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(54) **SECTIONAL SNOW PLOW WITH TRIP EDGE**

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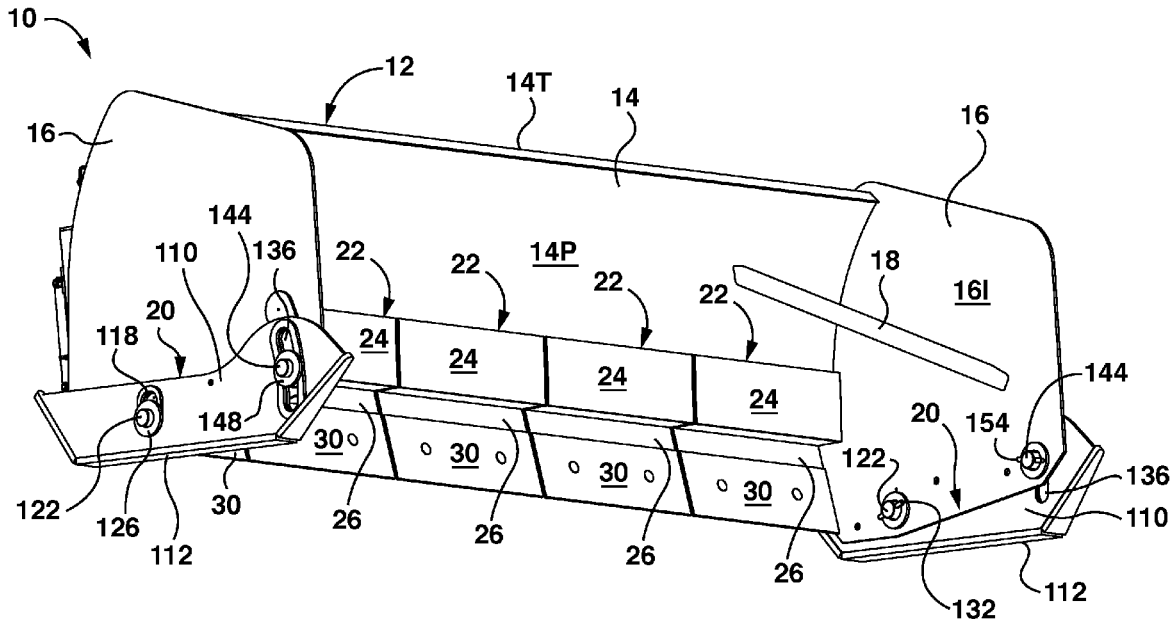
(52) **U.S. Cl.**
CPC ***E01H 5/062*** (2013.01); ***E01H 5/065*** (2013.01)

(57) **ABSTRACT**

A sectional snow plow has a plurality of surface-engaging sections movably carried by the moldboard and depending from the moldboard in side-by-side relationship with one another. Each of the surface-engaging sections is linearly movable relative to the moldboard between an extended position and a retracted position, independently of each other surface-engaging section, to adjust to a surface being plowed. Each surface-engaging section comprises a main body portion and a surface-engaging trip blade portion pivotally carried by the main body portion so as to be pivotable between a surface-scraping position and a deflected position. At least one biasing member simultaneously urges each surface-engaging section toward the extended position and urges the trip blade portion toward the surface-scraping position. For each surface engaging section, each biasing member simultaneously both urges that surface-engaging section toward the extended position while also urging the trip blade portion toward the surface-scraping position.



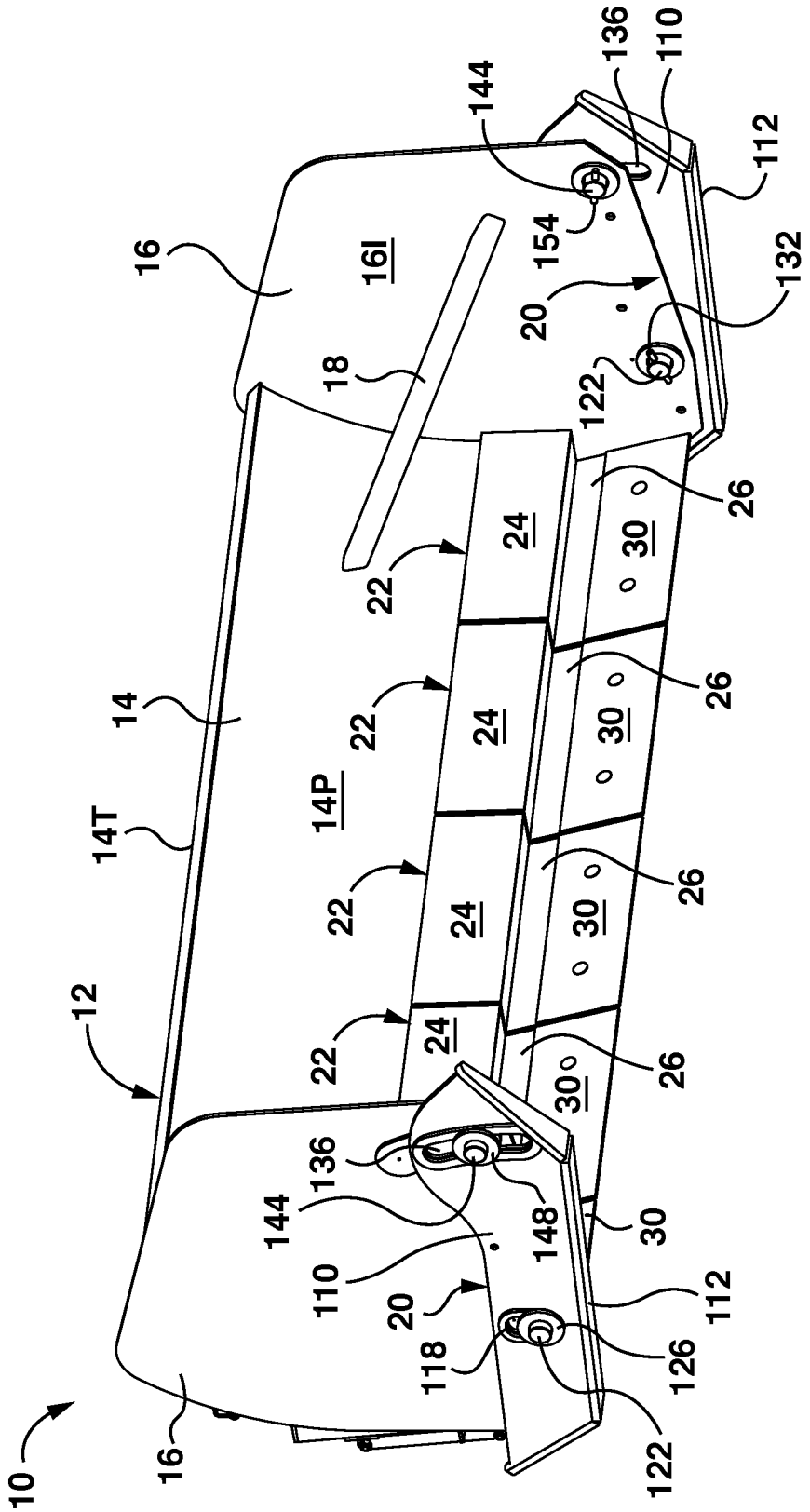

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FIG. 1

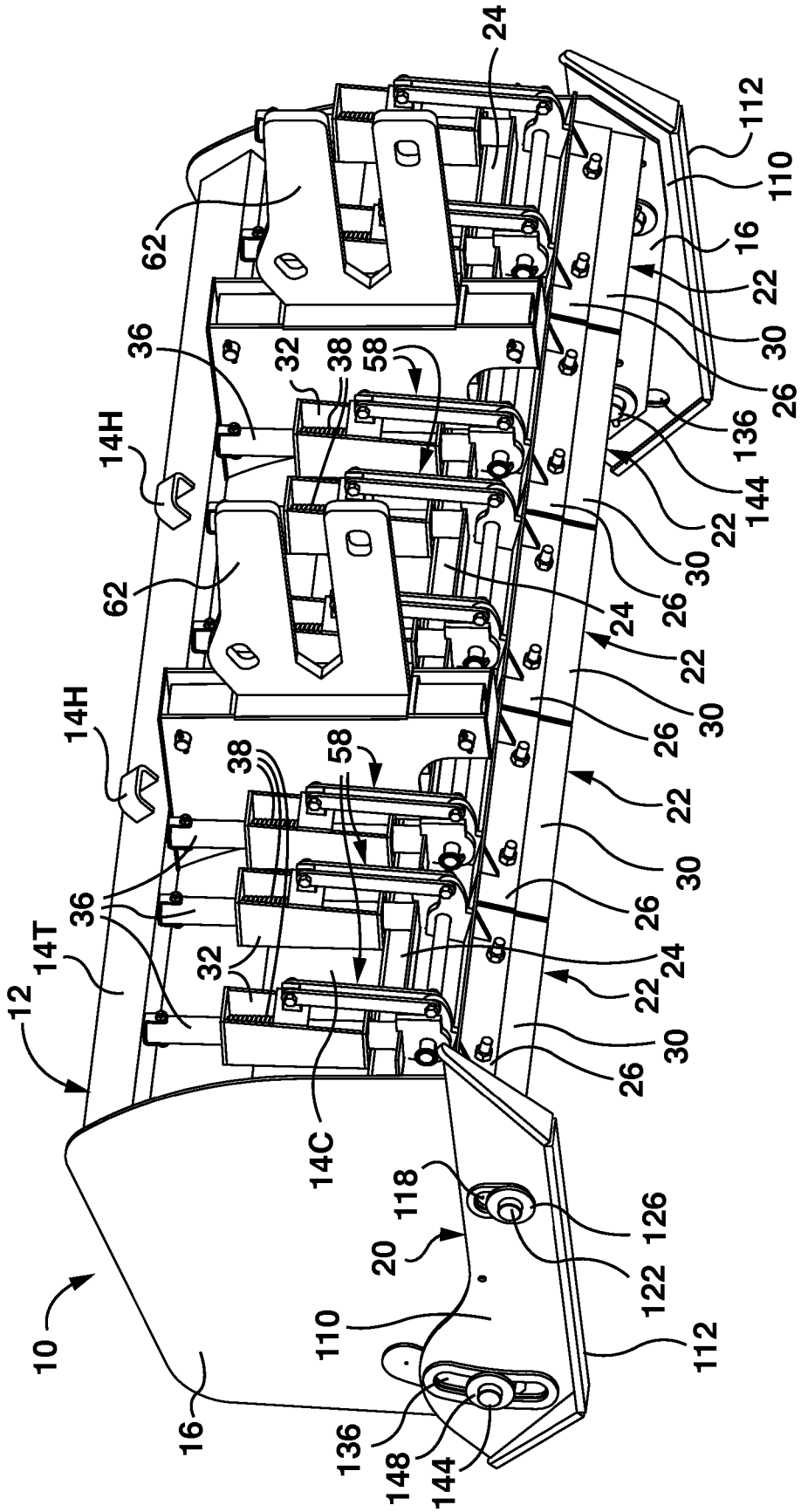
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FIG. 2

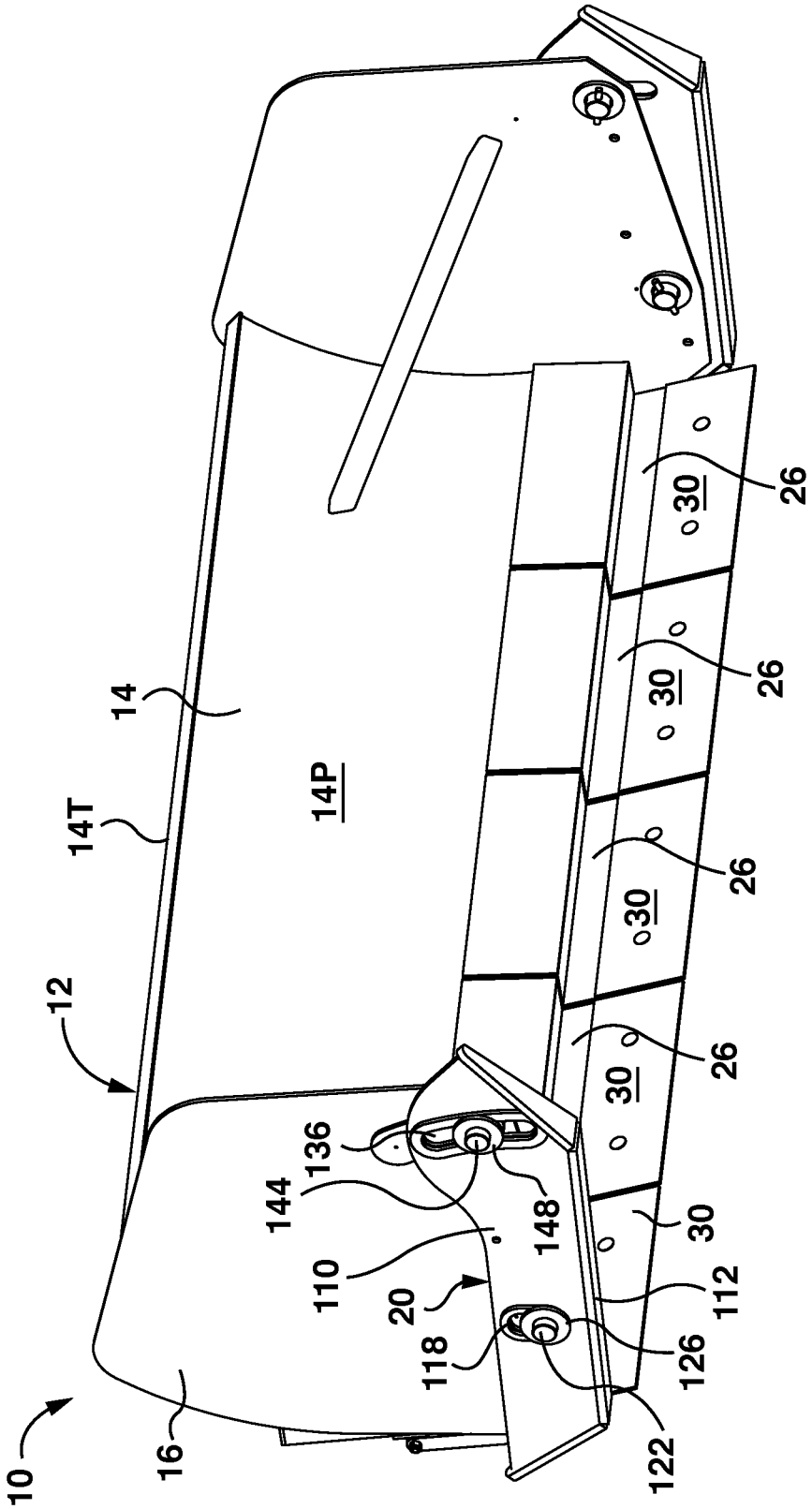

FIG. 3

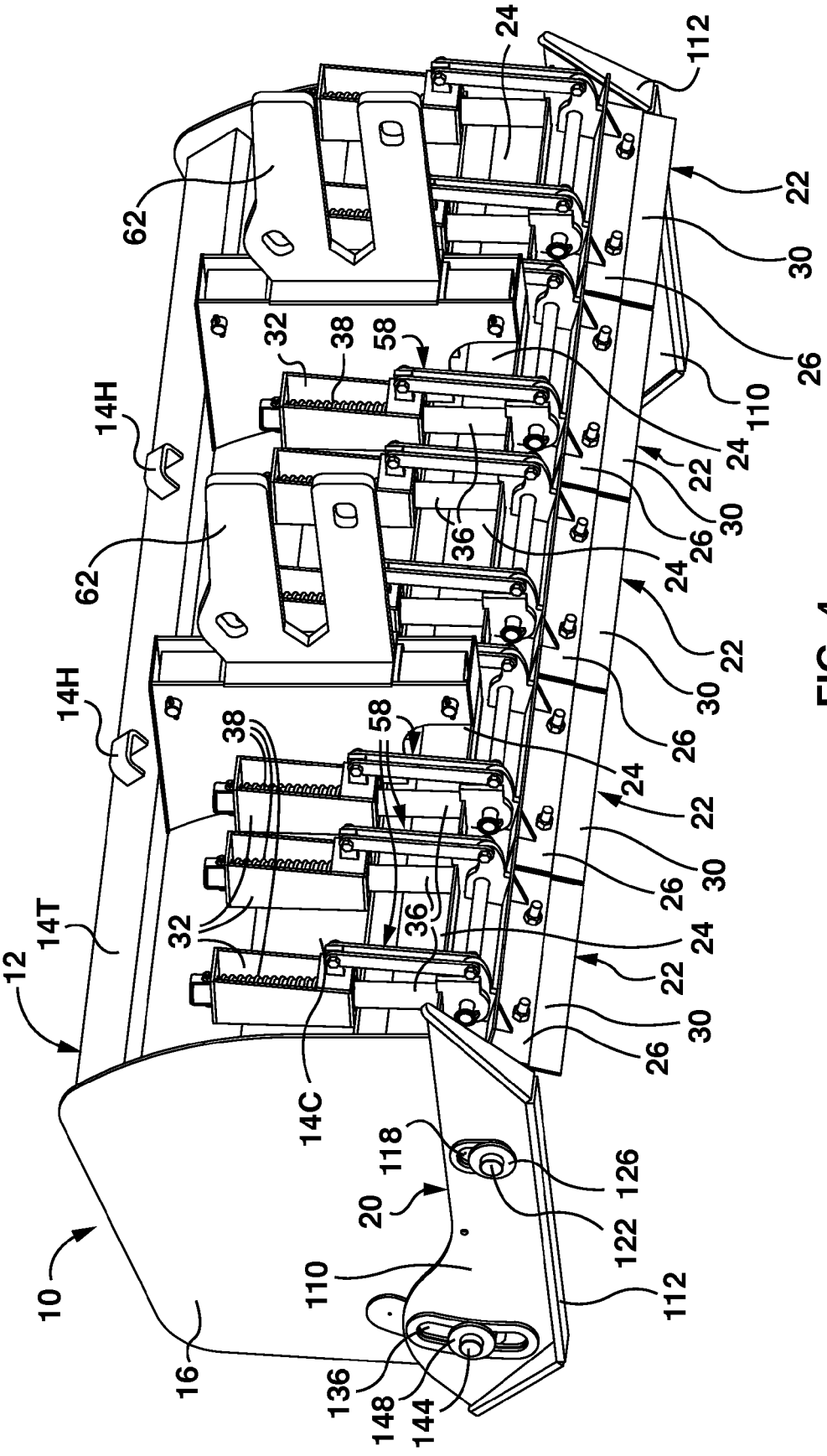
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FIG. 4

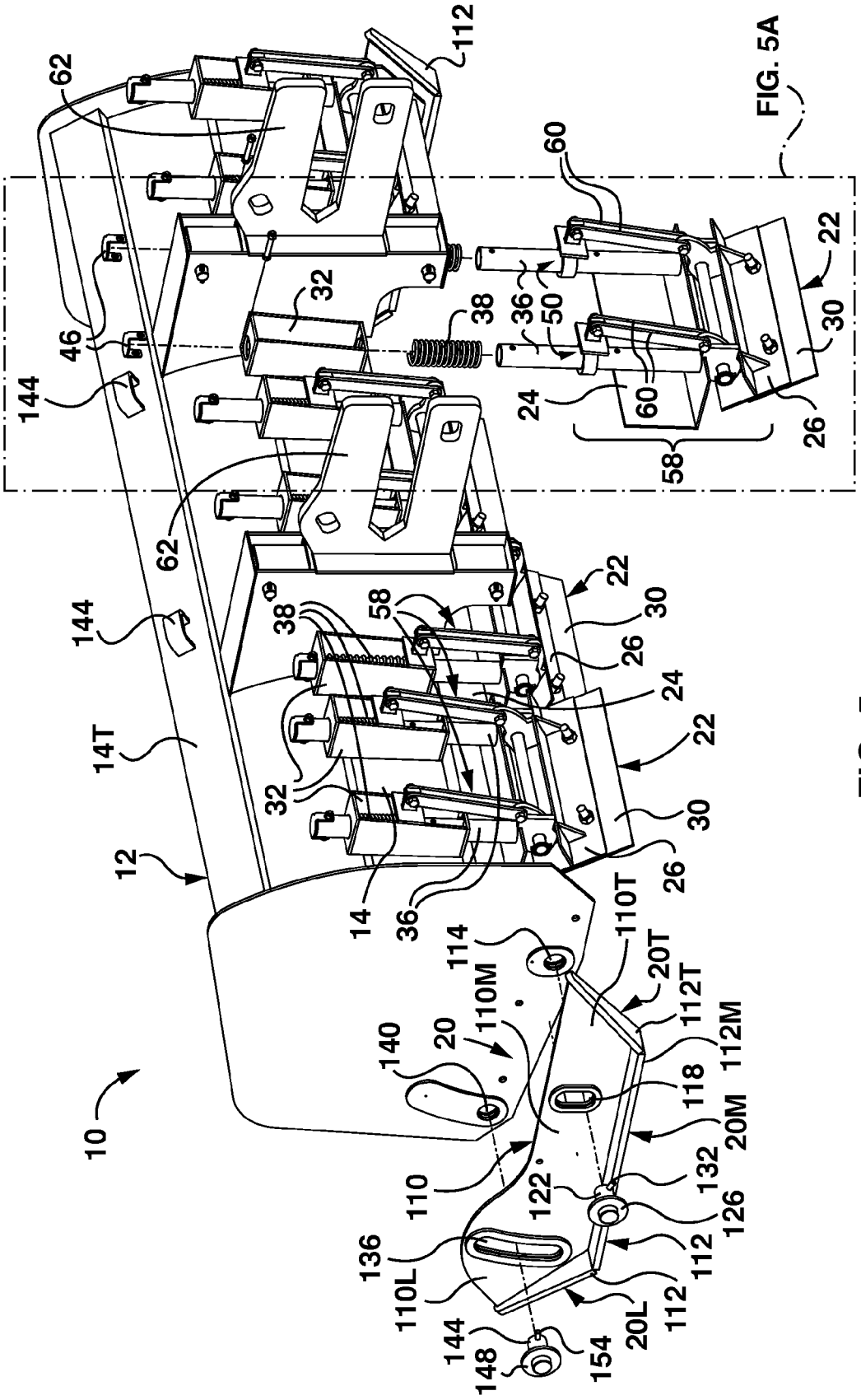
FIG. 5A
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FIG. 5

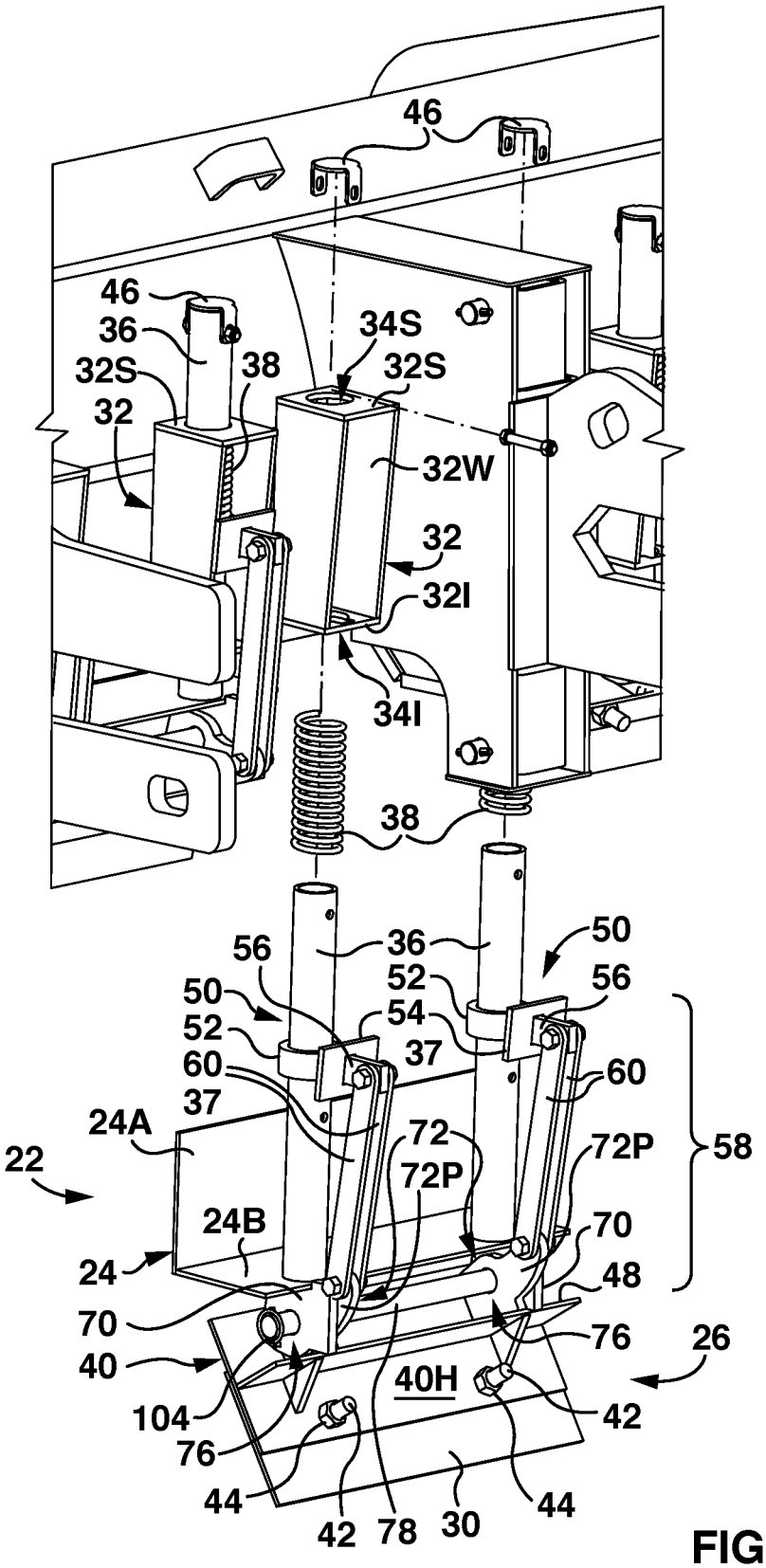
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FIG. 5A

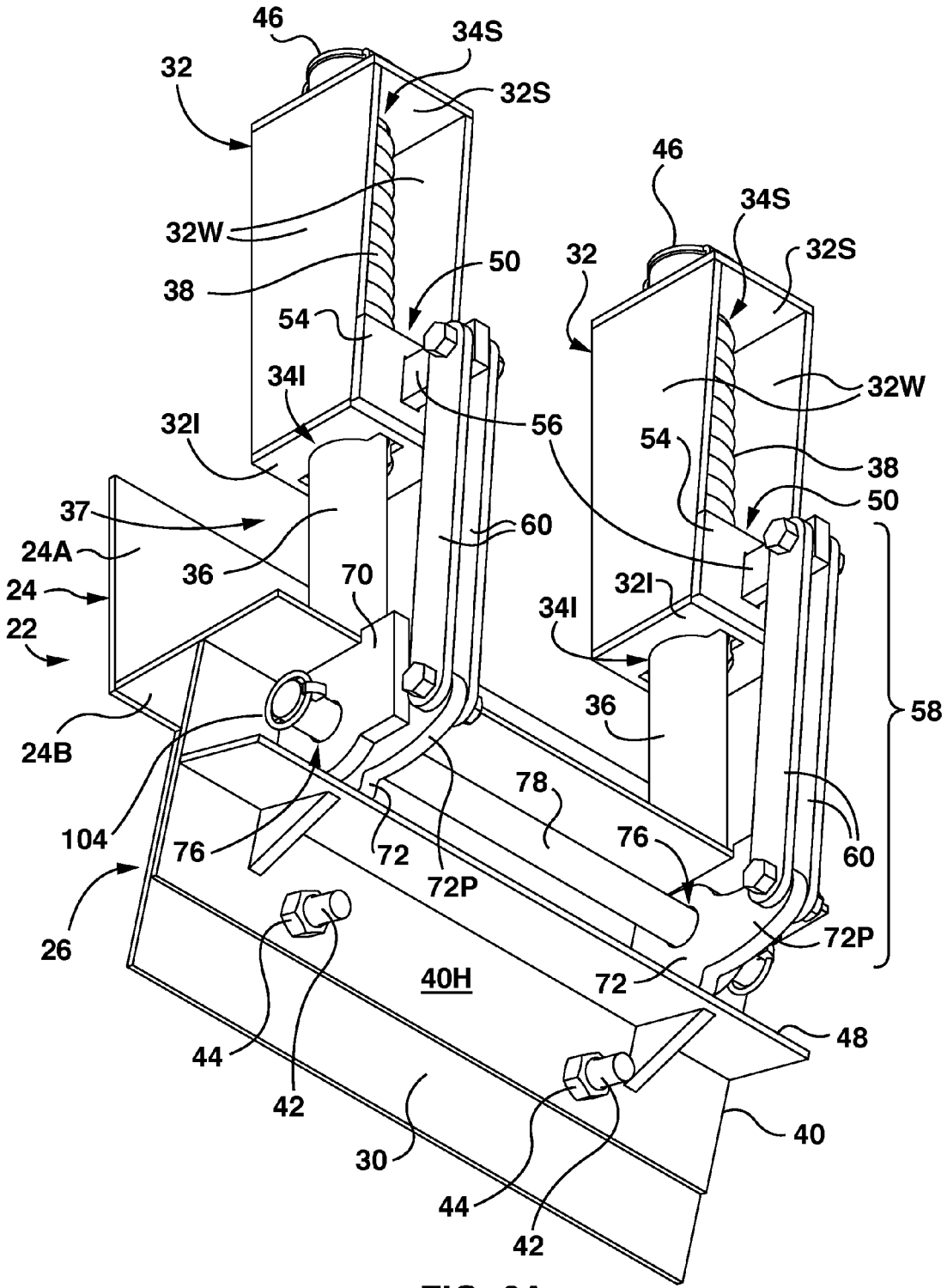
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FIG. 6A

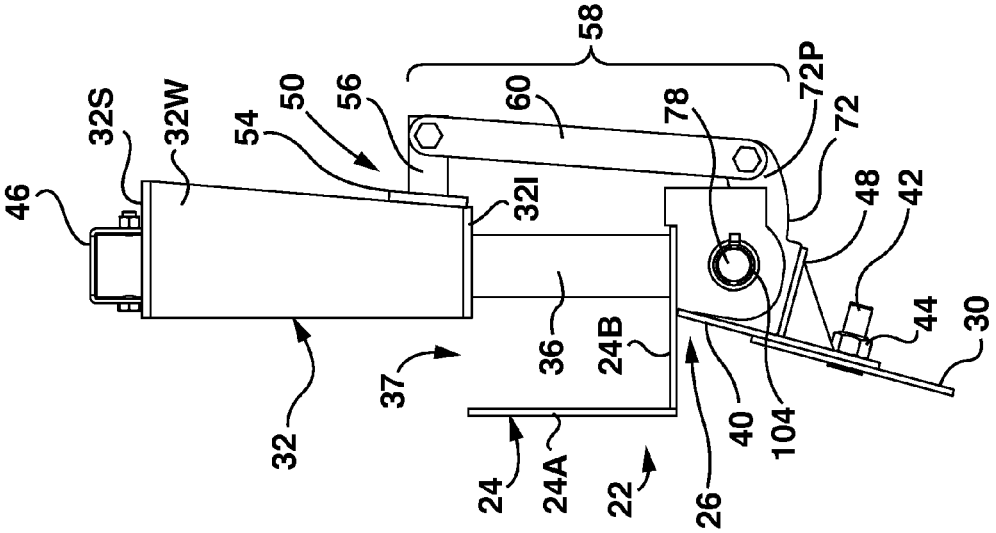
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FIG. 6C

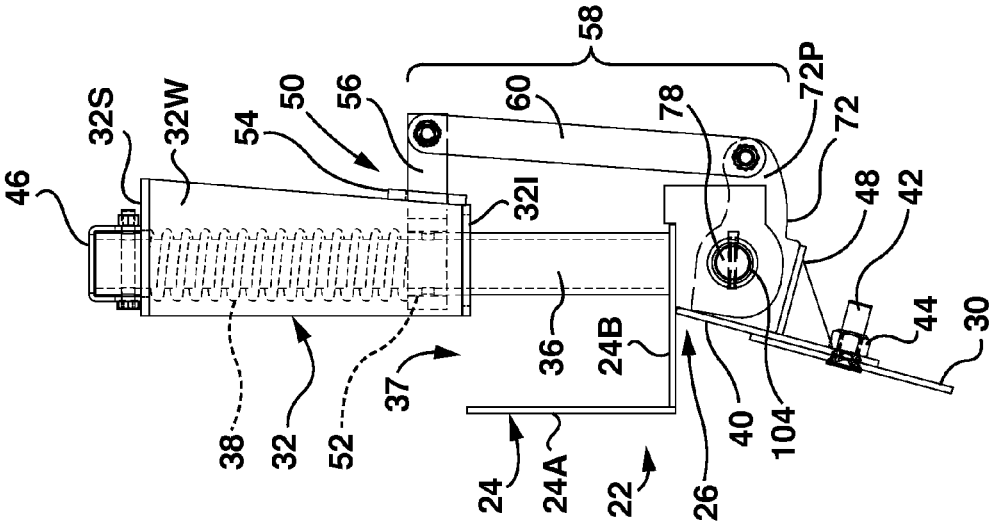
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FIG. 6B

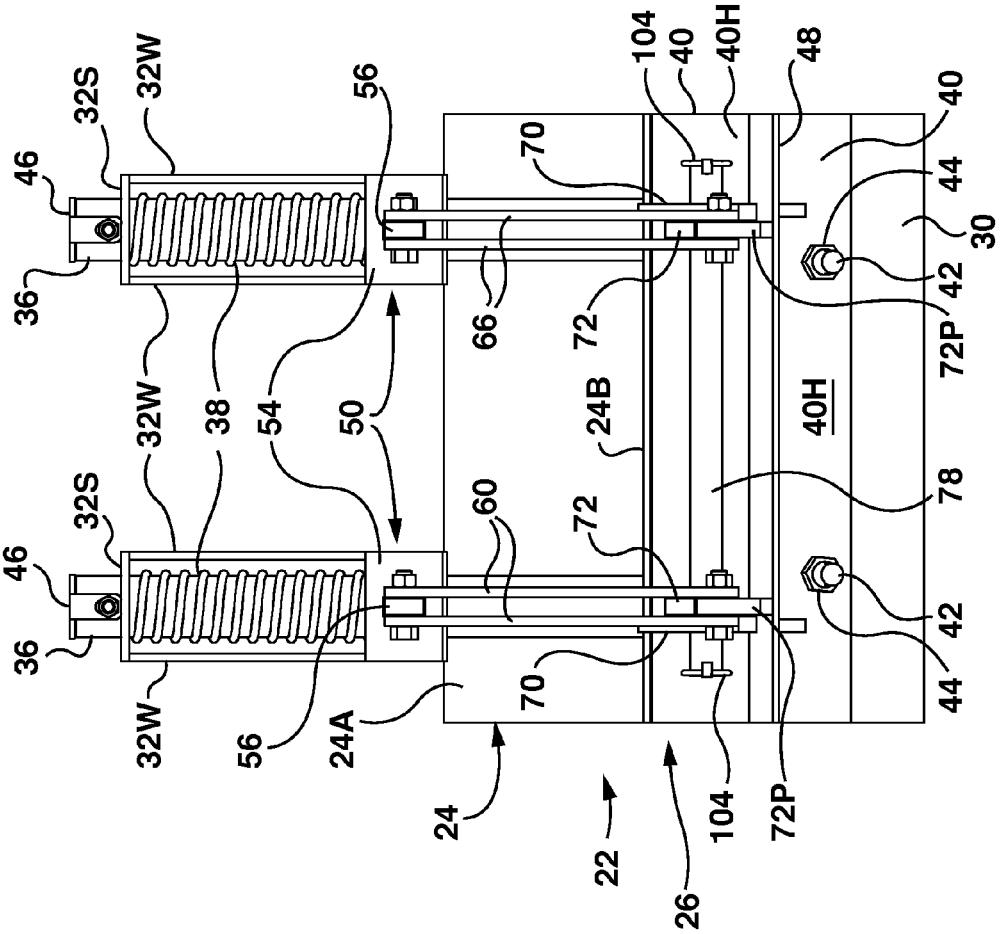
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FIG. 6D

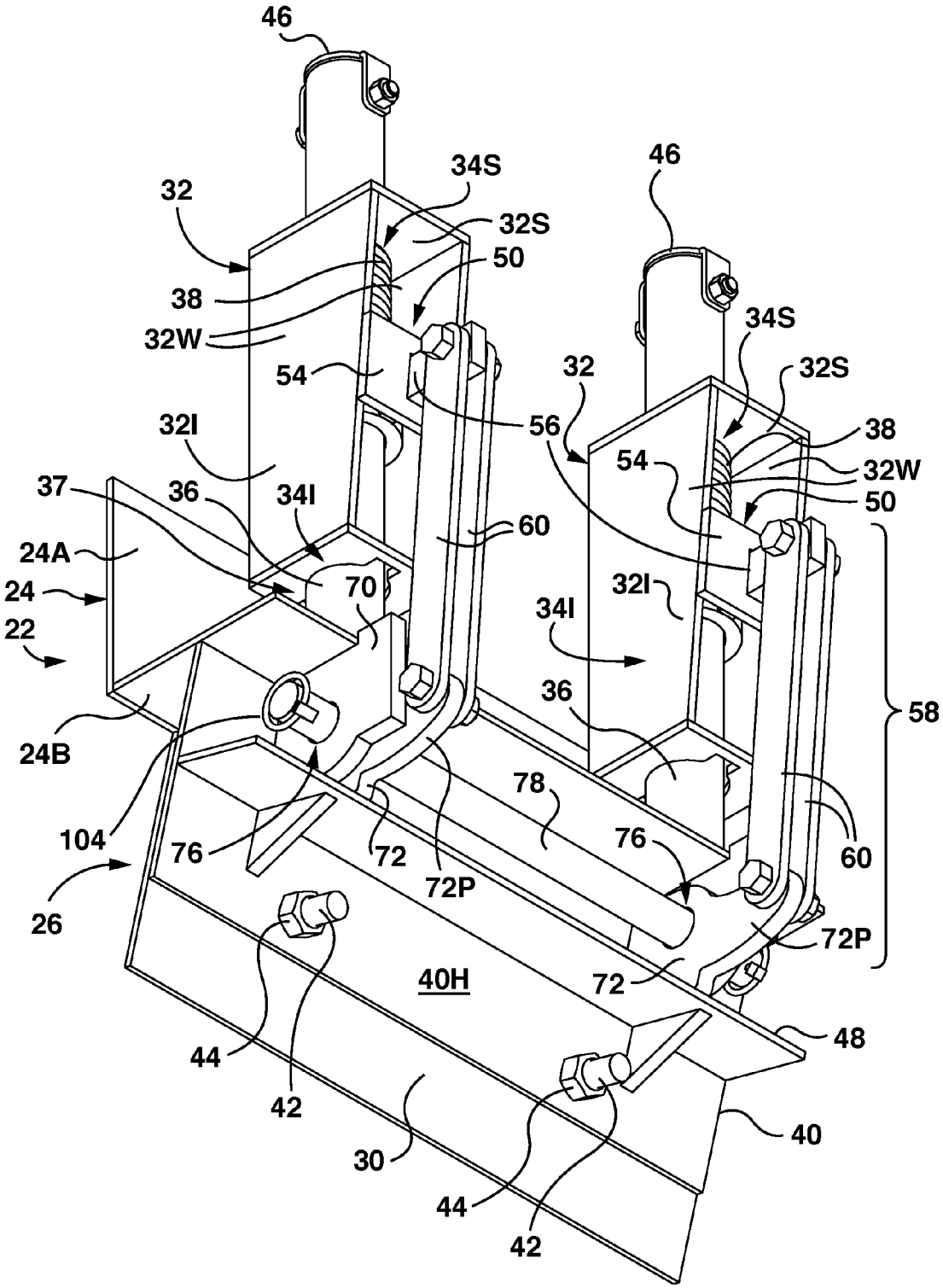
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FIG. 7A

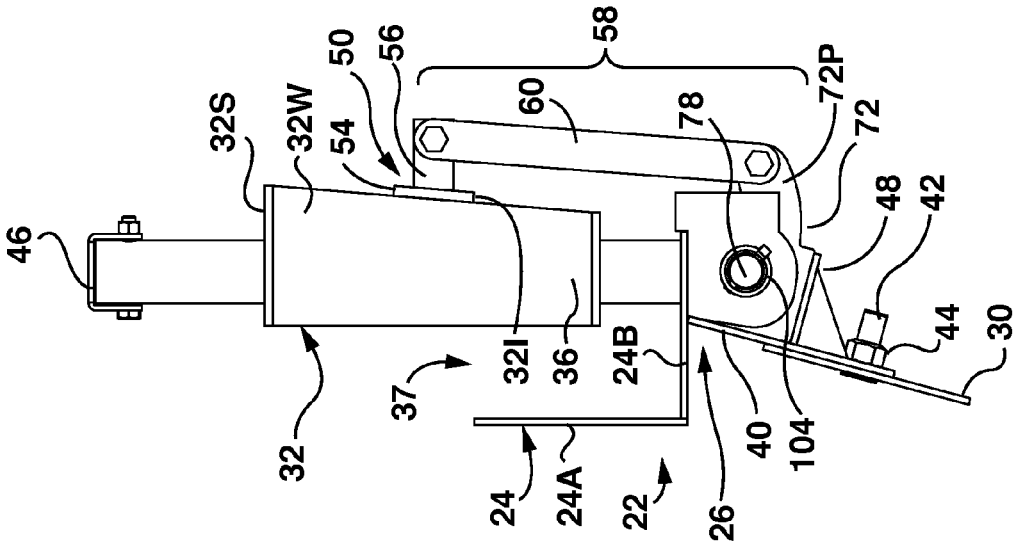
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FIG. 7C

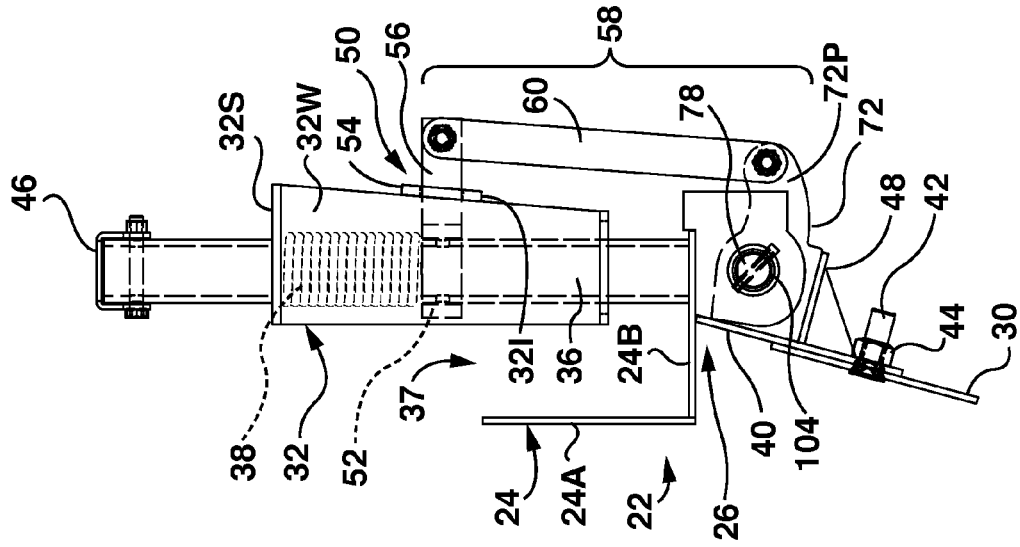
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FIG. 7B

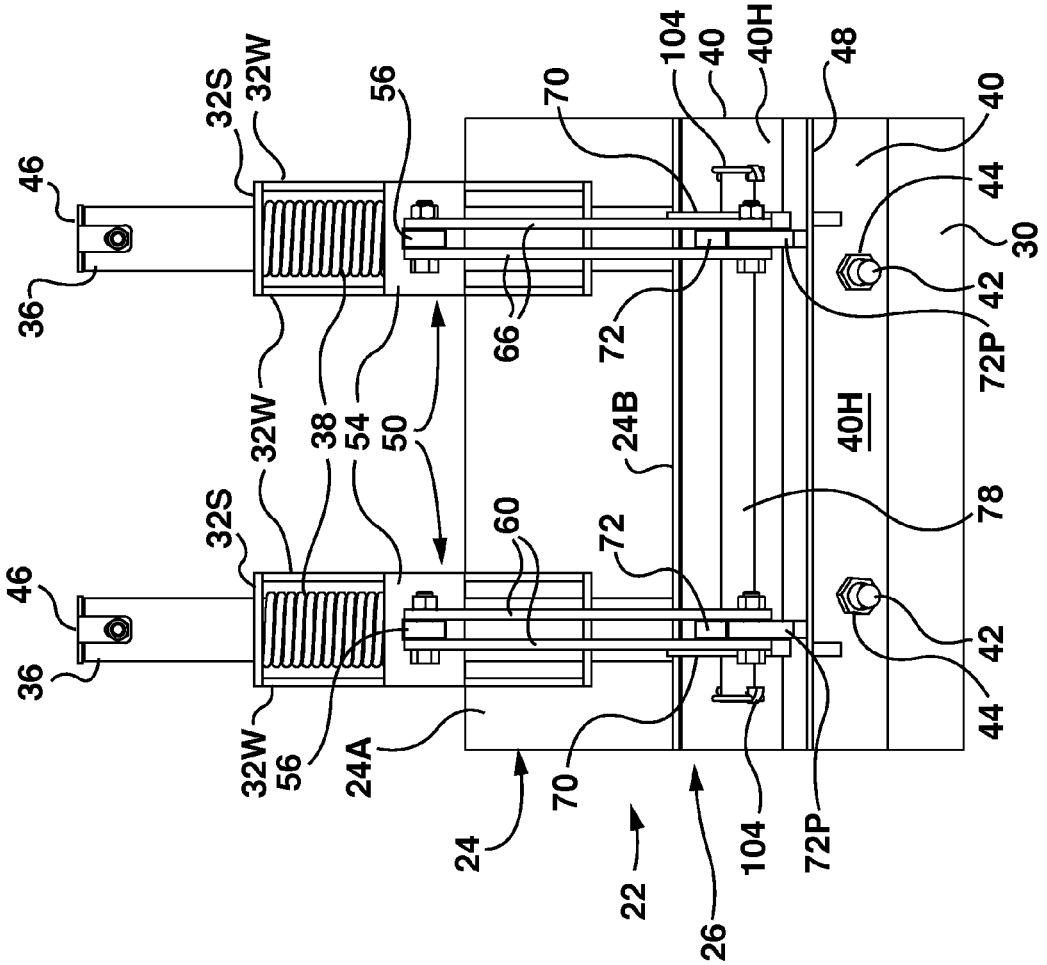
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FIG. 7D

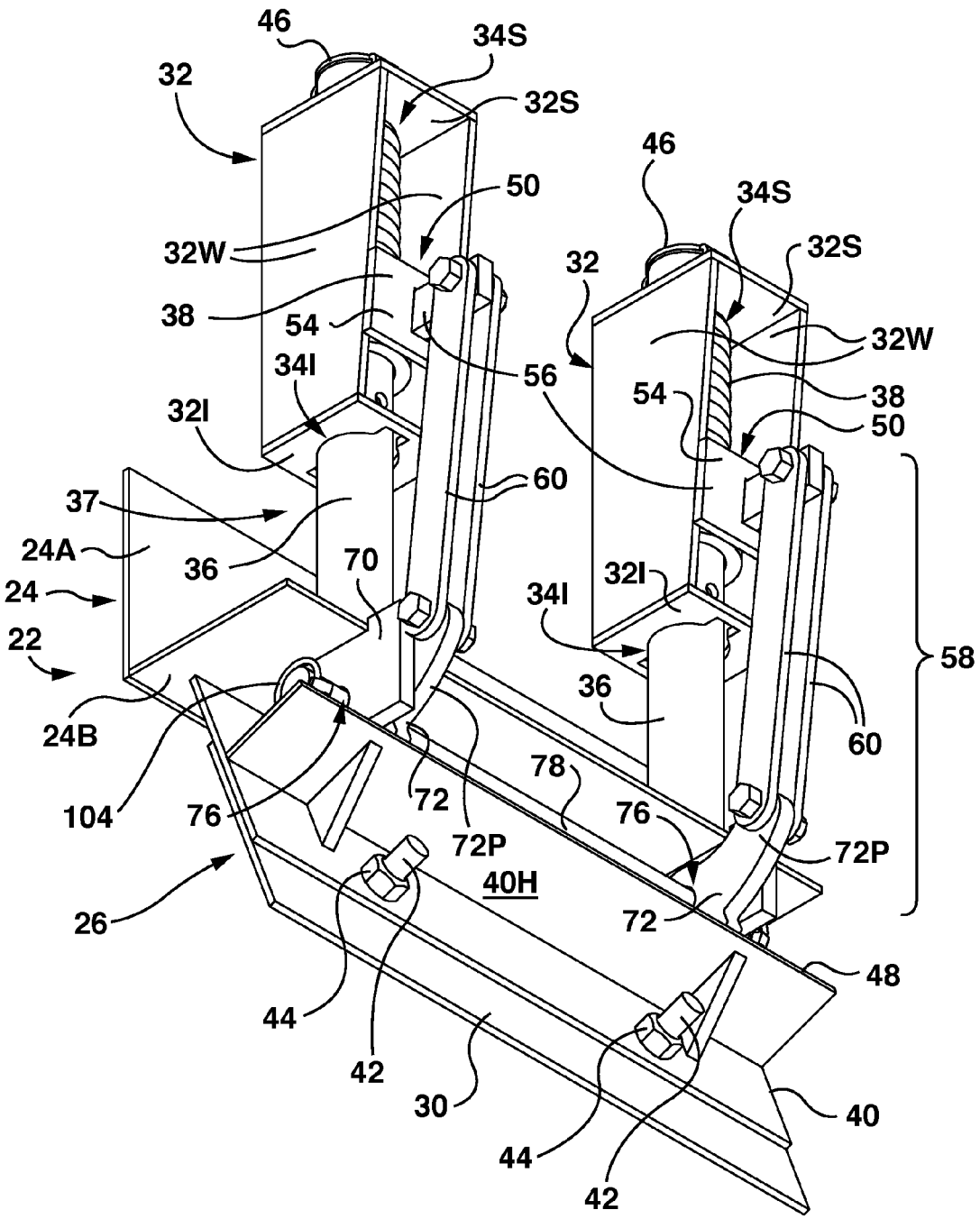
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FIG. 8A

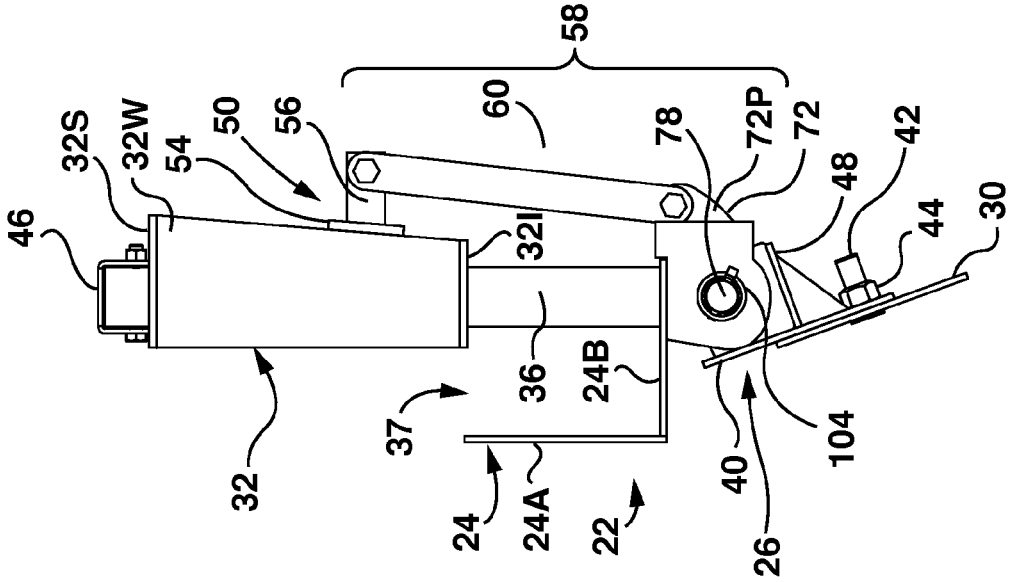
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FIG. 8C

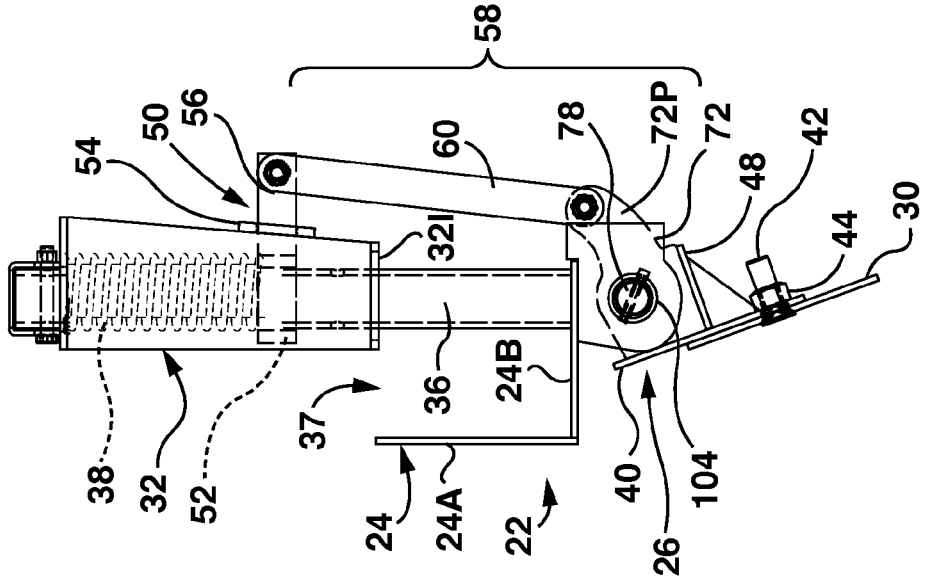
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FIG. 8B

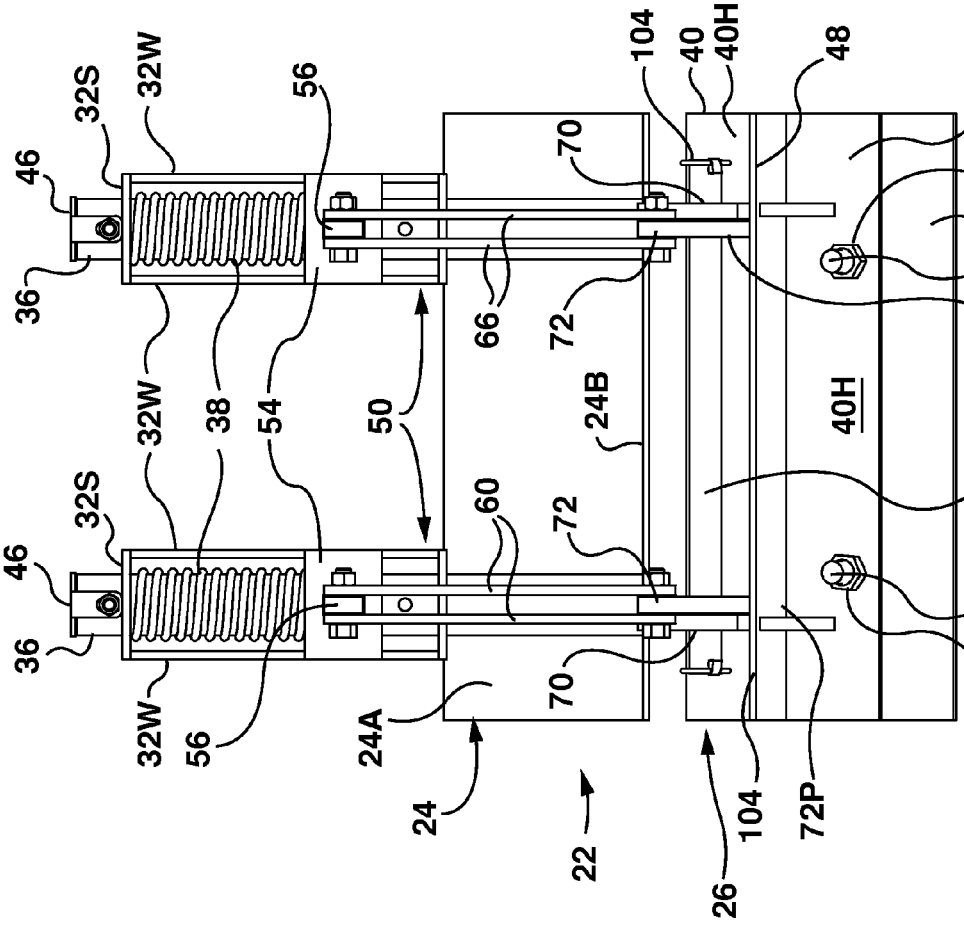
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FIG. 8D

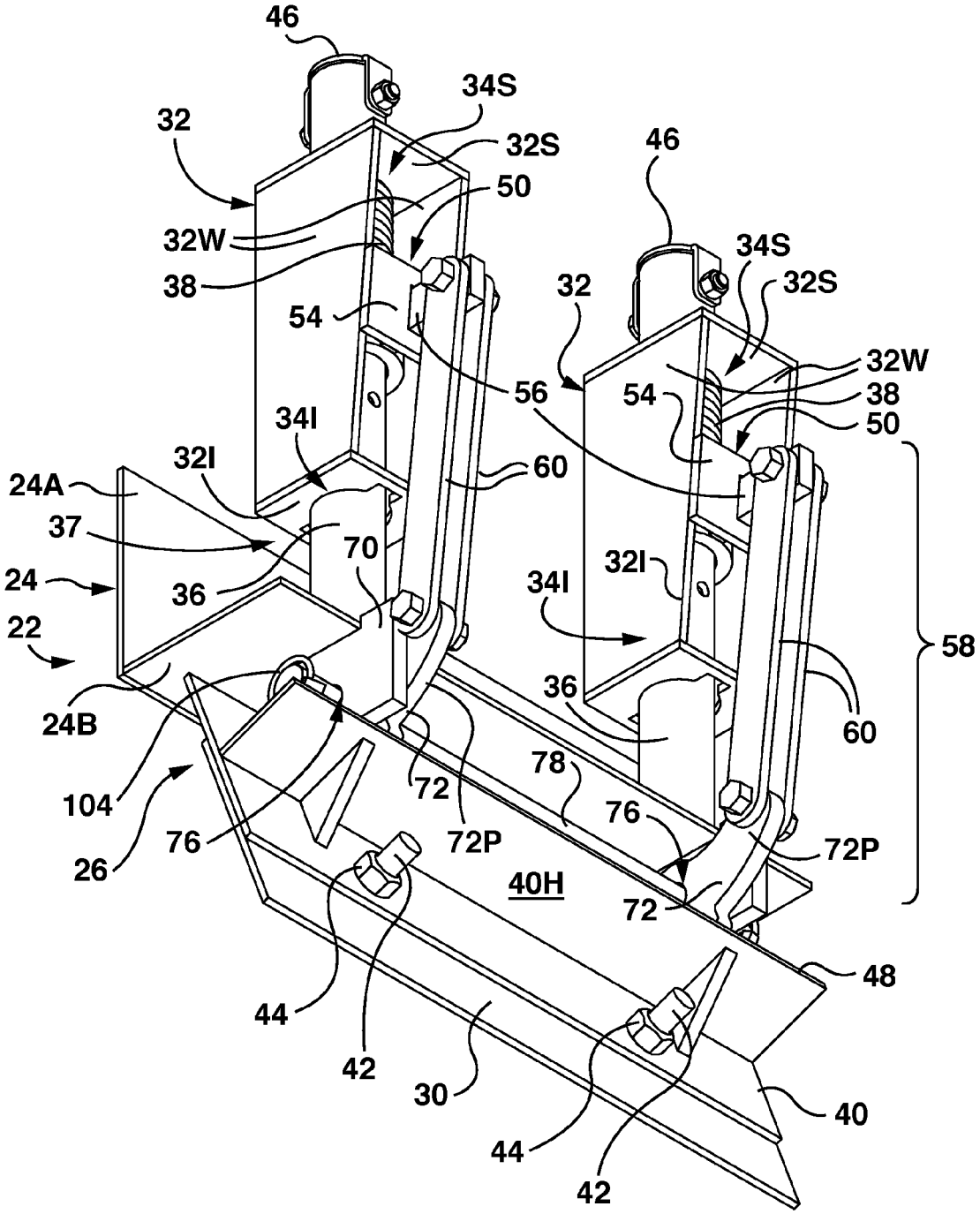
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FIG. 9A

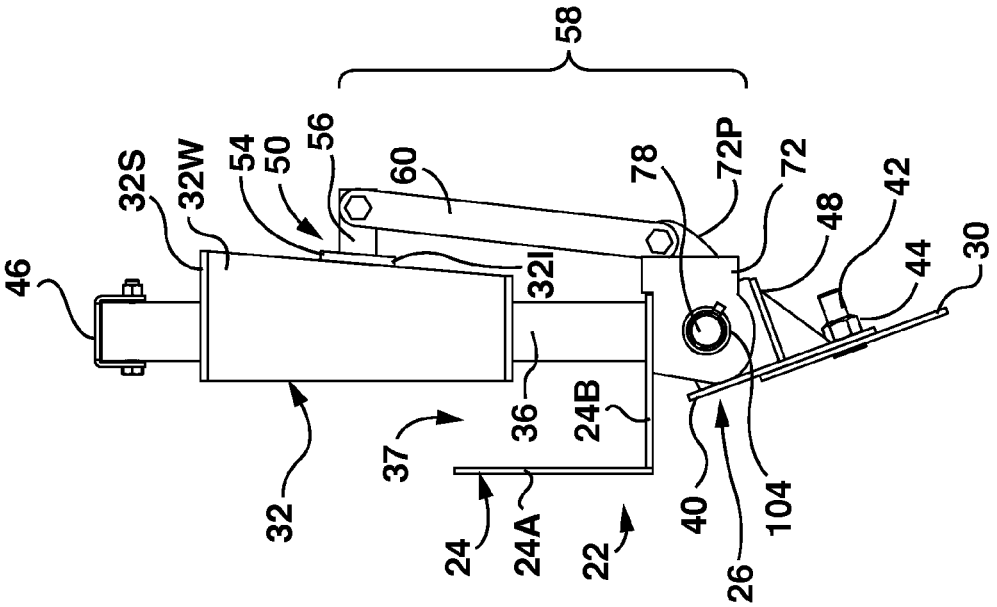
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FIG. 9C

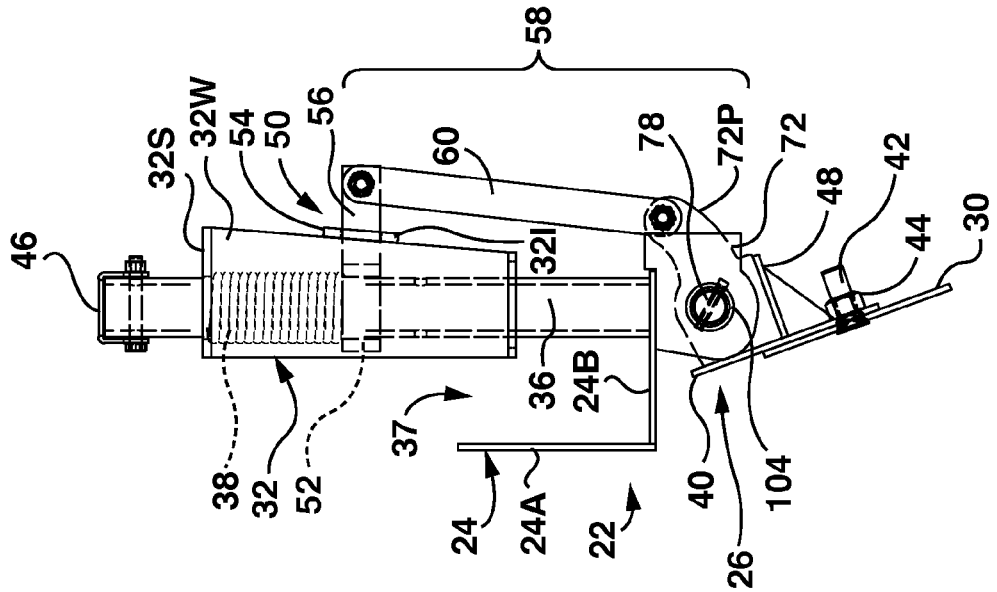
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FIG. 9B

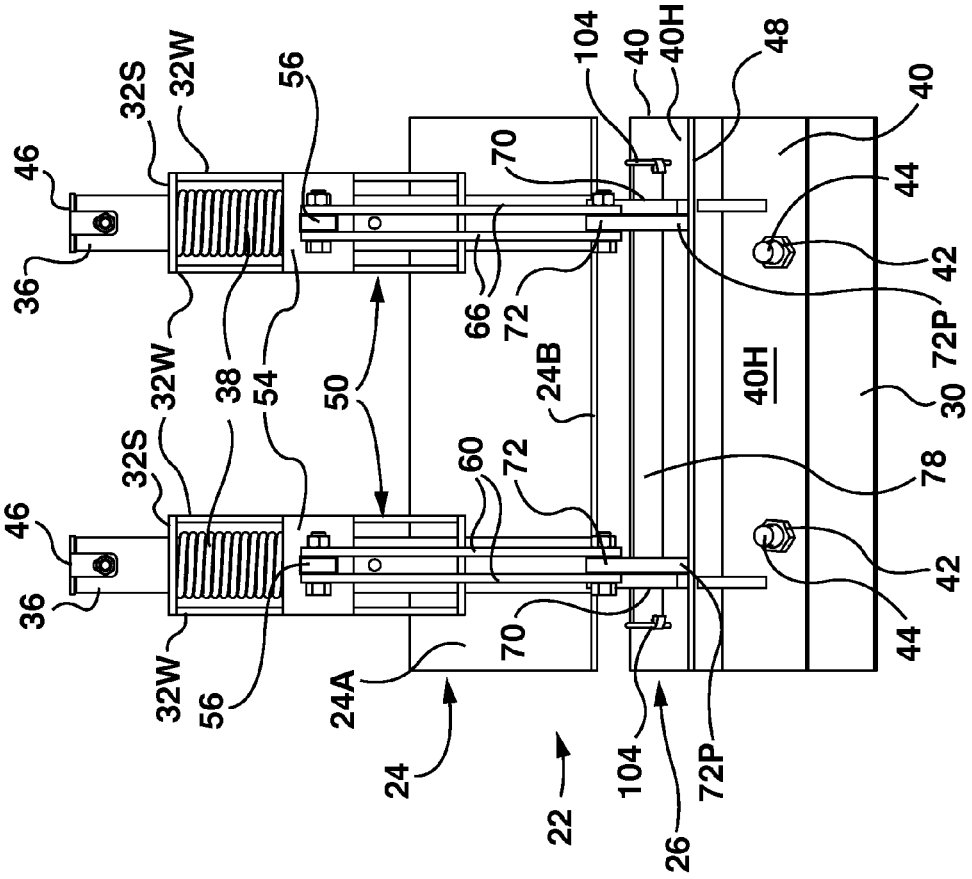
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FIG. 9D

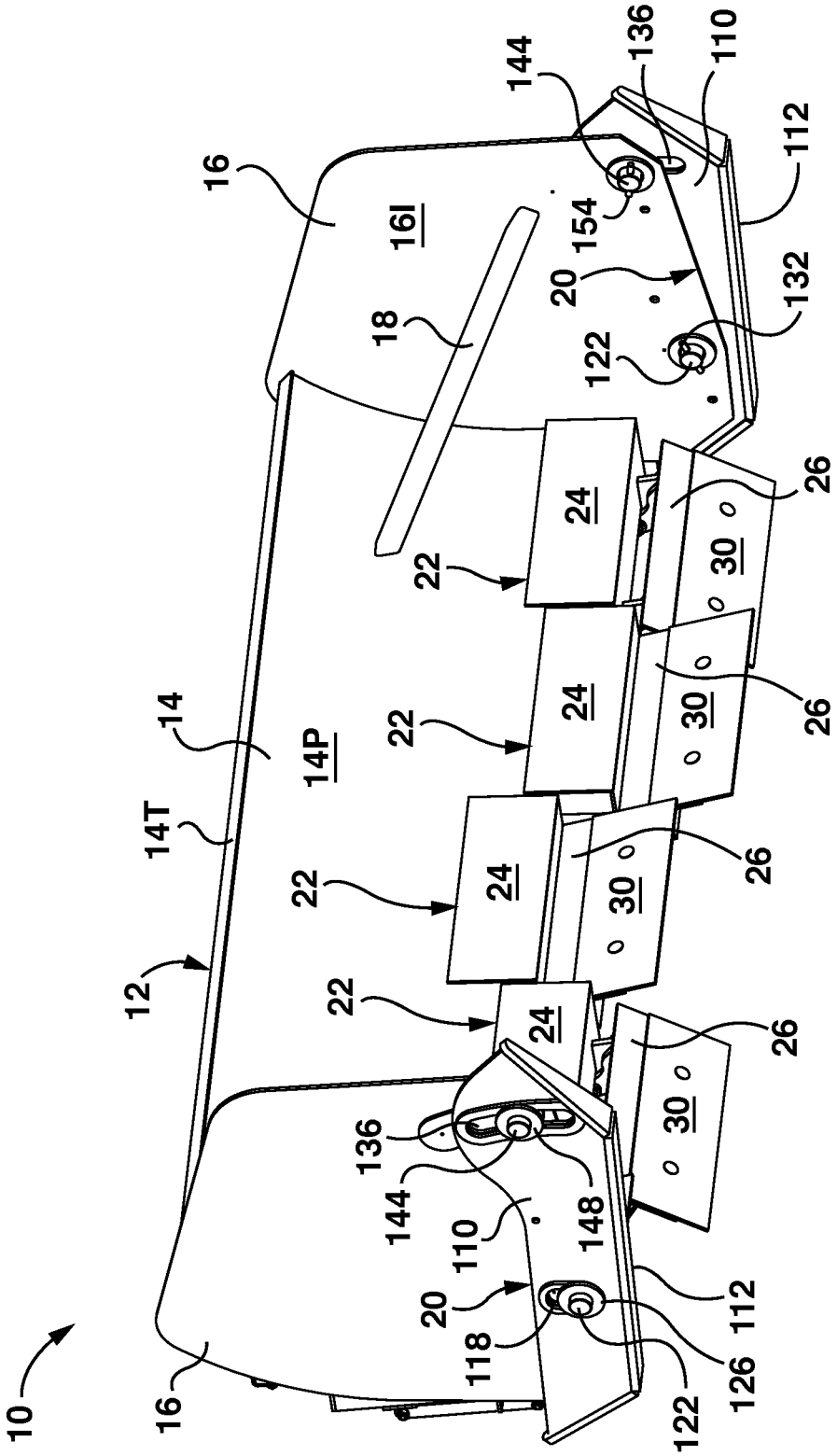
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FIG. 10A

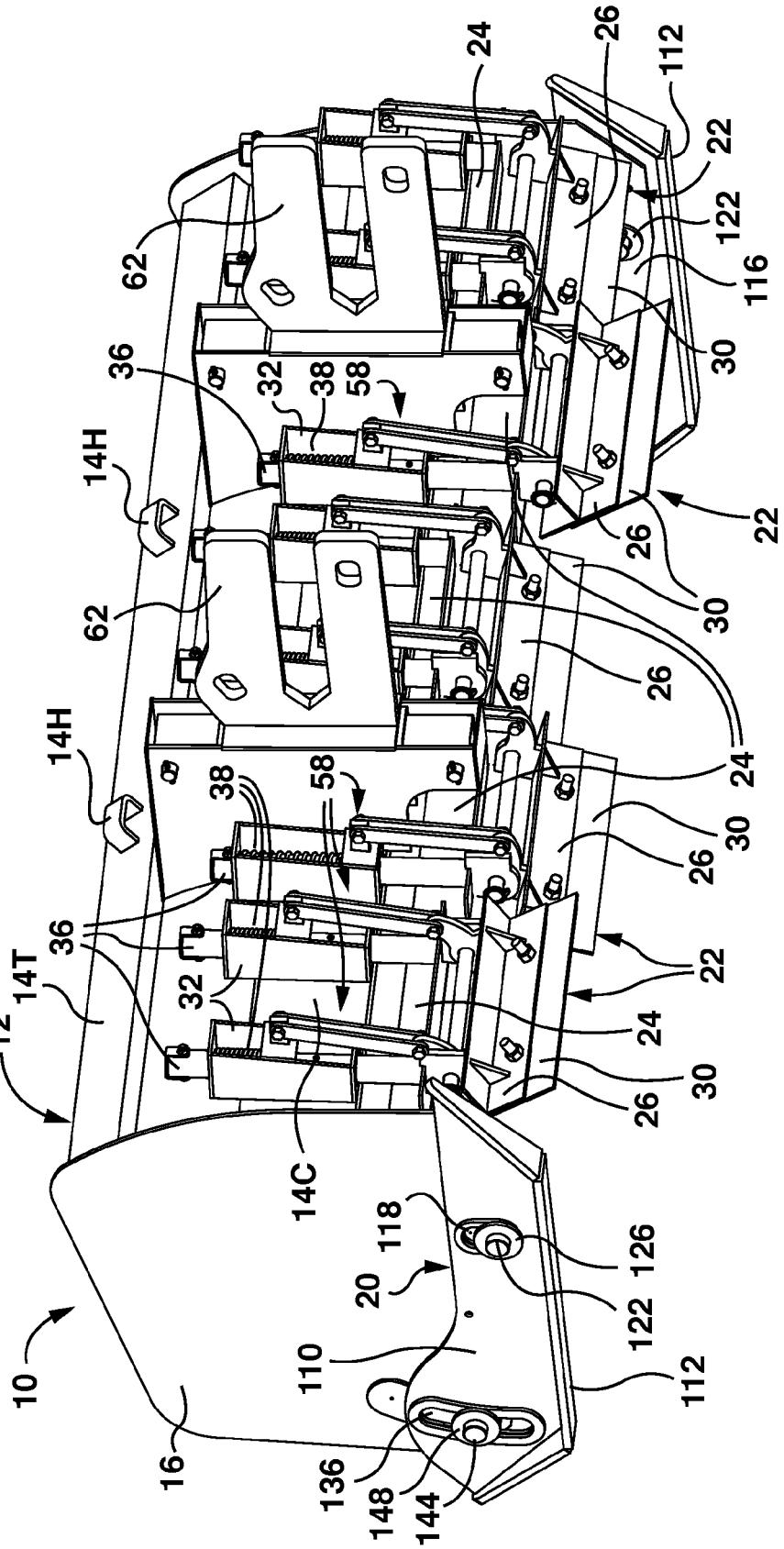
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FIG. 10B

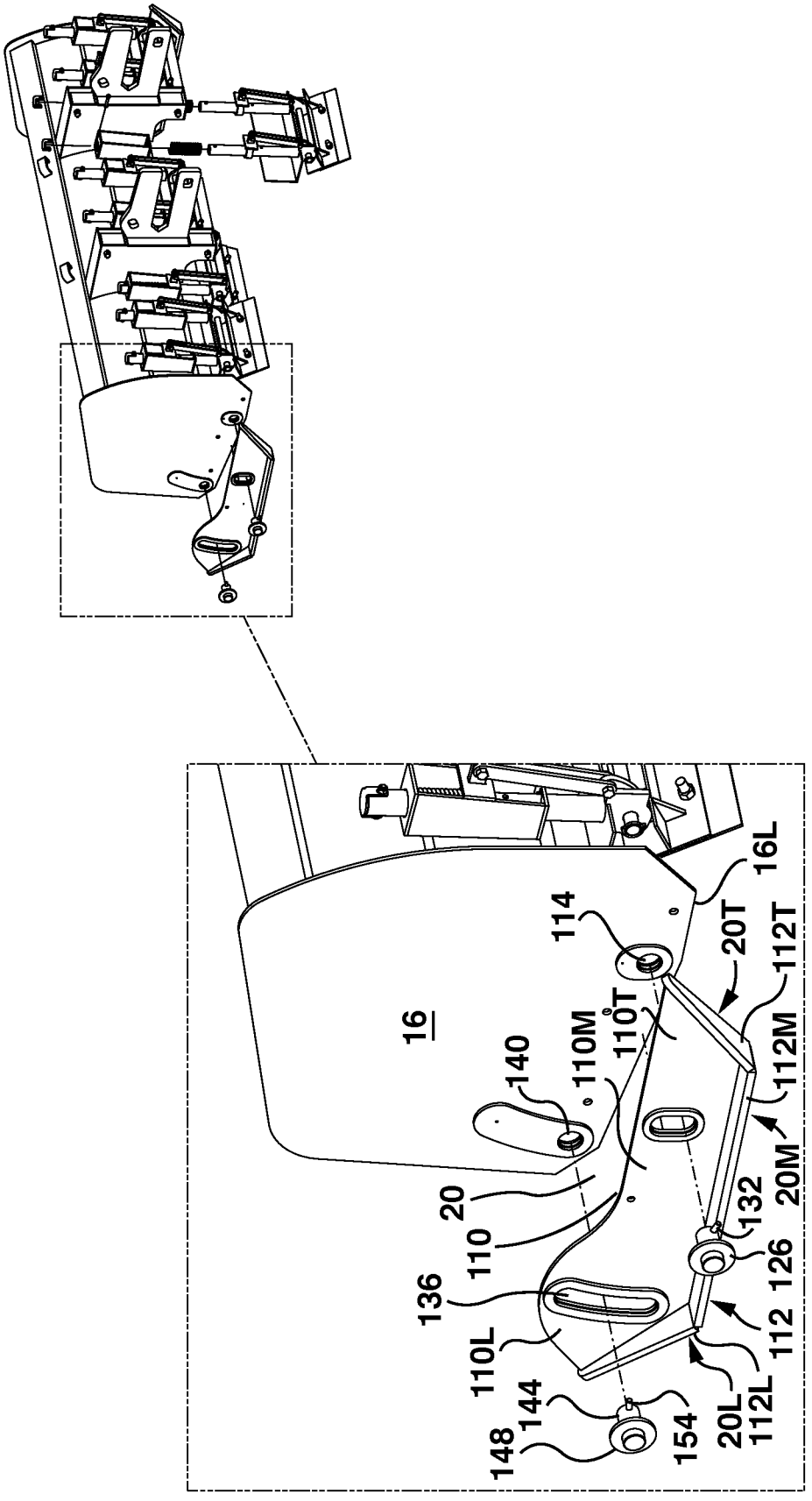
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FIG. 11

SECTIONAL SNOW PLOW WITH TRIP EDGE

TECHNICAL FIELD

[0001] The present disclosure relates to a snow plow assembly and particularly relates to a snow plow having a structure for adjusting to surface contours and obstacles.

BACKGROUND

[0002] Snow plows typically include, in addition to the moldboard, a pair of opposed generally planar wing plates fixed to opposed longitudinal ends of the moldboard. These wing plates cooperate with the moldboard in scooping snow during plowing operations. The structural stability of these wing plates, relative to the rest of the snow plow, is important because the wing plates are subject to significant stresses and could be bent or sheared away from the snow plow if not properly reinforced.

[0003] It is not uncommon for a snow plow to strike obstacles during snow clearing operations, such as frozen debris or objects buried beneath the snow such as road curbs and manhole covers. One approach to dealing with this problem is described in U.S. Pat. No. 2,962,821 to Pietl, which teaches a snow plow having individual blade sections that are oriented at a steep angle to the surface being plowed. The blade sections are slidingly received within guide pockets on the moldboard and are biased forwardly by springs, so that the blades can retract into the pockets when striking an obstacle. More typically, snow plow blades are mounted to snow plow bodies with a resilient trip mechanism that allows a snow plow blade to yield by generally pivoting upwardly and rearwardly upon striking such obstacles and to be restored to an operative position after encountering an obstacle. U.S. Pat. No. 4,794,710 to Hiring, U.S. Pat. No. 5,437,113 to Jones, U.S. Pat. No. 5,697,172 to Verseef, British Patent Specification No. 886,572, German Patent Specification No. 3205974 and European Patent No. 1,557,494 provide examples of such resilient trip mechanisms.

[0004] In addition to the problem of obstacles, unevenness of the surface to be plowed also presents a problem, since a localized elevation can cause the entire snow plow to be lifted up. This leaves lower parts of the surface adjacent the elevation with a layer of snow. Similarly, the snow within a localized depression may also not be removed because the blade is carried by the higher surface adjacent the depression. A number of solutions to this issue have been proposed.

[0005] U.S. Pat. No. 4,669,205 to Smathers teaches a snow plow having a segmented blade formed from a plurality of individual bits each carried by a vertical shank of triangular cross-section which is slidably mounted in a triangular retention means on the moldboard of the snow plow, with the bits biased downwardly. The bits can be individually displaced upon encountering a higher point in the surface being plowed or an obstacle.

[0006] U.S. Pat. No. 5,743,032 teaches a snow plow in which individual blades are attached to the moldboard by flexible members which permit the individual blades to move in one direction in response to obstacles or depressions in the surface being plowed.

[0007] U.S. Pat. No. 5,819,443 teaches a snow plow comprising a frame and a plurality of finger members each comprising a plowing portion and a curved flexing portion to enable the plowing portion to remain in contact with an uneven surface.

[0008] U.S. Pat. No. 6,823,615 to Strait describes a sectional snow plow made up of several individual sections, each mounted to a frame by flexible, resilient members so as to be independently movable. The sections can each move upwardly and downwardly relative to adjacent sections of the snowplow in response to variations in the surface below that section without causing the adjacent sections to be lifted above their respective surfaces. In the commercial embodiment offered by Arctic Snow and Ice Control, each section includes a resilient trip mechanism that allows the snow plow blade to yield by generally pivoting upwardly and rearwardly. The entire plowing face is formed by the individual moldboard sections, without any single moldboard extending the entire length of the plow, and the wing plates are pivotally mounted to the snow plow frame to provide a leveling function.

[0009] U.S. Patent Application Publication No. 2013/0025629 in the name of Vigneault teaches a sectional snow plow comprising an upper blade portion and a bottom blade portion. The bottom blade portion has a plurality of individual blade segments arranged in side-by-side relation. The bottom edge of each blade segment can slide up and down relative to the bottom edges of the other blade segments and can also pivot fore and aft about a pivot axis that is substantially parallel to the bottom edge. The edge of each blade segment is biased downwardly with respect to the sliding and forwardly with respect to the pivoting. Vigneault describes several different embodiments; in each case a first biasing device is used to urge the edge of the blade segment downwardly with respect to the sliding and a second biasing device, which is separate and distinct from the first biasing device, is used to urge the edge of each blade segment forwardly with respect to the pivoting.

SUMMARY

[0010] The present disclosure describes a sectional snow plow in which trip blade portions can move linearly to accommodate surface contours and also pivot or "trip" when encountering an obstacle, and in which biasing members urge the trip blade portions both linearly and pivotally into engagement with a surface being plowed, with each biasing member simultaneously urging both pivotal and linear movement.

[0011] In one aspect, a snow plow comprises a main plow body, the main plow body comprising a moldboard and a plurality of surface-engaging sections movably carried by the moldboard and depending from the moldboard in side-by-side relationship with one another. Each of the surface-engaging sections is linearly movable relative to the moldboard between an extended position and a retracted position, independently of each other surface-engaging section, for adjusting to a contour of a surface being plowed. Each of the surface-engaging sections comprises a main body portion, a surface-engaging trip blade portion, and at least one mounting shaft. The surface-engaging trip blade portion is pivotally carried by the main body portion so as to be pivotable between a surface-scraping position and a deflected position, and each mounting shaft extends from the main body portion and is slidably received in a respective guide fixed to the moldboard. Each mounting shaft has a rider slidably disposed thereon for sliding movement along the respective

mounting shaft, independent of sliding movement of the respective mounting shaft within its respective guide. Each rider is coupled to the trip blade portion by a mechanical linkage that transmits linear movement of the trip blade portion to the rider to cause the rider to move linearly with the mounting shaft and translates pivotal movement of the trip blade portion into linear sliding motion of the rider along the mounting shaft. At least one biasing member acts between the moldboard and the riders, and for each individual biasing member, the biasing member acts through the respective mechanical linkage to simultaneously both urge the respective surface-engaging section toward the extended position and also urge the respective trip blade portion toward the surface-scraping position.

[0012] In one embodiment, the mechanical linkage comprises at least one rigid transfer bar, with each transfer bar being pivotally coupled to the trip blade portion and pivotally coupled to the rider. In one particular embodiment, each biasing member comprises a coil spring surrounding a respective mounting shaft and captured between the respective rider and a superior end collar on the guide.

[0013] In another aspect, a method of operating a sectional snow plow comprises providing a sectional snow plow having a plurality of surface-engaging sections movably carried by the moldboard and depending from the moldboard in side-by-side relationship with one another, with each of the surface-engaging sections being linearly movable relative to the moldboard between an extended position and a retracted position, independently of each other surface-engaging section, for adjusting to a contour of a surface being plowed, and each of the surface-engaging sections comprising a main body portion and a surface-engaging trip blade portion pivotally carried by the main body portion so as to be pivotable between a surface-scraping position and a deflected position. The method further comprises, for each surface-engaging section, using at least one biasing member to simultaneously urge that surface-engaging section toward the extended position and also urge the trip blade portion toward the surface-scraping position, so that for each surface-engaging section, each biasing member simultaneously both urges that surface-engaging section toward the extended position while also urging the trip blade portion toward the surface-scraping position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and other features will become more apparent from the following description in which reference is made to the appended drawings wherein:

[0015] FIG. **1** is an isometric front view of a first exemplary embodiment of a snow plow according to an aspect of the present disclosure showing the surface-engaging sections thereof in a retracted position;

[0016] FIG. **2** is an isometric rear view of the snow plow of FIG. **1** showing the surface-engaging sections thereof in a retracted position;

[0017] FIG. **3** is an isometric front view of the snow plow of FIG. **1** showing the surface-engaging sections thereof in an extended position;

[0018] FIG. **4** is an isometric rear view of the snow plow of FIG. **1** showing the surface-engaging sections thereof in an extended position;

[0019] FIG. **5** is a partially exploded isometric rear view of the snow plow of FIG. **1**;

[0020] FIG. **5**A is a partially-exploded isometric rear view of one of the surface-engaging sections of the snow plow of FIG. **1**;

[0021] FIGS. **6**A to **6**D show, respectively, an isometric rear view, a partially transparent side elevation view, a side elevation view and a rear view of the surface-engaging section of FIG. **5**A, with the surface-engaging section in the extended position and a trip blade portion thereof in a surface-scraping position;

[0022] FIGS. **7**A to **7**D show, respectively, an isometric rear view, a partially transparent side elevation view, a side elevation view and a rear view of the surface-engaging section of FIG. **5**A, with the surface-engaging section in the retracted position and the trip blade portion thereof in the surface-scraping position;

[0023] FIGS. **8**A to **8**D show, respectively, an isometric rear view, a partially transparent side elevation view, a side elevation view and a rear view of the surface-engaging section of FIG. **5**A, with the surface-engaging section in the extended position and the trip blade portion thereof in the deflected position;

[0024] FIGS. **9**A to **9**D show, respectively, an isometric rear view, a partially transparent side elevation view, a side elevation view and a rear view of the surface-engaging section of FIG. **5**A, with the surface-engaging section in the retracted position and the trip blade portion thereof in the deflected position;

[0025] FIG. **10**A is an isometric front view of the snow plow of FIG. **1** showing various positions of the surface-engaging sections and the trip-blade portions of the surface-engaging sections;

[0026] FIG. **10**B is an isometric rear view of the snow plow of FIG. **1** showing various positions of the surface-engaging sections and the trip-blade portions of the surface-engaging sections; and

[0027] FIG. **11** is a detailed partially exploded isometric rear view showing mounting of one of the wear shoes on the wing plate of the snow plow of FIG. **1**;

DETAILED DESCRIPTION

[0028] Reference is now made to FIGS. **1** to **4**, in which a first embodiment of an exemplary snow plow according to an aspect of the present invention is shown generally at **10**. The snow plow **10** comprises a main plow body **12** formed by a curved moldboard **14** having a plowing face **14**P and a pair of opposed generally planar wing plates **16** fixed to opposed longitudinal ends of the moldboard **14**. In operation, the wing plates **16** cooperate with the moldboard **14** for scooping snow. The moldboard **14** is somewhat curved forwardly and includes a reinforced push channel **14**C on the lower portion of the moldboard **14**, relative to the surface to be plowed. A reinforced top edge **14**T of the moldboard **14** is fitted with a pair of longitudinally spaced handles **14**H (FIGS. **2** and **4**) for lifting the snow plow **10** by means of a crane or the like in order to load and off load the snow plow **10** on delivery of same. However, during day to day use, the snow plow **10** is moved by means of a vehicle which pushes the plow body **12** forwardly by engaging a pair of rearwardly extending vehicle receivers **62**. For example, the snow plow **10** might be pushed by a front end loader. The vehicle receives may be, for example, of the type described in U.S. Pat. No. 9,255,370 to Paonessa, the teachings of which are hereby incorporated by reference. Bracing struts **18** (FIG. **1**) extend between the moldboard **14** and each wing plate **16**,

in particular between the plowing face **14**P of the moldboard **14** and the inside faces **161** of the wing plates **16**. The exemplary snow plow **10** also includes a pair of wear shoes **20** for supporting the main plow body **12** on the surface being plowed, with each wear shoe **20** being carried by and supporting one of the wing plates **16**. Mounting of the wear shoes **20** to the wing plates **16** is described in greater detail below.

[0029] The snow plow **10** comprises a plurality of surface-engaging sections **22** movably carried by the moldboard **14** and depending from the moldboard **14** in side-by-side relationship with one another. Each of the surface-engaging sections **22** is carried by the moldboard **14** so as to be linearly movable relative to the moldboard **14**, independently of each other surface-engaging section **22**, between a retracted position, as shown in FIGS. **1** and **2**, and an extended position, as shown in FIGS. **3** and **4**. The ability of the surface-engaging sections **22** to move linearly relative to the moldboard **14** enables the snow plow **10** to adjust to a contour of a surface being plowed. As best seen in FIGS. **5**, **5**A and **6**A to **9**D, each of the surface-engaging sections **22** comprises a main body portion **24** carried by the moldboard **14** and a surface-engaging trip blade portion **26** pivotally carried by the main body portion **24** so as to be pivotable between a surface-scraping position and a deflected position. The trip blade portion **26** carries a replaceable blade **30** for scraping snow. The blades **30** will typically be formed of heat treated steel in order to make them more resistant to the constant wear arising from scraping a road surface or the like.

[0030] The independently movable surface-engaging sections **22**, including the trip blade portions **26**, enable the snow plow **10** to accommodate uneven surfaces and obstacles by adjusting to the surface to be plowed. In FIG. **5**, the leftmost surface-engaging section **22** is shown in between the extended position and the retracted position with its trip blade portion **26** in the deflected position, the second surface-engaging section **22** from the left is shown in the extended position with its trip blade portion **26** in the surface-scraping position, and the third surface-engaging section **22** from the left is (second from the right) is shown disengaged from the moldboard **14** to illustrate the linearly movable mounting of the surface-engaging section **22** to the moldboard **14**. The rightmost surface-engaging section **22** is shown in the retracted position with the trip blade portion **26** in the surface-scraping position.

[0031] As noted above, each of the surface-engaging sections **22** is carried by the moldboard **14** so as to be linearly movable relative to the moldboard **14**, independently of each other surface-engaging section **22**, between a retracted position and an extended position. Referring now to FIG. **5**A, the main body portion **24** of each surface-engaging section **22** comprises a spacer **24**B as well as a generally planar snow-engaging panel **24**A and two spaced-apart mounting shafts **36**. The snow-engaging panel **24**A and the mounting shafts **36** extend from the same side of the spacer **24**B generally parallel to one another and, when the surface-engaging section **22** is mounted to the moldboard **14** with the snow plow **10** resting on a surface, will project generally upwardly at a slight incline from vertical. The snow-engaging panel **24**A and the mounting shafts **36** are spaced from one another to define a gap **37** between the snow-engaging panel **24**A and each mounting shaft **36**. When the surface-engaging section **22** is mounted to the moldboard **14**, the lower edge of the moldboard **14** is received in the gap **37** between the snow-engaging panel **24**A and the mounting shafts **36**.

[0032] The mounting shafts **36** extending from the main body portion **24** are slidably received in respective guides **32** fixed to the moldboard; the guides **32** each comprise a superior end collar **32**S and an inferior end collar **321** opposed to one another, and two opposed parallel sidewalls **32**W extending between the superior end collar **32**S and the inferior end collar **321**. The superior end collar **32**S and the inferior end collar **321** have respective collar apertures **34**S, **34**I shaped to slidingly receive the mounting shafts **36**. End caps **46** are secured at the superior ends of the mounting shafts **36**, superiorly of the superior end collar **32**S. The end caps **46** engage the superior end collar **32**S to act as stops so as to limit downward travel of the mounting shafts **36** and thereby define the extended position of the surface-engaging section **22**.

[0033] Continuing to refer to FIG. **5**A, the trip blade portion **26** of each surface-engaging section **22** comprises a mounting bracket **40** which removably receives a replaceable blade **30**, and a hinge bearing panel **48** extending substantially perpendicularly from the surface **40**H of the mounting bracket **40** opposite the surface of the mounting bracket **40** that receives the blade **30**. The blade **30** is mounted to the mounting bracket **40** by way of bolts **42** which are secured by nuts **44** and extend through apertures in the mounting bracket **40** and the blade **30**.

[0034] A first pair of longitudinally spaced hinge portions **70** depend from the side of the spacer **24**B opposite the side from which the snow-engaging panel **24**A and the mounting shafts **36** extend, and a second pair of longitudinally spaced hinge portions **72** is secured to the mounting bracket **40**, extending between the hinge bearing panel **48** and the surface **40**H of the mounting bracket **40** opposite the surface of the mounting bracket **40** that receives the blade **30**. Each of the second pair of longitudinally spaced hinge portions **72** includes a superiorly (i.e. upwardly) curved pivot arm **72**P, the function of which is described further below. Each of the hinge portions **70**, **72** has a respective rod aperture **76** which slidingly receives a longitudinally extending pivot rod **78**. The main body portion **24** and the trip blade portion **26** are mounted to one another to form the surface-engaging section **22** as follows. The pivot rod **78** is inserted between the first and second hinge portions **70** and **72**, and a locating ring **104** is positioned in receiving apertures formed at each end of the pivot rod **78** so as to secure the assembly.

[0035] Still referring to FIG. **5**A, each mounting shaft **36** has a respective rider **50** slidably disposed thereon for sliding movement along the respective mounting shaft **36**, independent of sliding movement of the respective mounting shaft **36** within its respective guide **32**. In the illustrated embodiment, each rider **50** comprises a slide ring **52** that encircles and slides along the respective mounting shaft **36** coupled to a slide plate **54** that slides along the edges of the sidewalls **32**W of the respective guide **32**, and a pivot mounting **56** extending from the slide plate **54** opposite the slide ring **52**.

[0036] Each rider **50** is coupled to the trip blade portion **26** by a mechanical linkage. As will be explained further below, the mechanical linkage is configured so as to transmit linear movement of the trip blade portion **26** to the rider **50** to cause the rider **50** to move linearly with the mounting shaft **36**, and also to translate pivotal movement of the trip blade portion

26 into linear sliding motion of the rider 50 along the mounting shaft 36. One or more biasing members are positioned to act between the moldboard 14 and the riders 50. Each individual biasing member acts through the respective mechanical linkage to simultaneously both urge the respective surface-engaging section 22 toward the extended position and urge the respective trip blade portion 26 toward the surface-scraping position.

[0037] In the illustrated embodiment, the mechanical linkage is denoted generally by reference 58, and comprises the pivot mounting 56 extending from the slide plate 54, the curved pivot arm 72P of the second longitudinally spaced hinge portion 72, and a pair of parallel rigid transfer bars 60. Each transfer bar 60 is pivotally coupled at one end to the curved pivot arm 72P and at the other end to the pivot mounting 56, and is thereby pivotally coupled to the trip blade portion 26 and also pivotally coupled to the rider 50. Also in the illustrated embodiment, each biasing member comprises a coil spring 38 surrounding a respective mounting shaft 36 and captured between the respective rider 50, in particular the slide ring 52, and the superior end collar 32S on the guide 32. Since the guide 32 is fixed to the moldboard 14, the coil springs 38 will act between the moldboard 14 and the respective surface-engaging section 22.

[0038] With reference now to FIGS. 6A to 9D, operation of the exemplary mechanical linkage 50 will now be described.

[0039] As noted above, each of the individual biasing members, i.e. each individual coil spring 38, acts through the respective mechanical linkage 58 to simultaneously both urge the respective surface-engaging section 22 toward the extended position and urge the respective trip blade portion 26 toward the surface-scraping position. More particularly, the coil springs 38 act between the superior end collar 32S on the guide 32 and the rider 50, in particular the superior surface of the slide ring 52. Since the guide 32, including the superior end collar 32S, is fixed to the moldboard 14, each of the coil springs 38 will urge its respective rider 50 inferiorly, away from the superior end collar 32S. Force is thereby applied to the mechanical linkage 58, that is, pivot mounting 56 moves with the rider 50 and applies force through the rigid transfer bars 60 to the curved pivot arm 72P of the second longitudinally spaced hinge portion 72 and in turn to the hinge bearing panel 48 on the trip blade portion 26. This urges the trip blade portion 26 of the surface-engaging section 22 to pivot toward the surface-scraping position, in which the superior (upper) edge of the mounting bracket 40 engages the inferior (lower) surface of the spacer 24B to inhibit further pivoting. When the trip blade portion 26 is in the surface-scraping position, further movement of the rider 50 under urging from the coil spring 38 will urge the surface-engaging section 22 away from the guide 32, and hence away from the moldboard 14, toward the extended position, in which the end caps 46 engage the superior end collar 32S. FIGS. 6A to 6D show the surface-engaging section 22 in the extended position with the trip blade portion 26 in the surface-scraping position.

[0040] When the surface-engaging section 22 encounters a surface contour and/or obstacle, forces will be applied to the surface-engaging section 22 through the trip blade portion 26 thereof. The vertical component of such forces will tend to cause linear movement of the trip blade portion 26 toward or away from the moldboard 14, and the horizontal component of such forces will tend to cause pivotal movement of the trip blade portion 26.

[0041] Linear movement of the trip blade portion 26 is transmitted by the mechanical linkage 58 to the rider 50 to cause the rider 50 to move linearly with the mounting shaft 38. More particularly, a vertical component of force (e.g. from an obstacle or contour) is transmitted from the blade 30 to the mounting bracket 40 to the second pair of hinge portions 72 to the pivot rod 78 to the first pair of hinge portions 70 to the spacer 24B to the mounting shafts 36. This causes the mounting shafts 36 to slide superiorly (upwardly) within the guides 32 against the urging of the coil springs 38, as shown in FIGS. 7A to 7D. At the same time, the vertical component of force does not pivot the trip blade portion 26 since such pivoting is obstructed by engagement of the superior edge of the mounting bracket 40 with the inferior surface of the spacer 24B; this means that the position of the curved pivot arms 72P of the second longitudinally spaced hinge portion 72 are fixed relative to the spacer 24B and hence also fixed relative to the mounting shafts 36. Since the positions of the curved pivot arms 72P are fixed relative to the mounting shafts 36 and the riders 50 are coupled to the curved pivot arms 72P by the transfer arms 60, there is no movement of the riders 50 relative to the mounting shafts 36; the riders 50 move with the mounting shafts 36 within the guide 32.

[0042] Pivotal movement of the trip blade portion 26 is translated by the mechanical linkage 58 into linear sliding motion of the rider 50 along the mounting shaft 36. More specifically, a horizontal component of force (e.g. from an obstacle or contour) is transmitted from the blade 30 to the mounting bracket 40 to the second pair of hinge portions 72, which then pivot about the pivot rod 78. This causes the curved pivot arms 72P of the second longitudinally spaced hinge portion 72 to pivot superiorly relative to the spacer 24B and hence also superiorly relative to the mounting shafts 36. Since the riders 50 are coupled to the curved pivot arms 72P by the transfer arms 60, the motion of the curved pivot arms 72P relative to the mounting shafts 36 is transferred by the transfer arms 60 into sliding motion of the riders 50 along the mounting shafts 36 against the urging of the coil springs 38, as shown in FIGS. 8A to 8D.

[0043] Where an obstacle and/or surface contour applies a force that includes both a horizontal and a vertical component, there will be both linear movement of the trip blade portion 26 toward or away from the moldboard 14 and also pivotal movement of the trip blade portion 26. This results in linear movement of the riders which is a combination of (a) movement of the riders 50 along the mounting shafts 36 caused by pivoting of the trip blade portion 26; and (b) movement of the riders 50 with the mounting shafts 36 caused by linear movement of the trip blade portion 26, as shown in FIGS. 9A to 9D.

[0044] Thus, FIGS. 6A to 9D illustrate a method of operating a sectional snow plow in which at least one biasing member is used to simultaneously urge the surface-engaging section toward the extended position and urge the trip blade portion toward the surface-scraping position, and in which, for each surface-engaging section, each biasing member simultaneously both urges that surface-engaging section toward the extended position while also urging the trip blade portion toward the surface-scraping position. While the exemplary embodiment shows each surface-engaging sec-

tion as having two biasing members (coil springs **38**), other embodiments may provide only a single biasing member for each surface-engaging section, or may provide three or more biasing members for each surface-engaging section. The mechanical linkage **58** shown and described herein is merely exemplary, and other types of mechanical linkage may also be used.

[0045] FIGS. **10**A and **10**B show various configurations of the surface-engaging sections **22** and trip blade portions **26**. In FIG. **10**B the rightmost surface-engaging section (which is the leftmost surface-engaging section **22** on FIG. **10**A, only a small portion of the blade **30** of which is visible in FIG. **10**A) is shown in the retracted position with its trip blade portion **26** between the deflected position and the surface-scraping position, and the second surface-engaging section **22** from the left (second from the right in FIG. **10**B) is shown in the extended position with its trip blade portion **26** in the deflected position. Continuing to refer to FIG. **10**A, the third surface-engaging section **22** from the right (third from the left in FIG. **10**B) is shown in the retracted position with its trip blade portion **26** in the surface-scraping position, the second surface-engaging section **22** from the right (second from the left in FIG. **10**B) is shown in the extended position with its trip blade portion **26** in the surface-scraping position, and the rightmost surface-engaging section **22** (leftmost in FIG. **10**B) is shown between the extended and the retracted position with its trip blade portion **26** in the deflected position.

[0046] The ability of the surface-engaging sections **22** to move independently, relative to the moldboard **14**, between the extended position and the retracted position allows the snow plow **10** to adjust to the contour of the surface being plowed. One or more individual surface-engaging sections **22** can rise to accommodate a local rise in the surface, or descend into a local depression in the surface, with the respective blades **30** remaining engaged with the surface and without lifting or lowering the rest of the snowplow. In addition, the trip blade portions **26** with the blades **30** can deflect to accommodate obstacles, and can cooperate with the linear movement of the surface-engaging sections **22** to accommodate larger obstacles than can be accommodated solely by deflection of the trip blade portions **26** and blades **30**.

[0047] As noted above, the exemplary snow plow **10** also includes a pair of wear shoes **20** for supporting the main plow body **12** on the surface being plowed. The wear shoes **20** support the main plow body **12** such that the blades **30** carried by the surface-engaging trip blade portions **26** are in engagement with the surface to be plowed. As explained in greater detail below, each wear shoe **20** is pivotally mounted to a respective wing plate **16** both proximally to and distal from the moldboard **14** so that the main plow body **12** can pivot, rise and fall relative to the wear shoes **20** when the wear shoes **20** rest on a surface.

[0048] Referring now to FIG. **11**, each wear shoe **20** is carried by and supports one of the wing plates **16**, and comprises an ankle plate **110** which articulates relative to the wing plate **16** and a skid plate **112** mounted to the ankle plate **110**, with the ankle plate **110** being generally perpendicular to the skid plate **112**. Each wear shoe defines a main portion **20**M, a leading portion **20**L and a trailing portion **20**T, and the ankle plate **110** and skid plate **112** include corresponding main portions **110**M, **112**M, leading portions **110**L, **112**L and trailing portions **110**T, **112**T. During operation of the snow plow **10**, the main portion **20**M of the wear shoe **20**, and in particular the main portion **112**M of the skid plate **112**, will slide along the surface being plowed. The leading portion **110**L of the ankle plate **110** is shaped so that the leading portion **112**L of the skid plate **112** slopes upwardly from the main portion **112**M of the skid plate **112**, and similarly the trailing portion **110**T of the ankle plate **110** is shaped so that the trailing portion **112**T of the skid plate **112** slopes upwardly from the main portion **112**M of the skid plate **112**. The overall shape of the wear shoe **20** assists in accommodating unevenness in a surface being plowed and allows the wear shoe **20** to slide over small obstacles.

[0049] Continuing to refer to FIG. **11**, each wear shoe **20** is pivotally and slidingly mounted to the outside of the respective wing plate **16**, both proximally to and distally from the moldboard **14**, so that the main plow body **12**, including the wing plates **16**, can pivot relative to the wear shoes **20** when the wear shoes **20** rest on a surface. In the illustrated embodiment, each wing plate **16** includes a reinforced aperture **114** therethrough toward its lower edge **16**L, proximally to the moldboard **14**, and each wear shoe **20** has a corresponding reinforced closed generally linear slot **118** defined through the main portion **110**M of the ankle plate **110**, adjacent the trailing portion **20**T of the wear shoe **20**. A proximal guide rod **122** having an outer flange **126** is inserted through the aperture **114** and slot **118** and secured by friction-fitting a locking pin **132** into an aperture in the proximal guide rod **122**, so that the ankle plate **110** and the wing plate **16** are trapped between the outer flange **126** and the locking pin **132** and can both slide and pivot relative to one another. Similarly, in the illustrated embodiment, a reinforced closed arcuate slot **136** is defined in the main portion **110**M of the ankle plate **110**, adjacent the leading portion **20**L of the wear shoe **20**, and a reinforced aperture **140** is defined through the wing plate **16** toward the lower edge **16**L thereof. A distal guide rod **144** having an outer flange **148** is inserted through the apertures **140** and the arcuate slot **136** and secured by friction-fitting a locking pin **154** into an aperture in the distal guide rod **144**, trapping the ankle plate **110** and the wing plate **16** between the outer flange **148** and the locking pin **154**.

[0050] Because the guide rod **144** projects from the wing plate **16** through the arcuate slot **136** in the wear shoe **20**, when the wear shoe **20** and wing plate **16** pivot relative to one another about the proximal guide rod **122**, the distal guide rod **144** slides within the arcuate slot **136** and acts as a stop by preventing the wear shoe **20** and wing plate **16** from pivoting beyond the limits defined by the arcuate slot **136**. The ability of the main plow body **12** to pivot relative to the wear shoes **20** when the wear shoes **20** rest on a surface provides the snow plow **10** with a self-leveling function. The closed generally linear slot **118** allows the position of the moldboard **14** and wing plates **16**, relative to the wear shoe **20**, to adjust to accommodate wear on the blades **30** over time.

[0051] Certain currently preferred embodiments have been described by way of example. It will be apparent to persons skilled in the art that a number of variations and modifications can be made without departing from the scope of the claims.

What is claimed is:

1. A snow plow, comprising:

a main plow body comprising a moldboard; and

a plurality of surface-engaging sections movably carried by the moldboard and depending from the moldboard in side-by-side relationship with one another,

each of the surface-engaging sections being linearly movable relative to the moldboard between an extended position and a retracted position, independently of each other surface-engaging section, for adjusting to a contour of a surface being plowed; and

each of the surface-engaging sections comprising:

a main body portion;

a surface-engaging trip blade portion pivotally carried by the main body portion so as to be pivotable between a surface-scraping position and a deflected position;

at least one mounting shaft extending from the main body portion and slidably received in a respective guide fixed to the moldboard;

each mounting shaft having a rider slidably disposed thereon for sliding movement along the respective mounting shaft, independent of sliding movement of the respective mounting shaft within its respective guide; and

each rider being coupled to the trip blade portion by a mechanical linkage that:

transmits linear movement of the trip blade portion to the rider to cause the rider to move linearly with the mounting shaft; and

translates pivotal movement of the trip blade portion into linear sliding motion of the rider along the mounting shaft;

at least one biasing member acting between the moldboard and the riders, whereby for each individual biasing member, the biasing member acts through the respective mechanical linkage to simultaneously both:

urge the respective surface-engaging section toward the extended position; and

urge the respective trip blade portion toward the surface-scraping position.

2. The snow plow of claim **1**, wherein the mechanical linkage comprises at least one rigid transfer bar, each transfer bar being pivotally coupled to the trip blade portion and pivotally coupled to the rider.

3. The snow plow of claim **2**, wherein each biasing member comprises a coil spring surrounding a respective one of the at least one mounting shaft and captured between the respective rider and a superior end collar on the guide.

4. A method of operating a sectional snow plow, comprising:

providing a sectional snow plow having a plurality of surface-engaging sections movably carried by the moldboard and depending from the moldboard in side-by-side relationship with one another,

each of the surface-engaging sections being linearly movable relative to the moldboard between an extended position and a retracted position, independently of each other surface-engaging section, for adjusting to a contour of a surface being plowed; and

each of the surface-engaging sections comprising:

a main body portion;

a surface-engaging trip blade portion pivotally carried by the main body portion so as to be pivotable between a surface-scraping position and a deflected position

for each surface-engaging section, using at least one biasing member to simultaneously urge that surface-engaging section toward the extended position and urge the trip blade portion toward the surface-scraping position;

wherein for each surface-engaging section, each biasing member simultaneously both urges that surface-engaging section toward the extended position while also urging the trip blade portion toward the surface-scraping position.

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