers 11. The common locking member 20 is then in its locking position in which it locks the drawers 11 against being drawn open. When the drawers 11 are in this closed position, the axis of rotation of the locking member or shaft 20 is in such a position with respect to the axes of the pins 15 about which the hooks 14 are swingable, and with respect to the nose 36, that no substantial couple which would tend to rotate the said member or shaft 20 out of its locking position can be exerted on that member by means of the locking hooks 14, by attempting to draw open the drawers 11. The locking device therefore is self-locking, and it is practically impossible to subject the lock 36 to high forces by attempting to draw open one or more of the closed drawers 11; therefore, the lock 36 may be of comparatively light construction although it may serve for locking a large number of drawers.

If by means of the key 37 one rotates the locking member or shaft 20 by some $45^\circ$ in the direction of the arrow Q of Fig. 5, into the unlocking position in which it is shown in that figure, the locking surface 38 assumes an oblique position with respect to the direction in which the drawers 11 are slideable. The said locking surface 38 thus is lifted off the co-operating surface 39 of the noses 16, without sliding along that surface 39. At the most, the extreme edges of the noses 16 of the locking hooks 14 remain in contact with the locking surface 38 of member 20, as shown in Fig. 5. Therefore, only slight frictional forces between the locking surface 38 and the noses 16 must be overcome when rotating the locking member 20 into its unlocking position, as the edge of the locking surface 38 meets an adjacent face of the square shaft 20 is displaced laterally towards the locking hooks 14 so that the latter are swung out somewhat into an inactive position (Fig. 5). Thereby and owing to the oblique position of the locking surface 38, the locking hooks 14 now are enabled to slide off from this locking surface and from the common locking member 20 as a whole, as soon as one exerts a force on the corresponding drawer 11 in the direction of drawing it open. The drawers 11 are no longer locked and any of them can be drawn open separately or jointly, and closed again at will.

Closer of the drawer may also be possible when the common locking member 20 is in its locking position as shown in Fig. 4. If any drawer not yet closed is pushed back towards its closed position, the inclined surface 39 of its locking hook 14 meets the common locking member 20, whereby the locking hook 14 is swung sideways against the action of its spring 18. As soon as the drawer reaches its fully closed position, the nose 16 is snapped in behind the locking member 20 by its spring 18, so that the drawer is automatically locked.

The main advantage of the described locking device consists in that only comparatively small forces are required to rotate the common locking member 20 from its locking to its unlocking position. This makes it possible to use one and the same common locking member 20 for co-operating with a very large and hitherto inadmissible number of drawers 11 or locking hooks 14, without impairing the ease with which the common locking member can be rotated into its unlocking position. For this reason it is possible with a locking device according to the invention to lock and unlock up to three hundred or even more drawers from one central point. The drawers must not necessarily be arranged one above the other as shown, but they may also be in a plurality of vertical rows arranged side by side, in which case one common locking member 20 will be provided for the drawers of each vertical row and the several locking members will be connected by suitable linkage or similar means.

Another advantage of the central locking device according to the invention resides in the fact that the hand with which the common locking member 20 can be rotated from its locking position to its unlocking position is in no way impaired if one simultaneously attempts to draw open the drawers 11 or if one pushes them rearwards in the direction of their closing. If the drawers are loaded with heavy objects such as tools and if their guiding rails 14 happen to be inclined forwards or rearwards instead of being horizontal, so that the weight of the contents tends to move the drawers into their open or closed position, the easy operation of the locking device remains unaffected.

A further advancement of the invention is that rotation of the common locking member into its unlocking position has no pulling or pushing effect whatever on the drawers 11, in the direction in which they are slideable. For this reason as well, it is immaterial whether the drawers are empty or heavily loaded.

Further, the described locking device has the advantage that the common locking position even if none or only some of the drawers are in their closed position. The drawers which have remained open or partly open can be closed afterwards and then become automatically locked. If some of the drawers 11 are nearly but not fully closed when the common locking member is rotated into its locking position, the locking surface 38 on rotating in a direction opposed to that of the arrow Q in Fig. 5 engages the noses 16 of the locking hooks 14 of
the said drawers which are nearly closed and thereby moves these drawers into their fully closed position.

There is also an advantage of the locking device according to the invention in the fact that the locking hooks may engage the common locking member at any convenient point of its length, so that the drawers can be arranged at adjustable levels in the chest, or that the number of drawers in a given chest can be increased at will within the limits imposed by the size of the chest.

Instead of a square shaft as shown a prismatic shaft of other cross-sectional shape could be used as the common locking member.

The locking device according to the invention is suitable for chests of drawers, cases, lockers and the like equipped with drawers adapted to contain tools, documents, index cards, or any other articles.

I claim:

In a chest of drawers having parallel side walls, a plurality of drawers supported on the side walls and slidably in parallel directions, and top and bottom walls on the top and bottom edges of the side walls, a drawer locking device comprising a common locking member rotatably supported between said top and bottom walls and rotatable between a locking and an unlocking position about an axis perpendicular to the said parallel directions in which the drawers are slidable, a pair of fixed aligned pins on said top and bottom walls on which said common locking member is rotatably supported, one of said pins being longer than the other, the said common locking member having a pair of aligned end bearings into which said pins are respectively engaged, an axial abutment for said common locking member on the shorter one of said pins, and a removable locating means on the longer one of said pins for axially locating said common locking member against said axial abutment on the shorter pin, said common locking member having a locking surface extending at right angles to said parallel directions when said common locking member is in its said locking position and obliquely to said parallel directions when said member is in its said unlocking position, a plurality of locking hooks each swingably supported on one of said drawers for rotation about an axis parallel to the said axis of rotation of the said common locking member, each of said hooks having an abutment surface adapted to abut against said locking surface of said common locking member when the latter is in its said locking position, said common locking member being between the abutment surface and the axis of rotation of said hooks, whereby the drawer on which said hook is supported is prevented from forward motion, means biasing each of said hooks towards said common locking member, and each of said hooks being configured to contact said locking surface of the common locking member, when the latter is in its said unlocking position with its locking surface extending obliquely, whereby forward motion of the drawer on which said hook is supported causes the latter to be swung out by said obliquely extending locking surface against the action of the said biasing means so as to disengage said abutment surface of the hook from said locking surface of the common locking member.

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