My invention relates to day beds, and the
like, that is, to a device wherein there is a main or stationary bed section and a movable or extension bed sec-
tion adapted to be extended so as to bring its
mattress structure in the same plane with the
mattress structure of the main bed section when in use and to be supported in superim-
posed position over the main bed section when
not in use.

One of the objects of my invention is to provide a bed of this type which is compact, simple in construction, durable and cheap to
manufacture, and which may be used efficiently
as a couch or seat when closed and as a double bed with all of the conveniences there-
of when opened.

Another object is to provide compact and
efficient means for raising and lowering the
mattress structure of the main bed section and maintaining it in such raised position when
the other bed section is extended, such means consisting in part of improved spring and
link arrangement mounted and effective at
each end of the bed.

A further object is to provide means for automatically linking the mattress structures of the respective bed sections together in open
position, such means being adapted to auto-
matically effect disengagement of such sec-
tions as the bed is closed, and effective in so
linking the bed sections, as to prevent verti-
cal displacement of the adjacent edges of the
mattress structures, whereby the comfort of
the user of the bed is greatly increased.

Other and further objects will become
apparent as this description progresses and
by reference to the drawings wherein:

Fig. 1 is an end elevation of a bed in ex-
tended or open position, such bed embodying
my invention.

Fig. 2 is an end elevation of the bed of Fig.
1 with the bed supporting ends removed
showing an intermediate position of the ex-
tension bed section during the extension move-
ment thereof, and in the position it assumes
immediately before the mattress structure of
the main bed section is picked up by the asso-
ciated levers to elevate the same.

Fig. 3 is an end elevation of the bed of
Figs. 1 and 2, showing the bed sections in
closed position, the supporting bed ends be-
ing shown removed.

Fig. 4 is an enlarged partial section taken
substantially on line 4—4 of Figure 1, show-
ing the relative positions of the bed section
supporting members and actuating means.

Fig. 5 is a partial diagrammatic plan view
of the spring mattress structure of the bed
in its extended or open position.

Fig. 6 is an enlarged view of a portion of
the spring mattress structure of Fig. 5 show-
ing the construction and application of the
means for automatically linking the bed sec-
tions together in open position, and which
automatically disengages the sections during
the closing movement.

Fig. 7 is a detailed view taken on line 7—7
of Fig. 6, showing the manner of engagement of the linking parts referred to in connection
with the description of Fig. 6.

Referring particularly to the drawings,
which show the preferred embodiment of my
invention, the bed may comprise a main bed
section A (see Figs. 1 to 4) and an extension
bed section B. The main bed section A com-
prises an end frame at each end, each end
frame having a front leg 1 and a rear leg 2,
both formed preferably of angle iron, an
angle bar 3 connecting the upper ends of such
legs and a flat bar 4 parallel with the bar 3
for connecting such legs at the bottom. A
bar 5 at the front end extends longitudinally of
the bed section to connect the sides of the cor-
responding end legs together, and a similar
bar 6 is so connected to the rear legs 2.

A spring mattress structure is mounted for
vertical movement on the main bed section.
This spring mattress structure comprises
coiled bed springs 7 which are suitably con-
nected together at their upper ends in any
desired manner so as to hold them in up-
right operative position, the joined springs
being confined within and supporting the
tongue or border wire or rod 8. The bed
springs 7, at their lower ends are mounted
in any desired manner, preferably, on trans-
verse bars or slats (not shown) which are
secured at their ends to suitably provided
longitudinal side bars 9 and 9" which are, in
turn, connected together near their ends
by a cross bar 9' (at each end). These lat-
er named bars are preferably formed of an-
gle iron.

The movable or extension bed section, at
each end, comprises an end cross bar 10 con-
nected at its opposite ends by the side mem-
bers 12 and 13, and supported by a leg 11
at each end. These supporting members are
also preferably formed of angle iron. The

The extension bed section is swingingly supported upon the main bed section by pairs of parallel links 15 and 16, each end of the bed being provided with identical pairs of such links. The upper end of each of these links is pivotally mounted to the cross end bar 10 of the extension bed section by suitably provided bearings in the form of studs or the like. The lower end of the link 15 is connected to and pivotally supported upon the cross bar 4 of the main bed section by being mounted upon a protruding end of a rock shaft 17, the rock shaft 17 being the ordinary rock shaft provided for effecting simultaneous and uniform movement of the bed section at both ends thereof. The lower ends of the links 16 are also pivotally connected to the cross bar 4 by a suitably provided bearing which may take the form of a stud or bolt 16*.

By observing Figs. 1 and 3 it will be seen that when the bed is opened and the movable bed section is extended, the spring mattress structures of these two bed sections lie in the same plane, making a smooth mattress surface. When the bed is closed, as will be seen in Fig. 3, it will be noted that the spring mattress structure of the main bed section has been lowered to a position beneath that shown in Fig. 1 to permit the extension bed section to be moved over into the position shown in Fig. 3, thus providing a compact bed structure which may be readily used as a couch or seat when not being used directly as a bed.

The means for raising and lowering the spring mattress structure of the main bed section to bring the bed to a position shown in Figs. 1, 2 and 3 may comprise, at each end of the bed, a pair of toggles, one toggle located at the front portion of the main bed section and the other at the rear of the same. The rear toggles comprise a pair of toggle links 18 and 19 while the front toggles comprise a pair of links 20 and 21. The toggle links 19 and 21 are pivoted at their lower ends to a cross bar 22 which is in turn supported at its ends by the longitudinal bars 5 and 6. The toggle links 18 and 20 are pivotally connected at their upper ends to the cross bar member 59 which carries the spring mattress structure of the main bed section. The toggle links 18 and 19 and 20 and 21 are pivotally connected together as at 23 and 24 respectively, thus completing the toggle. The pair of toggles, at each end, is joined together by a toggle connecting link 25 so that they will operate in unison and a movement of one toggle will cause a corresponding movement of the other. The toggle link 21 at each end is provided with an extension 21* which carries suitable means, which may be a roller or stud, or the like, indicated at 21† for engaging and riding in a longitudinal slot 9* in the spring mattress cross bar structure 9*.

Movement of the pair of toggles at each end is effected through the medium of the operating link 26. This link 26 is pivotally connected to the toggle links 18 and 19 at their point of pivotal connection being carried by the pivot 23 joining these two links together at their inner ends. The swinging link 16 at each end is provided intermediate its pivotal connections with a laterally projecting lug or pin 28, or roller if desired, which is adapted to engage and ride in the longitudinal slot 29 in the toggle operating link 26. In this manner the swinging link 16 after a predetermined movement thereof is adapted to pick up the toggle operating link 26 and move the same, together with the toggles to raise the spring mattress structure of the main bed section.

From the foregoing description it is seen that the following operation takes place during the opening and closing movements of the bed: Assuming that the bed is in closed position as shown in Fig. 3, the side member 12 of the extension bed section may be grasped and moved outwardly so as to move the extension bed section outwardly. During this movement the swinging levers 15 and 16, pivotally connected to both link 26 and bed section and the main bed section, cause the extension bed section to swing upwardly and outwardly in an upright position. At the beginning of this movement of the extension bed section, and until it is moved to the position of Figure 2, the pin 28 of the swinging link 16 moves along freely in the longitudinal slot 29 of the link 26, the link 26 taking only a slight compensating upward movement about its pivot, with the result that the extension bed section is moved to the position of Fig. 2 before there is any movement of the pairs of toggles at each end of the bed to cause an upward movement of the spring mattress structure of the main bed section. Obviously, the position of pick up need not be limited to the exact position of Figure 2 but may be varied according to the requirement or desire in any particular case. One purpose in providing this lost motion is to enable the extension bed section to be moved upwardly and to a preliminary position before the spring mattress
structure of the main bed section is moved, so that it will readily clear and not conflict with the following movement of the spring mattress structure of the main bed section during the final opening movement of the extension bed section. As the extension bed section is moved from the position shown in Fig. 2 toward the position shown in Fig. 1, the pin 29 carried by the link 16 engages the outer end of the link slot 29 so that continued movement of the link 16 will act to cause a corresponding movement of the toggle operating link 26. As this latter movement of the toggle operating link takes place, the toggle links 18 and 19 are extended, as shown in Fig. 1, this extended movement being simultaneously transmitted to the toggle links 20 and 21 through the medium of the toggle connecting link 25. As the pairs of toggle links are extended, the extension 21* of the toggle link 21 is moved to carry its pin or roller 21 forward in the slot 9 to the position shown in Fig. 1. It this manner the extended toggle link 21 serves to additionally support the spring mattress structure and lock the same in its uppermost and open position.

In order to assist the user in opening and closing the bed, I preferably employ a pair of springs 30 and 31 at each end of the bed. One end of each of these springs may be connected in any desired manner to the stationary frame of the main bed section, while the other end of each spring is connected to a V-shaped member 32 as at 33 and 34. The V-shaped member 32 is mounted upon the pivot lug or rivet 16 which carries the swinging link 16, such V-shaped member being also pinned, or otherwise securely fastened to the swinging link 16, as at 35. With this arrangement when the bed is in its closed position as shown in Fig. 3, each of the springs are under tension, the spring 30 being under greater tension than the spring 31. During the opening movement of the bed the tension of these springs, at the beginning of this movement tend to assist the operator in swinging the levers 15 and 16, the pressure exerted by the springs, at the beginning of such movement tending in that direction. At a certain position during the movement of the extension bed section to the position shown in Fig. 2, the tension is removed from the spring 30 and, by the time such extension bed section reaches the position of Fig. 2, the tension is removed from the spring 31 and again applied to the spring 30. The spring 30 being under tension in this latter position, upon further movement of the extension bed section, the spring 30 is placed under greater tension and serves thereby to cushion the further opening movement of the extension bed section. Towards the completion of this opening movement the spring 31 is again placed under tension which further assists in the aforementioned cushioning of the opening movement. Upon closing the bed the reverse of the foregoing operation takes place. At the beginning of the closing operation the springs function to assist the operator in swinging the extension bed towards its closed position and at the completion of such movement they function to cushion the closing movement in a manner similar to the cushioning of the opening movement.

Each bed section carries its own spring mattress structure, and, as already stated, they lie in the same plane in open position of the bed. Unless otherwise provided for, such construction would involve a break in the continuity of the complete and open spring mattress structure at the adjacent inside portions of the border wires 8 and 8. This condition would permit an up and down or sagging movement of one border wire and its adjacent bed springs relative to the other during movement of the occupant of the bed from one position to another on the bed, which may cause such occupant considerable discomfort. It is desirable to eliminate this condition and have the spring mattress structures of the bed sections in their open position form a continuous spring surface. I provide for this by the use of a plurality of automatically operating hook members 36. Each of these hook members comprise a piece of spring wire bent to a V-shape, the closed end of the V being formed to a hook-like shape as shown in Figs. 6 and 7. The hook portion 37 of each of these hook devices is provided with a looped extension or lip 37 bent at an obtuse angle relative to the depending portion 37 of such hook. The bend of the lip or guide 37 is made at a point spaced inward of the point where the border wire 8 of the spring mattress structure of the main bed section engages the hook 37. The legs 36 of each of the hook members straddle the border wire 8 of the spring mattress structure of the extension bed section and pass over and are interlocked with and secured to adjacent bed springs 7 of the extension bed section as at 36 in the manner shown in Figs. 5 and 6, the extreme ends of the V-legs being bent around or over one of the coils of such bed springs in any desired manner. With this construction, as the extension bed section is moved to open the bed, the guide or lip 37 of each hook 37 first contacts with the border wire 8 of the spring mattress structure of the main bed section and, upon the continued movement of the extension bed section this guide 37 guides such border wire along its under-surface and snaps the same into the hook portion 37 to the position shown in Fig. 7. The spring mattress structures are thus locked together so that they form one continuous spring mattress surface with the same effect as if the adjacent bed springs 7 and 7 of the respective spring mattress structure were joined.
to form the usual full sized spring mattress structure, while, at the same time, permitting separation of these mattress structures in closing the bed. There will be no sagging of one mattress structure away from the other. Thus, all the comforts of a full sized bed are provided.

As the extension bed section is moved towards its closing movement and is moved upwardly, with a corresponding upward movement of the spring mattress structure of the main bed section, the hooks 36 are moved out of engagement with the border wire of the spring mattress structure of the main bed section, effecting disengagement of these respective spring mattress structures. Thus, it is seen that effective means are provided for automatically locking and unlocking the spring mattress structures to cause them to assume a continuous spring mattress structure in the open position of the bed, and to break such continuity in closing the bed.

It will be understood that the invention is susceptible of various changes and modifications without departing from the scope and spirit of my invention as defined in the following claims.

I claim:

1. In a bed, the combination of a main bed section, an extension bed section, swinging links at each end of the bed to permit movement of said extension bed section in an upright condition to open and closed positions, a spring mattress structure for said extension bed section and a vertically movable spring mattress structure for said main bed section, and means for raising and lowering the spring mattress structure of the main bed section during the opening and closing movements of the bed comprising a pair of toggles at each end of the bed, each toggle having a link pivoted to the vertically movable spring mattress structure and another link pivoted to the stationary frame of the main bed section, a link connecting each pair of toggles for effecting simultaneous movement of the same together, another link at each end of the bed connected to one of said toggles at each end and to one of said first mentioned links by a lost motion connection for effecting movement of the spring mattress structure of the main bed section upon the movement of the extension bed section to its open position, and after it has been partially moved toward such open position, and means carried by the other toggle, and in slidable engagement with the spring mattress structure of the main bed section, for assisting in raising and supporting said spring mattress structure in its upper and open position.

2. In a bed, the combination of a main bed section, an extension bed section, a pair of swinging links at each end of the bed and pivoted to both of said bed sections for permitting movement of the extension bed section in an upright condition to open and closed positions, a spring mattress structure for each of said bed sections, the spring mattress structure for the main bed section being carried by an upwardly and downwardly movable support, and means for effecting such latter movements comprising a toggle at each end of the bed pivotally connected to said movable support and to a stationary portion of said main bed section, another toggle at each end of the bed having one arm pivotally connected to the stationary portion of said main bed section and extended to slidably engage the said movable support, such second named toggle having another arm pivotally carried by said support, a connecting link between said toggles at each end for effecting simultaneous movement thereof, another link engaging one of said toggles and having a slot therein, said last named link also engaging one of said first named swinging links in such a manner that a portion of said first named swinging link rides in said slot for effecting extension of said toggles and raising of said supports after the said extension bed section has been partially moved to its open position.

In testimony whereof, I have subscribed my name.

GENE HERZ.