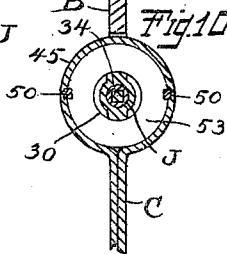
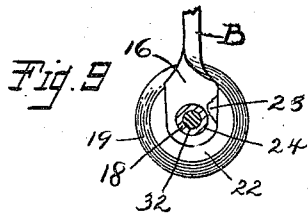
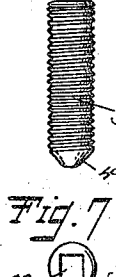
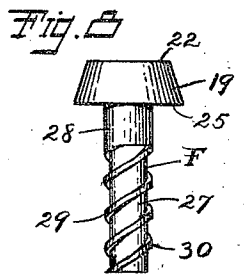
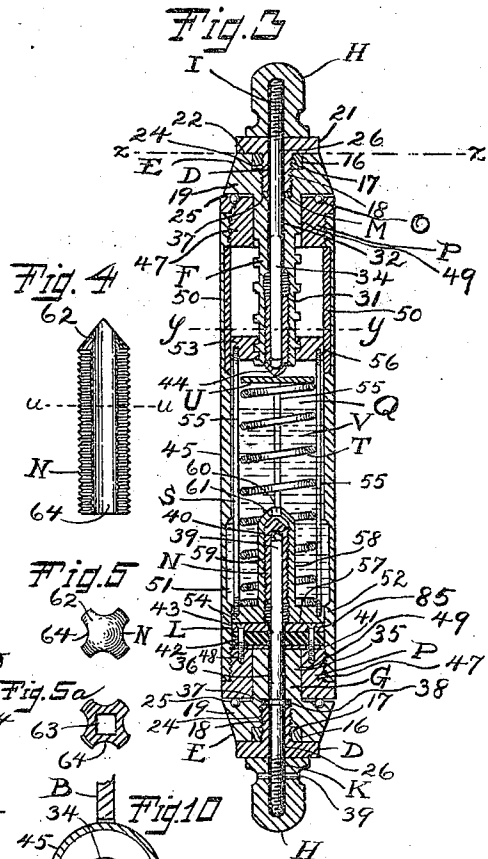
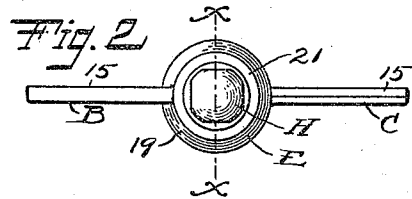
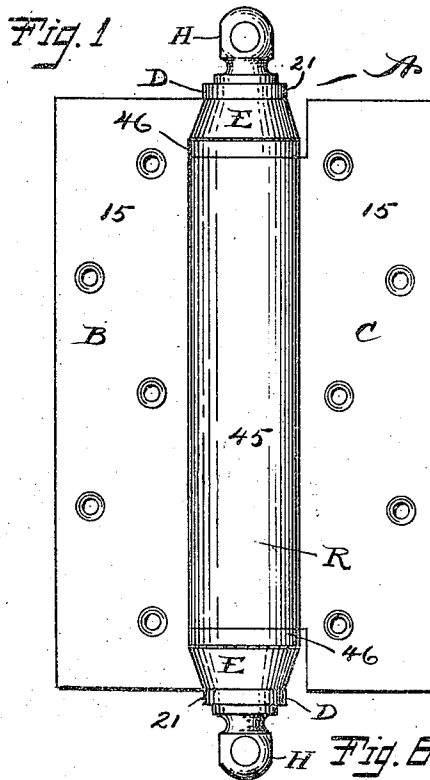


J. M. ZUK.  
 SPRING CHECK HINGE.  
 APPLICATION FILED MAY 1, 1912.

1,041,223.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.



Witnesses:

S. H. Clarke  
 Roger Schwab.

Inventor  
 Joseph M. Zuk.  
 By Louis W. Schmitt  
 Att'y.

J. M. ZUK.  
 SPRING CHECK HINGE.  
 APPLICATION FILED MAY 1, 1912.

1,041,223.

Patented Oct. 15, 1912.

2 SHEETS-SHEET 2.

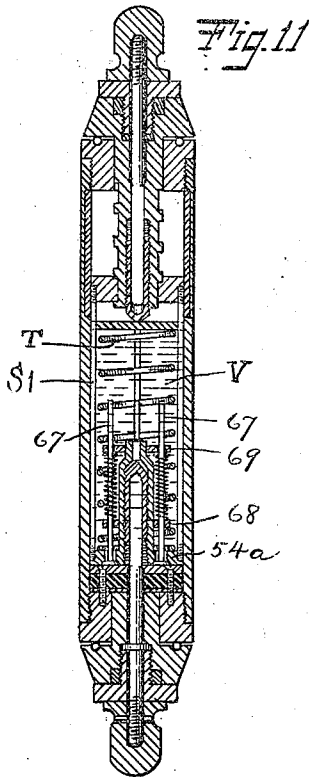


Fig. 12

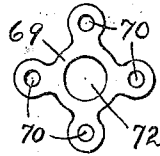


Fig. 13

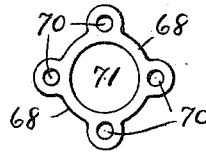


Fig. 14

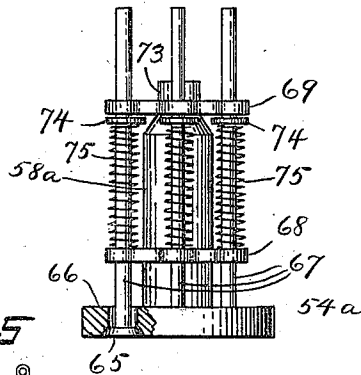


Fig. 15

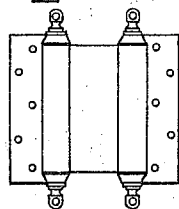
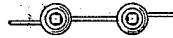


Fig. 16



Witnesses:

S. H. Clarke

Roger Edwards

Inventor

Joseph M. Zuk

By Louis M. Schmitt  
 Atty.

# UNITED STATES PATENT OFFICE.

JOSEPH M. ZUK, OF NEW BRITAIN, CONNECTICUT.

## SPRING CHECK-HINGE.

1,041,223.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed May 1, 1912. Serial No. 694,328.

*To all whom it may concern:*

Be it known that I, JOSEPH M. ZUK, a citizen of Russia, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful improvements in Spring Check-Hinges, of which the following is a specification.

My invention relates to improvements in spring check hinges, and the object of my improvement is simplicity and economy in construction and convenience and efficiency in use.

In the accompanying drawing:—Figure 1 is a side elevation of my improved spring check hinge. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view on the line *x x* of Fig. 2. Fig. 4 is a side elevation on an enlarged scale of the check regulating piece. Fig. 5 is a plan view of the same. Fig. 5<sup>a</sup> is a sectional view on the line *u u* of Fig. 4. Fig. 6 is a side elevation of the spring adjusting sleeve. Fig. 7 is a plan view of the same. Fig. 8 is a side elevation of the slide screw. Fig. 9 is a sectional view on the line *z z* of Fig. 3. Fig. 10 is a sectional view on the line *y y* of Fig. 3. Fig. 11 is a sectional view similar to Fig. 3 and on the same scale of a modification of my hinge. Fig. 12 is a plan view on an enlarged scale of the upper valve stem guide member. Fig. 13 is a similar view of the lower valve stem guide member. Fig. 14 is a side elevation, partly in section, of the plunger member. Figs. 15 and 16 are side elevation and plan view of a double hinge embodying my invention.

My spring check hinge A comprises a left leaf member B and a right leaf member C connected by a pivotal connection, provided with spring means for being closed relatively one to the other and means of adjustment thereof and also with checking means and means of adjustment thereof. The leaf members B and C comprise each a leaf proper 15 of sheet metal of the usual plate-like form and provided with screw holes to receive the supporting screws. The left leaf member B comprises the leaf proper 15 and overhanging the lateral edge of the same at the upper and lower ends on one side are provided end knuckle portions 16 in the form of a flat plate turned at right angles to the axis and the said end knuckle portions 16 have each an axial hole 17 suitable to receive and a fit for the body portion 18 of a holding nut D.

The end knuckles E are composite structures comprising each the end knuckle portion 16, a knuckle body comprising a block 19 having a cylindrical or conical outer periphery and the holding nut D. In the case of the upper end knuckle E the knuckle body or block 19 constitutes the head of the slide screw member F. In the case of the lower knuckle E the block 19 constitutes the head of the bottom filler member G. The body 19 of the upper end knuckle E comprises as shown a truncated conical exterior lateral wall, has the upper surface 22 plane suitable for a bearing surface for the lower surface of the head 21 of the holding nut D, is provided on the upper end with a channel 23 that is a fit for the end knuckle portion 16, is provided with an axial hole 24 that is screw-threaded suitably to receive the screw-threaded exterior of the body portion 18 of the holding nut D, and the inner side 25 is provided with a bearing surface for a ball bearing. Inward from the inner side 25 there is an axial sleeve like extension having special features for the upper and lower ends. A cylindrical extension of the hole or bore 24 forms a chamber 37 used for different purposes at the top and bottom ends. The top chamber 37 is used for housing a packing washer M.

The holding nut D comprises the body portion 18 that is cylindrical in formation, a fit for the hole 17 of the end knuckle portion 16, is screw threaded on the exterior as described and has the head 21 at the outer end suitable for engaging on its inner end with the bearing surface 22 on the end knuckle body portion 19, has the outer end suitable for a seat for the cap knob H, and is pierced axially by a bore 26 that is a fit for an axial pin to be described. The inner end of the body portion 18 of the holding nut D is suitable for forming the outer wall of the chamber 37 described. The inner wall of the chamber 37 is formed by the body of the member of which the said body portion 19 is a part, and as shown is adjacent the junction of the body portion 19 and the cylindrical extension referred to, the upper of the said members being the slide screw member F and the lower being the filler block or filler member G. The inner surface 25 of the upper body portion 19 is plane and flat, providing a plane raceway for the balls O of the upper ball bearing and the inner surface 25 of the lower body

portion is provided with a grooved raceway, otherwise the upper and lower body portions 19 are substantially similar.

The slide screw member F comprises the head 19 and the axial extension 27 of the upper end knuckle body or head 19 and the said extension comprises a cylindrical portion 28 adjacent the head 19 and below said cylindrical portion a threaded portion 29 provided with an especially steep thread 30, and is axially pierced by a bore of different diameters comprising at the upper portion a relatively enlarged portion constituting the hole 24, a second enlarged and threaded portion 31 at the lower end, and which is somewhat elongated, and intermediate the said ends and at the middle body portion a relatively reduced portion 32 that is a fit for the upper pin I, and adjacent the upper end comprises the chamber 37 already described.

The spring adjusting sleeve J comprises an elongated cylindrical member, screw threaded on the exterior, provided with an axial hole 33 of polygonal cross section, shown as square, the exterior being a fit for the threaded lower portion 31 of the bore of the slide screw member F, and which axial hole 33 is a fit for the square lower end 34 of the upper axial pin I. The lower end 44 of the spring adjusting sleeve J may be closed, as shown.

The axial pin I receives the knob H at the upper end and extends downward from the said upper end and in succession passes through the holding nut D, packing washer M, the intermediate reduced portion 32 of the bore in the slide screw member F and has the lower end engaged with the axial hole in the adjusting sleeve J.

The bottom filler member G comprises the lower body portion 19 having the upper surface 25 provided with a raceway as mentioned for a ball bearing and an axial extension 35 extending upward therefrom having a cylindrical lateral wall and plane upper end wall, and is provided with an axial bore comprising at the lower end the relatively enlarged and screw threaded portion constituting the hole 24, and the lower chamber 37 adjacent thereto and a reduced portion 36 at the upper end that is a fit for the body portion of the lower pin K. The lower pin K receives the lower knob H at its lower end, and to which it is secured by the radial pin 39, and extends upward therefrom and passes in succession through the axial bore 26 of the holding nut D, the chamber 37 and the bore 36 in the filler member G, and the upper end as it extends upwardly from the extension 35 passes in succession through a packing group L comprising a bottom end washer 41 of sheet metal, an intermediate packing washer 42 of suitable flexible packing material, and a top

backing washer 43, and the extreme upper end 39 is square in cross-section, suitably to engage with the axial hole 40 in the check regulating piece N, which also has a square cross section, and the pin K is itself supported against falling downward and out and is held in normal position as described by means of a laterally extending annular flange 38 which is housed in the chamber 37. The packing group L is secured by means of screws 85 to the lower cup member P.

As described, the left leaf member B is secured to the end knuckle body portions 19 by means of the holding nuts D, the end knuckle portions 16 being engaged in the channels 23, and held therein by reason of the engagement of the body portions 18 of the holding nuts D with the holes 17 in the said end knuckle portions 16. The head 21 of the holding nut D coöperates to hold the end knuckle portion 16 in the channel 23 and overhangs the said end knuckle portion 16 laterally and engages with the bearing surface 22 on the outer end of the end knuckle body portion 19.

The right leaf member C comprises the leaf proper 15 and overhanging the lateral edge of the same on one side is an intermediate knuckle portion 45 in the form of a flat plate that is rolled over to form a cylindrical shell-like structure having a generally cylindrical interior chamber Q and axially positioned between the end knuckles E.

The intermediate knuckle proper R is a composite structure, comprising for the greater portion of the length the intermediate knuckle portion 45 and at the ends thereof the heads 46 of the cup members P. The outer end surface of the upper cup member P is provided with a race way and the lower cup member P is finished off plane suitably to coöperate respectively with the adjacent plane surface 25 of the upper end knuckle body portion 19 and the race way provided in the surface 25 of the lower end knuckle body portion 19 to operatively house the balls O, and the heads 46 comprise lateral annular extensions at the outer end of the cylindrical body portion 47 suitable on the inner face to engage with the end of the intermediate knuckle portion 45. The cup members P comprise the cylindrical body portion 47 and head 46 referred to, the said cylindrical body portion 47 being threaded on the exterior and a fit for the correspondingly threaded outer end of the intermediate knuckle portion 45, and is pierced by an axial cylindrical bore 49. The lower cup member P is of such length that the upper end thereof is substantially flush with the upper end of the axial extension 35 of the filler member G and is provided with screw holes 48 for receiving the screws 85 that hold the packing group L, and the axial bore 49 is a fit for the said extension

35. The bore 49 of the upper cup member P is a fit for the cylindrical portion 28 of the extension 27 of the slide screw member F.

3 The lateral wall of the chamber Q is generally cylindrical and has operatively housed therein a traveling member or carriage S, spring T, contact disk U, and a quantity of liquid V suitable for checking the closing of the hinge A under normal conditions of operation, is provided at the side wall and at the upper end with a pair of laterally disposed and longitudinally extending keys 50 and adjacent the lower end with a laterally and outwardly recessed or enlarged portion 51. The said recessed portion 51 is separated from the threaded lower end of the lateral wall of the chamber Q by the cylindrical section 52 of the same diameter as that of the interior wall generally of the chamber Q.

10 The carriage S comprises at the upper end the slide nut 53, at the lower end the plunger 54, these two being connected by a skeleton construction comprising a plurality of longitudinally extending connecting rods 55. The slide nut 53 comprises an annular nut having the axial hole provided with a thread that fits the thread 30 of the sliding screw member F, the outer periphery of which is a fit for the wall of the chamber Q and has on the outer periphery a pair of keyways 56 suitable for engaging with the keys 50 and operative to permit axial movement of the carriage S and to prevent rotational movement thereof.

15 The contact disk U bridges the interior of the chamber Q and is positioned between the lower end of the spring adjusting sleeve J and the upper end of the spring T. The lower end of the spring T bears on an annular seat on the upper side of the disk-like plunger proper 57 forming the lower end of the plunger member 54. The plunger member 54 comprises the said disk-like plunger proper 57 at the lower end, and which fits the general interior wall of the chamber Q and an elongated sleeve like axial extension 58 extending axially upwardly therefrom, and is pierced by an axial bore that comprises a main bore 59 of appreciable diameter and internally threaded extending the greater part of the length of the said extension from the bottom end upward and is reduced at the upper end to a small, somewhat restricted outlet 60, and the connecting wall 61 between the same and the main bore 59 is conical suitably to form a middle valve seat.

20 In the normal position, when the carriage S is at its lowermost position the plunger member 54 rests on the backing washer 43 and the upper surface of the plunger proper 54 is approximately at the lower end of the recessed portion 51 of the chamber Q, filling

the upper part of the lower cylindrical section 52 of the chamber Q that is not filled by the packing group L and which part constitutes the cylinder proper. The check regulating piece N comprises an elongated member threaded on the exterior to fit the threaded portion 59 of the plunger member 54 and somewhat shorter than the same, is closed at the upper end, has the outer wall 62 at the said upper end suitably shaped to operate as a needle valve in cooperation with the seat 61 and is provided below the said upper wall with an axial hole 63 shown in Fig. 5<sup>a</sup> that is square in cross section suitably to fit the square upper end 39 of the lower pin K and to be slidable axially thereon and the outer periphery is provided with a plurality of longitudinal flutes 64. The longitudinal flutes 64 permit free passage of the checking liquid along the length of the check regulating piece N and in operation serve to permit such free passage from below the plunger 54 to the upper end thereof, and to the restricted space or passage provided between the needle valve 62 and the needle valve seat 61.

As described, turning the lower pin K operates to raise or lower the check regulating piece N and thereby check the flow of liquid V through the needle valve described, particularly so when the leaf members B and C are brought to normal position by the spring T pushing the carriage S downward.

25 In use, the leaf members B and C are normally held in the extended position by the spring T and when moved from such normal position the slide nut 53 is turned relatively to the slide screw member F, resulting in raising the slide nut 53 and the carriage S including the plunger proper 54, and carrying with it without effective resistance the body of the liquid V and in opposition to the spring T, and the thickness of the plunger proper 54 is such that a movement corresponding to the normal amount of opening a door will bring the bottom end thereof above the bottom edge of the recessed portion 51 and will permit liquid V to pass around the plunger proper 54 and enter the space underneath the same. Accordingly, upon the release of the turning movement the spring T operates to bring the carriage S downward to its normal position and the first part of the returning movement is quite unrestricted until the piston proper 54 enters the cylinder proper 52, when the return movement is checked by the liquid V, which in the final stages in order to return to the general liquid space Q above the piston proper must pass by way of the flutes 64 and the needle valve 61, 62. Turning the lower pin K operates to regulate the check mechanism described. Turning the upper pin I operates

to move the spring adjusting sleeve J axially and thereby adjust the amount of compression of the spring T.

In the modification shown in Figs. 11, 12, 13 and 14 valve operating mechanism is provided for permitting free initial movement comprising a plurality of valves 65 engaged with valve seats 66 in the plunger proper 54<sup>a</sup> having elongated valve stems 67 extending upwardly and appreciably above the upper end of the cylindrical extension 58<sup>a</sup> of the plunger member 54<sup>a</sup> and guided axially by holes 70 in a pair of spiders 68 and 69 secured to the exterior of the extension 58<sup>a</sup>. The lower spider 68 is secured to the lower body portion of the said extension 58<sup>a</sup> by means of a central hole 71 that fits over the same and the upper spider 69 has a central hole 72 that fits over a neck 73 extending upward from the upper end of the said extension 58<sup>a</sup> and is secured to the said neck. Collars 74 are fixed on the stems 67 and coil springs 75 are loosely mounted thereon and the upper ends bear against said collars and the lower ends against the lower spider 68 and operate to hold the valves 66 normally in the closed position, and the collars 74 separated an appreciable distance from the upper spider 69.

Lifting the carriage S<sup>1</sup> operates initially to lift the liquid V and the pressure of the liquid operates to open the valves 65, whereby the movement of the carriage S<sup>1</sup> in the initial opening direction is essentially unrestricted. In the return movement effected by the spring T the first part thereof is also unrestricted until the position is reached in which the valve 65 is closed, when further return movement is restricted in the manner described for the style of hinge shown in Fig. 1.

My spring check hinge as described comprises spring means for returning the parts to the normal positions, means for checking the return movement, and separate means for adjusting the returning and checking means.

The hinge shown in Figs. 15 and 16 is of the double acting type and involves two sets of intermeshing knuckles and both of these knuckles are provided with spring operating and checking mechanism in accordance with my invention.

I claim as my invention:—

1. A combined hinge and check comprising a pair of leaf members, having intermeshing knuckles, a slide screw fixedly secured to one of the end knuckles by the outer end, having the inner end positioned in the intermediate knuckle, and having a body portion provided with a thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at one end and a plunger at the other end, and rods connecting the said ends, a spring

housed between the said inner end of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread, and means preventing rotative movement of the said slide nut and permitting axial movement thereof.

2. A combined hinge and check comprising a pair of hinge members having intermeshing knuckles comprising a pair of end knuckles and an intermediate knuckle, a slide screw fixedly secured to one of the end knuckles by the outer end, having the inner end positioned in the intermediate knuckle, and having a body portion provided with a thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at one end and a plunger at the other end, and rods connecting the said ends, a spring housed between the said inner end of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread, and means preventing rotative movement of the said slide nut and permitting axial movement thereof, and a needle valve provided in the said plunger and operative to restrict the flow of fluid from one side of the said plunger to the other.

3. A combined hinge and check comprising a pair of leaf members, having intermeshing knuckles, a slide screw fixedly secured to one of the end knuckles by the outer end, having the inner end positioned in the intermediate knuckle, and having a body portion provided with a thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at one end and a plunger at the other end, and rods connecting the said ends, a spring housed between the said inner end of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread, and means preventing rotative movement of the said slide nut and permitting axial movement thereof, and means for adjusting the tension of the said spring.

4. A combined hinge and check comprising a pair of hinge members having intermeshing knuckles comprising a pair of end knuckles and an intermediate knuckle, a slide screw fixedly secured to one of the end knuckles by the outer end, having the inner end positioned in the intermediate knuckle, and having a body portion provided with a thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at one end and a plunger at the other end, and rods connecting the said ends, a spring housed between the said inner end of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread, and means preventing rotative movement

of the said slide nut and permitting axial movement thereof, and a needle valve operative as a restricted passage provided in the said plunger, and means for adjusting the  
5 said needle valve.

5. A combined hinge and check comprising a pair of leaf members having intermeshing knuckles, a slide screw fixedly secured to one of the end knuckles by the outer  
10 end, having the inner end positioned in the intermediate knuckle, and having a body portion provided with a thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at  
15 one end and a plunger at the other end, and rods connecting the said ends, a spring housed between the said inner end of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread,  
20 and means preventing rotative movement of the said slide nut and permitting axial movement thereof, and means for adjusting the tension of the said spring comprising a  
25 pin positioned axially in the said slide screw and having one end accessible above the said end knuckle.

6. A combined hinge and check comprising a pair of hinge members having intermeshing knuckles comprising a pair of end  
30 knuckles and an intermediate knuckle, a slide screw fixedly secured to one of the end knuckles by the outer end, having the inner end positioned in the intermediate knuckle,

and having a body portion provided with a  
35 thread of steep pitch, a carriage housed in the said intermediate knuckle comprising a slide nut at one end and a plunger at the other end, and rods connecting the said ends, a spring housed between the said inner end  
40 of the slide screw and the said plunger, the said slide nut provided with an axial thread fitting and engaged with the said first thread, and means preventing rotative movement of the said slide nut and permitting  
45 axial movement thereof, and a needle valve operative as a restricted passage provided in the said plunger, and means for adjusting the said needle valve comprising a pin positioned axially relatively to the said plunger  
50 and having one end accessible exterior to the other of the end knuckles.

7. A combined hinge and check comprising a pair of end knuckles and an intermediate knuckle, means for pivotally connect-  
55 ing the said knuckles, spring means for moving the said end knuckles relatively to the said intermediate knuckle, check means operative to check the said spring means, an axial pin passing through one of the said  
60 end knuckles and operative to adjust the said spring means, and a second axial pin passing through the other end knuckle and operative to adjust the said check means.

JOSEPH M. ZUK.

Witnesses:

SHEFFIELD H. CLARKE,  
ROGER EDWARDS.