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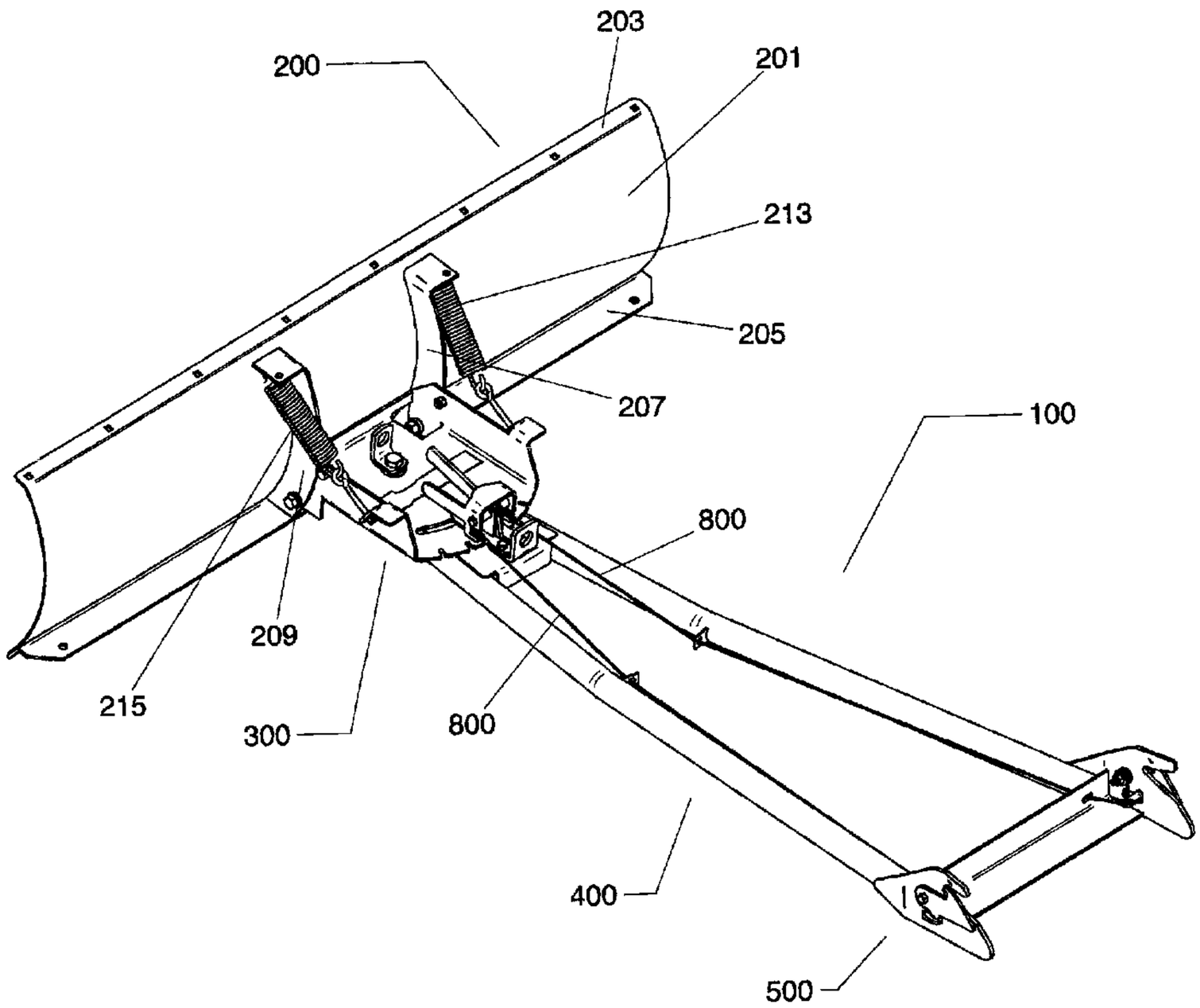
(54) Titre : ENSEMBLE SUPPORT DE CHASSE-NEIGE DE VTT A SYSTEME DE VERROUILLAGE RAPIDE ET METHODE D'INSTALLATION CONNEXE

(54) Title: ATV PLOW SUPPORT FRAME ASSEMBLY WITH QUICK LOCKING SYSTEM AND METHOD FOR INSTALLING SAME



(57) Abrégé/Abstract:
A plow or other front-mounted accessories support frame assembly for an All-Terrain Vehicle (ATV) is provided. The plow is attached to a frame which comprises, at its rearward end, a novel locking system. The locking system comprises pivotally attached locking hooks to securely attach the support frame assembly to the ATV underside. A handle, connected to the locking hooks via linking cables, preferably allows for the unlocking of the support frame assembly from the ATV.

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ATV PLOW SUPPORT FRAME ASSEMBLY WITH QUICK LOCKING SYSTEM AND METHOD FOR INSTALLING SAME

Abstract

A plow or other front-mounted accessories support frame assembly for an All-Terrain Vehicle (ATV) is provided. The plow is attached to a frame which comprises, at its rearward end, a novel locking system. The locking system comprises pivotally attached locking hooks to securely attach the support frame assembly to the ATV underside. A handle, connected to the locking hooks via linking cables, preferably allows for the unlocking of the support frame assembly from the ATV.

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Title of the Invention

[0001] ATV plow support frame assembly with quick locking system and method for installing same.

Field on the Invention

[0002] This invention relates to front-end mounted accessory support frame assembly for a vehicle. More particularly, this invention relates to a plow support frame assembly for all-terrain vehicle (ATV) comprising a quick locking and unlocking system.

Background of the Invention

[0003] Since a couple of years, the All-Terrain Vehicles (ATV) market has been growing steadily. Moreover, ATV users have been using their vehicle for new tasks such as snow removal, load transport, etc. To help ATV users make the fullest use of their vehicle, numerous accessories have been put on the market. Snow plow assemblies, traction kits, carrying cases and trailer hitches just to name a few.

[0004] However, in order for the ATV user to use an accessory to its full capacity, the accessory must be easy to use but more importantly, easy to install. In the field of snow plow and other front-mounted accessories support frame assemblies, this is even more important since these assemblies are generally relatively heavy and thus difficult to manipulate and install. The present invention simplifies the installation and uninstallation of a snow plow support frame assembly by means of a novel locking system.

[0005] Since the support frame assembly of the present invention can be used with accessories other than plows, hereinafter, the term "plow" shall be construed broadly and shall therefore relate to any front-mounted accessories such as plow, snow blade and other similarly mounted accessories.

[0006] Systems currently on the market are not easy or are time consuming to install. In the vast majority of cases, when the user is alone, he or she (hereinafter, for the sake of simplicity, only the masculine form will be used) must use brute force to install the plow assembly on his ATV. This comes from the fact that all the weight of the plow assembly rests on the ground, thus, the user must overcome the friction force between the ground and the plow. Moreover, since a snow plow or blade are generally made of metal, they can be relatively heavy and the friction force between the ground and the plow can be relatively large.

[0007] Thus, in general, most systems currently on the market necessitate at least two individuals to install a plow support frame assembly on an ATV in a quick and easy manner. The present invention overcomes this drawback by allowing a single user to install the novel plow support frame assembly on his ATV quickly and, most importantly, with very little effort.

[0008] Most plow support frame assemblies sold on the market today must be attached, underneath the ATV, by means of pins or bolts and screws. In US patents nos. 6,502,334; 6,843,002 and RE37,628, the rear end of the plow support frame is attached to the underside of the ATV with pins. Thus, the user must individually align each attach bracket of the plow support frame with each bracket of the ATV and then insert the pin or bolt. This operation can be difficult and time consuming. US patent no. 6,732,811 discloses a different attaching system comprising of U-shaped bolts. This system is not easier to use since the plow support frame assembly must first be positioned in place before the U-bolts can be attached to the frame. Furthermore, each end of each U-bolt must be secured in place by means of a screw.

[0009] There exists, however, plow support frame assemblies with quick connect systems for use on tractors, small trucks and all-terrain vehicles. Systems that resemble most systems used on ATV's are those used on small trucks. Examples of such systems can be seen in US patents nos. 6,594,924 ; 6,381,880 ; 6,209,231 and 6,145,222. These patents disclose a plow support frame assembly wherein the attachment means comprise a female

element, fixedly attached to the underside front portion of the truck. The female element further comprises a transversal metal rod. The male element, located on the plow assembly frame, has a shape generally matching the shape of the female element in order to have an adequate connection. The plow support frame assembly attachment means further comprise one or a plurality of latches. Thus, to install the plow support frame assembly described in the aforementioned patents, one must align the truck, equipped with the female element, with the plow support frame assembly. Then, the male element is inserted in the female element, generally by driving the truck forward. Upon completion of the insertion, the latch or latches are pivoted around the transversal metal rod in order to securely lock the plow support frame assembly to the truck.

[0010] A similar plow support frame assembly for ATVs has been built by Polaris Industries. In the system of Polaris, the user drives his ATV partly over the plow support frame assembly, a part of which automatically connects with the ATV. Then, the user, using his winch, raises the plow support frame assembly and finishes the installation.

[0011] Finally, another system is disclosed in the US patent application publication no. 2004/0148811. This system is very similar to the one disclosed in the US patents nos. 6,594,924; 6,381,880; 6,209,231 and 6,145,222 described earlier. In this system, the locking mechanism between the plow assembly frame and the ATV is not readily accessible and is not automatic.

[0012] Thus, there is indeed a need for a new and improved locking system for a plow support frame assembly for an ATV.

Object of the Invention

[0013] Thus, an object of the present invention is to provide a new locking mechanism for a plow support frame assembly for a vehicle which is easy to install.

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[0014] Another object of the present invention is to provide a locking mechanism for a plow support frame assembly for a vehicle which locks itself automatically upon installation.

[0015] Yet another object of the present invention is to provide a locking mechanism for a plow support frame assembly for a vehicle which can be unlocked easily by the user.

[0016] Still another object of the present invention is to provide a locking mechanism for a plow support frame assembly for a vehicle which will not unlock itself accidentally during use.

[0017] Other and further objects and advantages of the present invention will be obvious upon an understanding of the illustrative embodiments about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

Summary of the Invention

[0018] To attain these and other objects which will become more apparent as the description proceeds according to one aspect of the present invention, there is provided plow support frame assembly for an ATV which comprises an improved locking mechanism.

[0019] The plow support frame assembly of the present invention generally comprises a plow and preferably a plow angular adjustment assembly which itself comprises an angular latch bracket and an unlocking handle. The plow support frame assembly further comprises a frame having a forward portion and a rearward portion, at least one but preferably two locking hooks and at least one but preferably two linking cables.

[0020] The plow of the plow support frame assembly is preferably pivotally attached to the plow angular adjustment assembly which is itself preferably pivotally attached to the

forward portion of the frame. The locking hooks are preferably pivotally attached to the frame rearward portion. The unlocking handle and the locking hooks are linked by at least one but preferably two cables.

[0021] Other aspects and many of the attendant advantages will be more readily appreciated as the same becomes better understood by reference to the following detailed description and considered in connection with the accompanying drawings in which like reference symbols designate like elements throughout the figures.

Description of the Drawings

[0022] For a fuller understanding of the nature and object of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

[0023] Figure 1 is an isometric view of the preferred embodiment of the plow support frame assembly of the present invention.

[0024] Figure 2 is a close-up isometric view of the angular adjustment assembly of the plow support frame assembly.

[0025] Figure 3 is a close-up isometric view of the underside of the angular adjustment assembly of the plow support frame assembly.

[0026] Figure 4 is a close-up isometric view of the locking mechanism of the plow support frame assembly.

[0027] Figure 5 is an exploded view of the plow support frame assembly of figure 1.

[0028] Figure 6A is an isometric view of the frame of the support frame assembly of figure 1.

[0029] Figure 6B is a top view of the frame of the support frame assembly of figure 1.

[0030] Figure 6C is a side view of the frame of the support frame assembly of figure 1.

[0031] Figure 6D is a rear view of the frame of the support frame assembly of figure 1.

[0032] Figure 6E is a front view of the frame of the support frame assembly of figure 1.

[0033] Figure 7A is an isometric view of the angular adjustment plate of the support frame assembly of figure 1.

[0034] Figure 7B is a top view of the angular adjustment plate of the support frame assembly of figure 1.

[0035] Figure 7C is a side view of the angular adjustment plate of the support frame assembly of figure 1.

[0036] Figure 8A is an isometric view of the angular latch bracket of the support frame assembly of figure 1.

[0037] Figure 8B is a top view of the angular latch bracket of the support frame assembly of figure 1.

[0038] Figure 8C is a side view of the angular latch bracket of the support frame assembly of figure 1.

[0039] Figure 9A is an isometric view of the unlocking handle of the support frame assembly of figure 1.

[0040] Figure 9B is a front view of the unlocking handle of the support frame assembly of figure 1.

[0041] Figure 9C is a side view of the unlocking handle of the support frame assembly of figure 1.

[0042] Figure 9D is a top view of the unlocking handle of the support frame assembly of figure 1 in its unfolded form.

[0043] Figure 10A is a side view of the right locking hook of the support frame assembly of figure 1.

[0044] Figure 10B is an isometric view of the right locking hook of the support frame assembly of figure 1.

[0045] Figure 10C is a front view of the right locking hook of the support frame assembly of figure 1.

[0046] Figure 10D is a side view of the right locking hook of the support frame assembly of figure 1 in its unfolded form.

[0047] Figure 11A is a side view of the left locking hook of the support frame assembly of figure 1.

[0048] Figure 11B is an isometric view of the left locking hook of the support frame assembly of figure 1.

[0049] Figure 11C is a rear view of the left locking hook of the support frame assembly of figure 1.

[0050] Figure 11D is a side view of the left locking hook of the support frame assembly of figure 1 in its unfolded form.

[0051] Figure 12 is a front view of the plow assembly and an ATV prior to the installation of the plow support frame assembly.

[0052] Figure 13 is a side view of the plow support frame assembly upon installation on an ATV.

[0053] Figure 14 is a side view of the plow support frame assembly once installed on an ATV.

[0054] Figure 15 and 16 are close-up views of the locking mechanism of the plow support frame assembly as locked on an ATV.

[0055] Figure 17 is a side view of the plow support frame assembly upon actuation of the unlocking handle.

Description of a Preferred Embodiment

[0056] Referring to Fig. 1, we can see the plow support frame assembly 100 of the present invention. The plow support frame assembly generally comprises a plow 200 or other front-mounted similar devices, an angular adjustment assembly 300, a frame 400 and a locking mechanism 500. Referring to Fig. 2, we see that the angular adjustment assembly 300 comprises an angular latch bracket 600, an angular latch 650 and an unlocking bracket 700 comprising an unlocking device preferably configured as a handle 710. Since the plow support frame assembly 100 comprises several component parts, each of which will be described individually prior to describe the full system.

[0057] Plow assembly frame

[0058] Referring to Fig. 6A, we can see the frame 400 of the plow support frame assembly. This frame 400 is preferably a A-shape frame having a forward end and a rearward end. The width of the forward end is preferably smaller than the width of the rearward end. The frame 400 comprises two preferably metallic tubes 406 and 407. At about a third of way, starting from the forward end, the tubes are slightly bent 410 upwardly in order to add more clearance to the plow support frame assembly 100.

[0059] The two tubes 406 and 407 are linked together at the forward end by two preferably metal plates 401 and 408. The first plate 401 is located on the upper side of the frame 400, above the tubes 406 and 407. The shape of the plate generally matches the shape of the A-frame forward end. The plate 401 has a front portion and a back portion. The front portion of the plate comprises a hole which allows the mounting of the angular adjustment assembly 300 by means of a screw, bolt, pin or the like.

[0060] The back portion of the plate comprises holes to secure the angular latch bracket 600 with screws, bolts, pins or the like. The back portion also comprises a slot to allow the passage of the angular latch 650. The rearmost portion of the plate in bent downwardly, preferably at 90°, to add rigidity to the frame 400.

[0061] The second plate 408 is a reinforcing plate having a L-shape. The plate is fixedly attached to the end of both tubes 406 and 407 and to the first plate 401 as shown in Fig. 6A. This second plate 408 also comprises a hole, aligned with hole of the front portion of the first plate 401, which allows the mounting of the angular adjustment assembly 300.

[0062] The combination of plate 401 and plate 408 improves the strength of the frame 400, particularly at the forward end. Other means to improve the strength of the frame, such as adding more plates or to attach the angular assembly 300, the angular latch bracket 600 or other parts, such as welding, could also be used without departing from the scope of the invention.

[0063] Located along the tubes, inside the frame 400 as shown in Fig. 6A, are cable guides 405. There is one or more guides 405 on each tube and each guide 405 is preferably welded on the tube. The cable guides 405 are preferably small metal mounts comprising an aperture. The cable guides allow to redirect the cables 800 (see Figs. 2 and 3) for the locking system 500 and to prevent cables from scraping against the ground or the vehicle.

[0064] The rearward end of the A-frame comprises two attachments means 402 and 403 and an angle iron 404.

[0065] The two attachments means 402 and 403 are two preferably metallic plates. Only one plate 403 will hereinafter be described since the two plates 402 and 403 are of symmetric nature as best seen in Figs. 6A and 6B. The front portion of the plate 403 is fixedly attached, preferably by welding, to the rear end of the tube 407. The plate 403 is slightly bent, toward the interior of the frame, in order to be parallel with its corresponding symmetric plate 402. This bent thus defines the front portion, already described and a rear portion. As seen in Fig. 6A, the rear portion comprises a recess 411 with an innermost radius generally matching the radius of the support rod or bar located of the ATV (see Figs. 15 and 16). The portion 413 above the recess is bent toward the exterior of the frame. Thus, taken together, the portions 413 and 415 above the recess define a funnel like shape which helps to attach the frame to the ATV. The portion under the recess is not bent. This portion includes a circular hole which receives the fastening means for securing the locking hook 510 to the attachment means 403. This hole also defines a pivot point for the locking hook 510. The portion further includes an arcuate aperture which allows the locking hook 510 to pivot around the pivot point. This arcuate aperture also limits the rotational movement of the locking hook 510.

[0066] Finally, located between both attachment means and at the rear end of the tube is the iron angle 404. This iron angle 404 serves two purposes. First, it gives an adequate support to the attachment means 402 and 403 and secondly, it rigidifies the rearward portion of the A-frame. Iron angle 404 comprises two oblong apertures, preferably

located near the attachment means, one on each side. More precisely, these oblong apertures are located at the intersection between the interior of the A-frame and the interior of the tube. The part of these apertures located in the interior of the A-frame allows the passage of the cables 800. The part located in the interior of the tubes allows any water accumulated inside one of the tubes 406 and 407 to be expelled.

[0067] Angular adjustment assembly

[0068] The angular adjustment assembly 300 is the link between the plow 200 and the frame 400. The angular adjustment assembly 300 acts as plow 200 or other accessory mounting assembly and also allows the adjustment of the angle of the plow 200.

[0069] Referring to Figs. 7A and 7B, the piece of equipment is a plate 301 preferably made of metal. This plate comprises a plurality of angular adjustment notches 303. Preferably, these notches 303 are located at 25°, 12.5°, 0°, -12.5° and -25°. It is to be noted that these angles are by no means limitative in nature and other angles could be used without departing from the scope of the invention. The number of notches 303 can also be changed.

[0070] As shown in Fig. 7A, the sides 305 and 307 of the plate 301 are bent upwardly, preferably at 90°. These bent sides 305 and 307 further comprises small ears 309 and 311 bent outwardly (best shown in Fig. 7B). These ears 309 and 311 include a hole which is used to secure the plow retaining spring. The bent sides 305 and 307 further include downward protuberances. Each protuberance includes a hole reinforced with welded metal rings or flat bars. These holes receive the bolts that secure the plow 200 to the angular adjustment assembly 300.

[0071] The front portion of the plate 301 is also bent upwardly, preferably at 90°. This bent portion adds some strength to the angular adjustment assembly 300.

[0072] As seen in Fig. 7A, the plate 301 further comprises a hole 313, approximately located in the center of the plate 301. This hole 313 also defines a pivot point around which the angular adjustment assembly 300 will pivot. This is also reinforced with a welded metal ring. Located near the notches 303 is an arcuate aperture 315. This aperture 315, which allows the passage of a fixating pin or bolt of the angular latch bracket 600, also limits the angular travel of the angular adjustment assembly 300.

[0073] Angular latch bracket

[0074] As best shown in Fig. 8A, the angular latch bracket 600 is generally a small metal base plate 601 onto which two parallel protuberances 602 and 603 are projecting upwardly. These protuberances 602 and 603 are at right angle with the metal base plate 601. These two protuberances 602 and 603 further comprise two aligned holes 612 and 613, one in each protuberance, which also define a pivot point. The space defined between the protuberances 602 and 603 is where the latch 650 (see Fig. 2) will be located. The latch will pivot around the pivot point defined by the holes 612 and 613.

[0075] The base plate 601 further comprises a plurality of fastening holes, preferably three, which will be used to attach the base plate onto the angular adjustment assembly 300. The base plate 601 also includes an elongated slot or aperture 620. This aperture 620 allows the passage of the latch 650 when the aperture 620 is aligned with one of the angular adjustment notches 303 previously described.

[0076] Unlocking bracket

[0077] The unlocking bracket 700, best seen in Fig. 9A, is a U-shape piece 701, preferably made of bent metal. The bent sides 702 and 703 of the opening bracket 700 comprise attachment holes 714 and 715 and cable attachment means 704 and 705. The attachment holes 714 and 715, which are aligned, define a pivot point for the handle to pivot around. One of the side 702 or 703 further comprises an elongated protuberance 710 which acts as the handle. In Fig. 9A, the handle 710 extends from bent side 703.

[0078] Locking hooks

[0079] As best seen in Figs. 15 and 16, the main use of the locking hooks 510 and 520 is to securely attach the frame 400 of the plow support frame assembly 100 to the support rod located on the ATV. As seen in Fig. 4, the locking hooks 510 and 520 are two symmetric pieces of equipment. Each hook is associated with one attachment means 402 and 403 of the frame 400. Figs. 10A-10B and 11A-11B show detailed views of each of the locking hooks 510 520. Since both hooks 510 and 520 are symmetric in nature, only hook 520 of Fig. 10A-10B will be described. Hook 520 comprises a round portion 521 and a pointed portion 522. The pointed portion 522 is directed toward the ATV and allows the support rod to slide along the slope 526 of the locking hook 520. At the end of the slope side 526 of the point portion is a recess 523 which has a radius generally matching the radius of the support rod of the ATV (see Figs. 15 and 16). It is this recess 523 that effectively locks the frame 400 to the ATV.

[0080] The locking hook 520 also comprise a small protuberance 524, bent inwardly, which protuberance 524 comprises cable attachment means 525. The locking hook 520 further comprises pin holes which allow the locking hook 520 to pivot around the pin (not shown).

[0081] As best seen in Fig. 4, the locking hooks 510 and 520 are held in place via a bolt and nut assembly and a torsion spring. The torsion springs effectively keep the locking hooks 510 and 520 in locked position.

[0082] Linking cables

[0083] The linking cables 800, best seen in Figs. 1, 2 and 4, act as a mechanical link between the unlocking bracket 700 and the locking hooks 510 and 520. At both ends of each cable 800 are mounting loops 810 and 820. The loops are inserted into the cable attachments means of the unlocking handle 704 and 705 and of the locking hooks 515

and 525. The linking cables 800 allow the actuation of the locking hooks 510 and 520 by the actuation of the unlocking bracket 700. The skilled addressee will understand that other similar linking mechanisms, devices or means could be used instead.

[0084] Plow

[0085] Since the design of plow 200 and other front-mounted accessories is generally known in the art, it is considered outside the scope of this invention and will not be described any further.

[0086] General system functioning

[0087] Since the plow support frame assembly 100 is symmetric in nature, only one side of the system will be described for the sake of simplicity.

[0088] Starting from the forward end of the plow support frame assembly 100, the plow 200 is pivotally attached to the angular adjustment assembly 300, preferably using bolts and nuts. So attached, the plow 200 can pivot around a horizontal axis. The plow 200 is also linked to the angular adjustment assembly 300 via retaining springs 213 and 215.

[0089] The angular adjustment assembly 300 is pivotally attached to the forward end of the A-frame 400, preferably on the front plates 401, using nut and bolt. On top of the angular adjustment assembly 300 is the angular latch bracket 600 which is attached to the first plate 401 of the frame 400 using nuts and bolts. As seen in Fig. 2, the angular latch bracket 600 is completed with the angular latch 650 and the unlocking bracket 700. The latch 650 is kept in its angular notch 303 by a small retaining spring 651 (see Fig.3).

[0090] To create a small space between the angular adjustment assembly 300 and the first plate 401 of the forward end of the frame 400, a ring spacer and an anchoring bracket 900 are inserted between the angular latch bracket 600 and the first plate 401. The anchoring bracket 900 also serves as attachment means for the winch hook 950 (see Fig. 13).

[0091] This single latch 650 and bracket 700 assembly have the particularly interesting characteristic to allow the latch 650 and the bracket 700 to function independently one from the other.

[0092] To the unlocking bracket 700 are attached to two steel cables 800. These cables then go through the cable guides 405, through the oblong apertures in the angle iron 404 and up to the locking hooks 510 and 520. These hooks 510 and 520 are pivotally attached to the rearward end attachment plates 402 and 403 of the frame 400 via at least nuts and bolts. To allow a better functioning of the locking mechanism 500, washers can be inserted between the locking hooks 510 and 520 and the attachments plates 402 and 403. These washers prevent dirt, ice or snow to block the locking mechanism 500. The locking hooks 510 and 520 are maintained in locked position by preconstrained torsion springs generally coaxially mounted between the fixating nut and bolt as seen in Fig. 4.

[0093] To install the plow support frame assembly 100, the user of the ATV drives his vehicle partly over the rearward end of the frame as seen in Figs. 12 and 13. The frame 400 is most preferably aligned with the longitudinal axis of the ATV. The user then gets down from his ATV and attaches the winch hook to the anchoring bracket 900. Then, using the winch, the user raises the plow support frame assembly 100 approximately four (4) inches or ten (10) centimeters from the ground. The user, as shown in Fig. 13, then goes in the front of the plow and pushes the plow support frame assembly 100 on the support rod or bar located on the ATV. By sliding along the slopes 516 and 526 of the locking hooks 510 and 520 and the attachment plates 402 and 403, the rod forces open the locking hooks 510 and 520. When the rod is completely inside the recesses 513 and 523, as shown in Figs. 15 and 16, the locking hooks 510 and 520 forcefully return to their locked position with the help of the torsion springs. The user then returns on his ATV and lowers the plow assembly using the winch.

[0094] To remove the plow support frame assembly 100, the user lowers the plow assembly with the winch and gets down from his ATV. Then, by pulling on the unlocking

handle 710, as shown in Fig. 17, the user actuates the locking hooks 510 and 520 to their unlocked position. Then, simply by pulling on the assembly 100 while maintaining the pulling force on the unlocking handle 710, the support rod is extracted from the recesses 411, 412, 513 and 523 and thus, from the locking mechanism 500.

[0095] Although the present plow support frame assembly with a quick locking system has been described with a certain degree of particularity, it is to be understood that the disclosure has been made by way of example only and that the present invention is not limited to the features of the embodiment(s) described and illustrated herein, but includes all variations and modifications within the scope and spirit of the invention as hereinafter claimed.

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Claims

1. A support frame assembly for supporting a front-mounted accessory on a vehicle, said assembly comprising:
    a. a frame having a forward portion and a rearward portion;
    b. an accessory mounting assembly;
    c. an unlocking device;
    d. locking device; and
    e. linking means;

wherein said mounting assembly is mounted to said frame forward portion, said unlocking device is mounted adjacent to said forward portion, said locking device is mounted to said frame rearward portion and wherein said unlocking device and said locking device are operatively connected via said linking means.

2. A support frame assembly as claimed in claim 1, wherein said unlocking device is a piece fixed to said support frame assembly having a means to actuate said first linking means.

3. A support frame assembly as claimed in claim 2, wherein said unlocking device has a pivot point.

4. A support frame assembly as claimed in claim 3, wherein said unlocking device further comprises a first portion extending from said pivot point.

5. A support frame assembly as claimed in claim 4, wherein said unlocking device further comprises a second portion extending from said pivot point.

6. A support frame assembly as claimed in claim 5, wherein said first portion and second portion are substantially perpendicular to each other.

7. A support frame assembly as claimed in claim 4, wherein said linking means is connected to said first portion.

8. A support frame assembly as claimed in claim 7, wherein when a force is applied on said second portion, said unlocking device rotates around said pivot point and thereby actuates said linking means.

9. A support frame assembly as claimed in claim 8, wherein said linking means is attached to said locking device.

10. A support frame assembly as claimed in claim 9, wherein said linking means is a cable.

11. A support frame assembly as claimed in claim 1, wherein said locking device is adapted to lock onto a support rod of said vehicle.

12. A support frame assembly as claimed in claim 11, wherein said locking device is defined by a combination of a receiving portion located at the rearward portion of said support frame and a locking element movably mounted adjacent to said receiving portion, said locking element having at least a locked position and an unlocked position with respect to said receiving portion.

13. A support frame assembly as claimed in claim 12, wherein said receiving portion is fixedly mounted to said support frame.

14. A support frame assembly as claimed in claim 13, wherein said locking element is pivotally mounted to said receiving portion.

15. A support frame assembly as claimed in claim 14, wherein said receiving portion defines a first recess.

16. A support frame assembly as claimed in claim 15, wherein said locking element defines a second recess.

17. A support frame assembly as claimed in claim 16, wherein when said locking element is in locked position, said first recess and said second recess define an aperture sized to receive said support rod.

18. A support frame assembly as claimed in claim 17, wherein said locking element comprises a pointed portion adjacent to a slope portion extending toward said second recess whereby said support rod can slide along said slope portion.

19. A support frame assembly as claimed in claim 18, wherein said second recess and said slope portion define a hook-like portion to lock said support rod.

20. A support frame assembly as claimed in claim 14, wherein said locking element pivots when said unlocking device is actuated.

21. A support frame assembly as claimed in claim 14, wherein said locking element further comprises attachment means for connection with said linking means.

22. A support frame assembly as claimed in claim 21, wherein said attachment means are located on a protuberance.

23. A support frame assembly as claimed in claim 22, wherein said protuberance extends from said locking element.

24. A support frame assembly as claimed in claim 18, wherein said locking device further comprises resilient means for keeping said locking element in said locked position.

25. A support frame assembly as claimed in claim 24, wherein when said locking device is pushed against said support rod, said support rod slides along said slope portion of

said locking element and forces said locking element to pivot, thereby allowing said support rod to enter said first recess.

26. A support frame assembly as claimed in claim 11, wherein said locking device comprises:

a. a first receiving portion located on a first side of said rearward portion of said support frame;

b. a second receiving portion located on a second side of said rearward portion of said support frame;

c. a first locking element movably mounted adjacent to said first receiving portion, said first locking element having at least a locked position and an unlocked position with respect to said first receiving portion;

d. a second locking element movably mounted adjacent to said second receiving portion, said second locking element having at least a locked position and an unlocked position with respect to said second receiving portion.

27. A support frame assembly as claimed in claim 26, wherein said first and second receiving portions are fixedly mounted to said support frame.

28. A support frame assembly as claimed in claim 27, wherein said first locking element is pivotally mounted to said first receiving portion and said second locking element is pivotally mounted to said second receiving portion.

29. A support frame assembly as claimed in claim 28, wherein said first receiving portion defines a first recess.

30. A support frame assembly as claimed in claim 29, wherein said second receiving portion defines a second recess.

31. A support frame assembly as claimed in claim 30, wherein said first locking element defines a third recess.

32. A support frame assembly as claimed in claim 31, wherein said second locking element defines a fourth recess.

33. A support frame assembly as claimed in claim 32, wherein when said first and said second locking elements are in said locked position, said first and third recesses define a first aperture and said second and fourth recesses define a second aperture, both said apertures being sized to receive said support rod.

34. A support frame assembly as claimed in claim 33, wherein said first locking element comprises a first pointed portion adjacent to a first slope portion extending toward said third recess and said second locking element comprises a second pointed portion adjacent to a second slope portion extending toward said fourth recess whereby said support rod can slide along said first slope portion and said second slope portion.

35. A support frame assembly as claimed in claim 34, wherein said third recess and said first slope portion define a first hook-like portion and said fourth recess and said second slope portion define a second hook-like portion, both said hook-like portions being adapted to lock said support rod.

36. A support frame assembly as claimed in claim 28, wherein said first and second locking elements pivot when said unlocking device is actuated.

37. A support frame assembly as claimed in claim 36, wherein said first locking element further comprises first attachment means for connection with said linking means and wherein said second locking element further comprises second attachment means for connection with said linking means.

38. A support frame assembly as claimed in claim 37, wherein said respective first and second attachment means are located on a respective first and second protuberance.

39. A support frame assembly as claimed in claim 38, wherein said respective first and second protuberances extend from said respective first and second locking elements.

40. A support frame assembly as claimed in claim 26, wherein said locking device further comprises resilient means for keeping said first and said second locking elements in said locked position.

41. A support frame assembly as claimed in claim 24, wherein when said locking device is pushed against said support rod, said support rod slides along said first and said second slope portions of said respective first and second locking elements and forces said first and second locking elements to pivot, thereby allowing said support rod to enter said first and said second recesses.

42. A support frame assembly for supporting a front-mounted accessory on a vehicle, said support frame assembly comprising:

a. a frame having a front end portion and a rear end portion;

b. an accessory mounting assembly mounted near said front end portion of said frame;

c. an unlocking assembly mounted near said front end portion of said frame;

d. a locking assembly mounted near said rear end portion of said frame, said locking assembly having at least a locked position and an unlocked position;

e. linking means operatively connecting said unlocking assembly and said locking assembly;

whereby actuation of said unlocking assembly changes the position of said locking assembly from said locked position to said unlocked position.

43. A support frame assembly for supporting a front-mounted accessory on a vehicle, said support frame assembly comprising:

a. a frame having a first end and a second end, said second end being distal from said first end;

b. an accessory mounting assembly mounted near said first end of said frame;

c. unlocking means mounted near said first end of said frame;

d. locking means mounted near said second end of said frame, said locking means being distal from said unlocking means;

e. linking means operatively connecting said unlocking means and said locking means;

whereby actuation of said unlocking means opens said locking means.

44. A method to install a front-mounted accessory support frame assembly on a vehicle, said support frame assembly comprising a locking mechanism, said vehicle comprising support means and a winch with winch cable, said method comprising:

a. driving said vehicle partly over said support frame assembly;

b. attaching said winch cable to said support frame assembly;

c. raising said support frame assembly with said winch;

d. aligning said locking mechanism with said support means;

e. pushing said support frame assembly in order for the locking mechanism to lock on said support means;

f. lowering said support frame assembly.

45. A method to uninstall a front-mounted accessory support frame assembly from a vehicle, said support frame assembly comprising a locking mechanism mechanically linked to an unlocking means, said vehicle comprising support means and a winch with winch cable, said method comprising:

a. lowering said support frame assembly using said winch;

b. unlocking said locking mechanism from said support means by actuating said unlocking means;

c. pulling said support frame assembly while maintaining the actuation of said unlocking means;

d. detaching said winch cable from said support frame assembly.

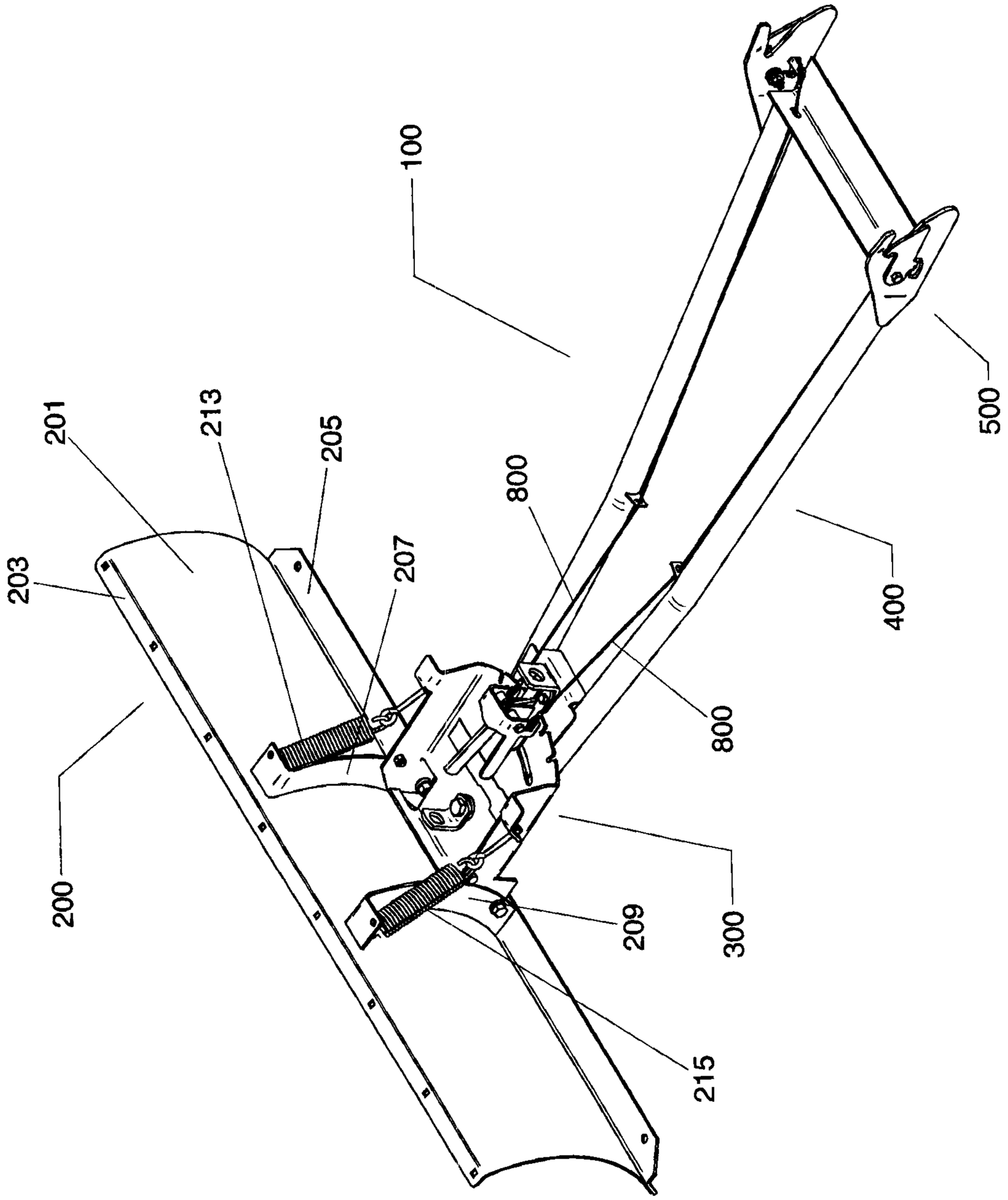


Fig. 1

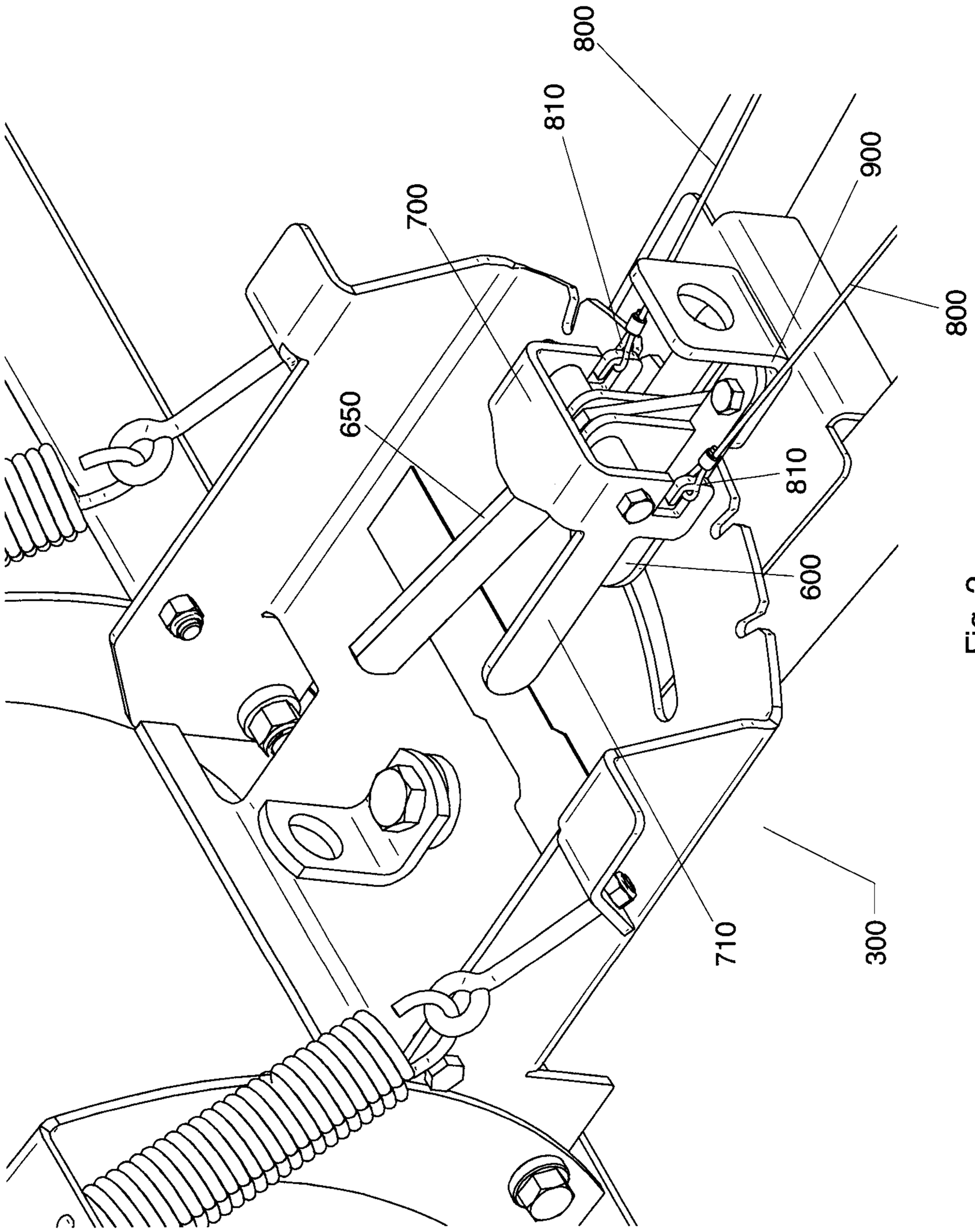


Fig. 2

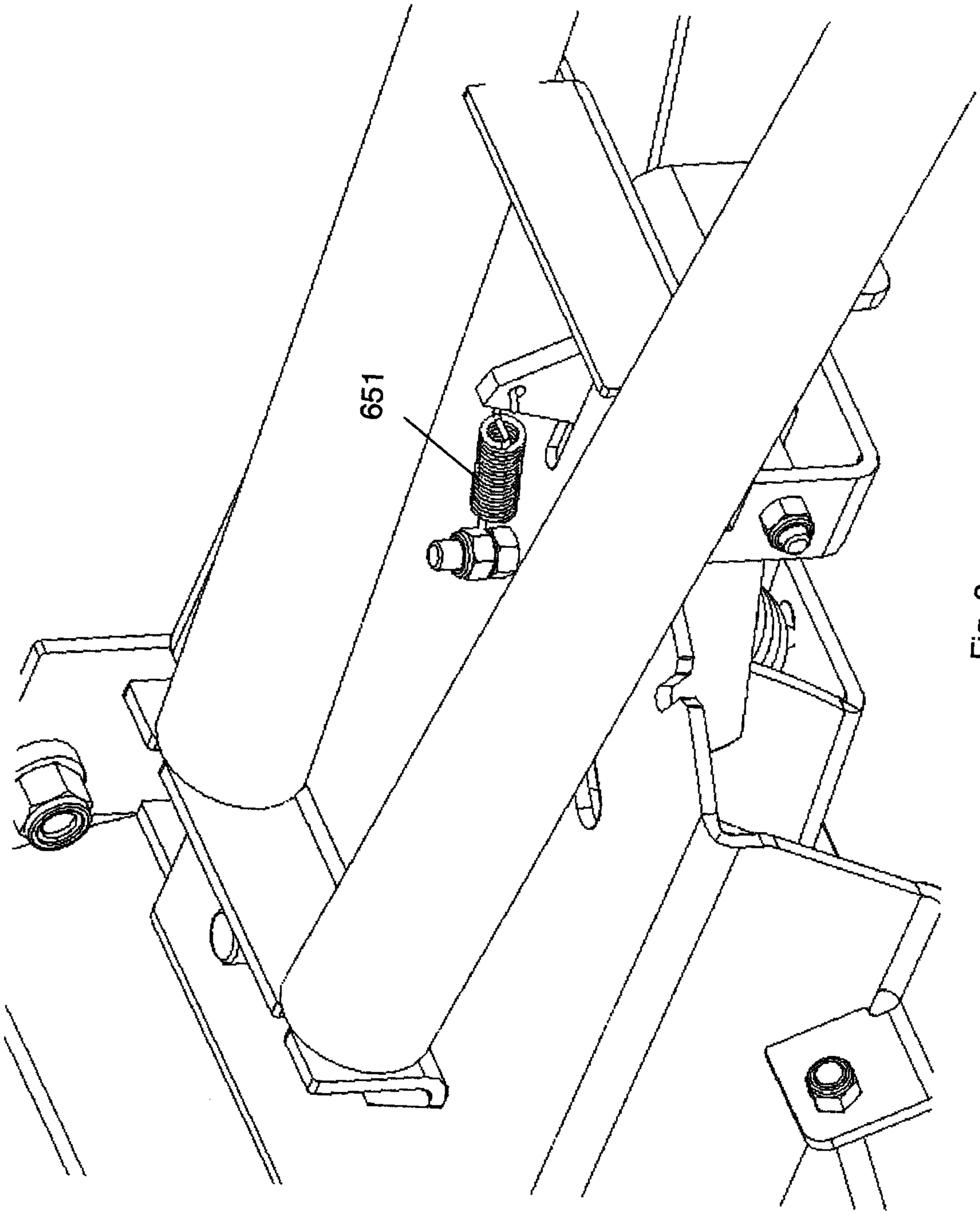


Fig. 3

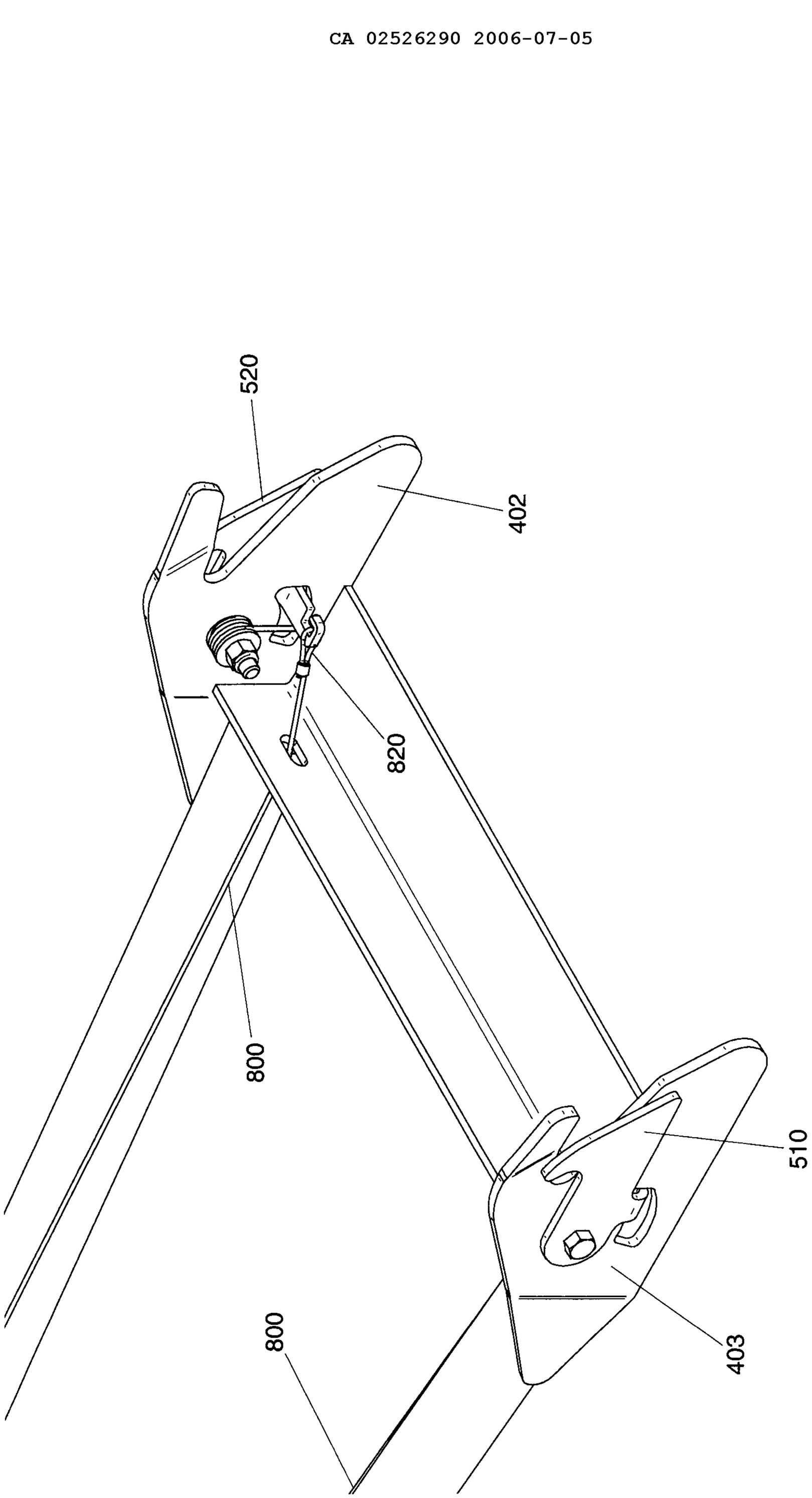


Fig. 4

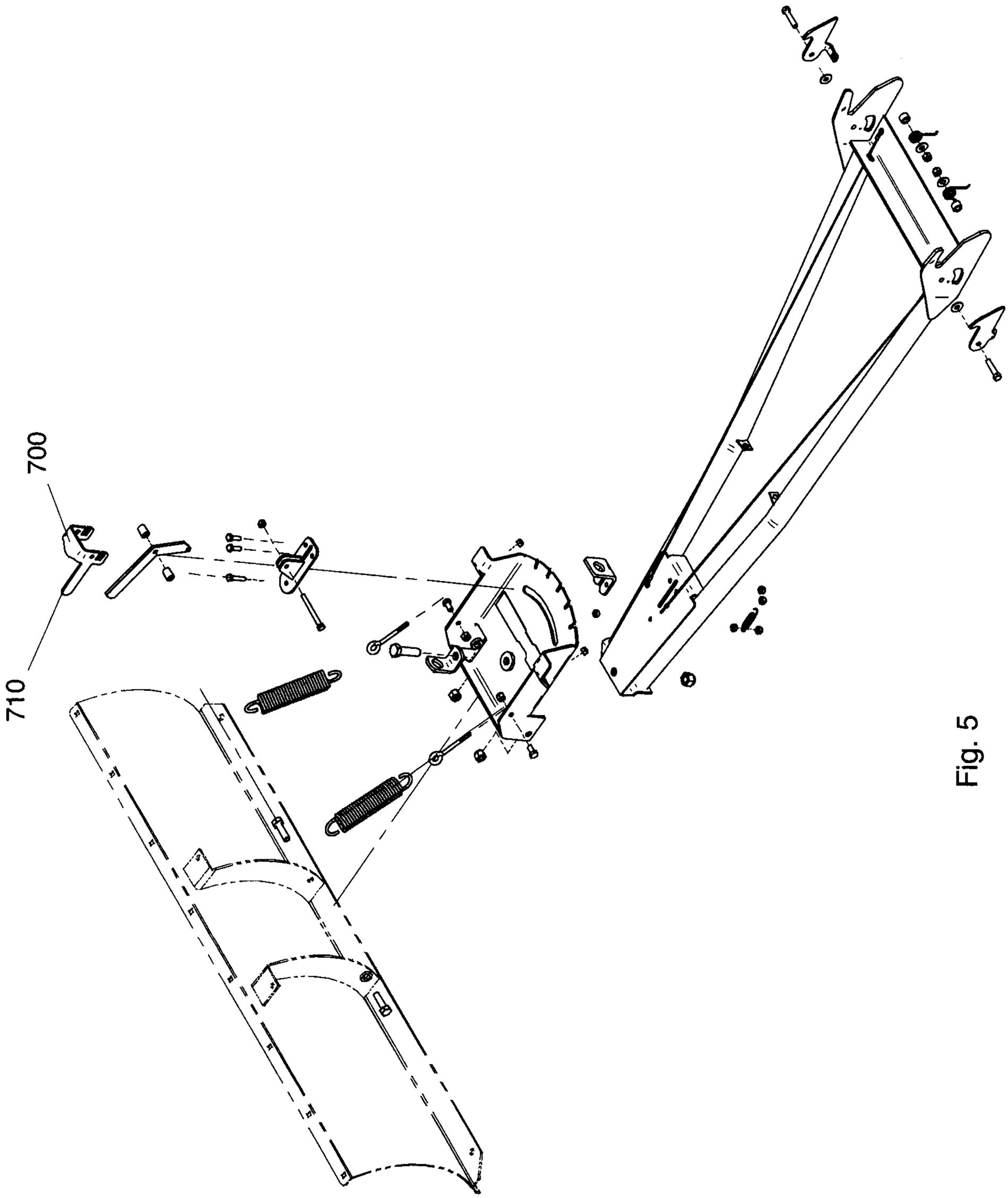


Fig. 5

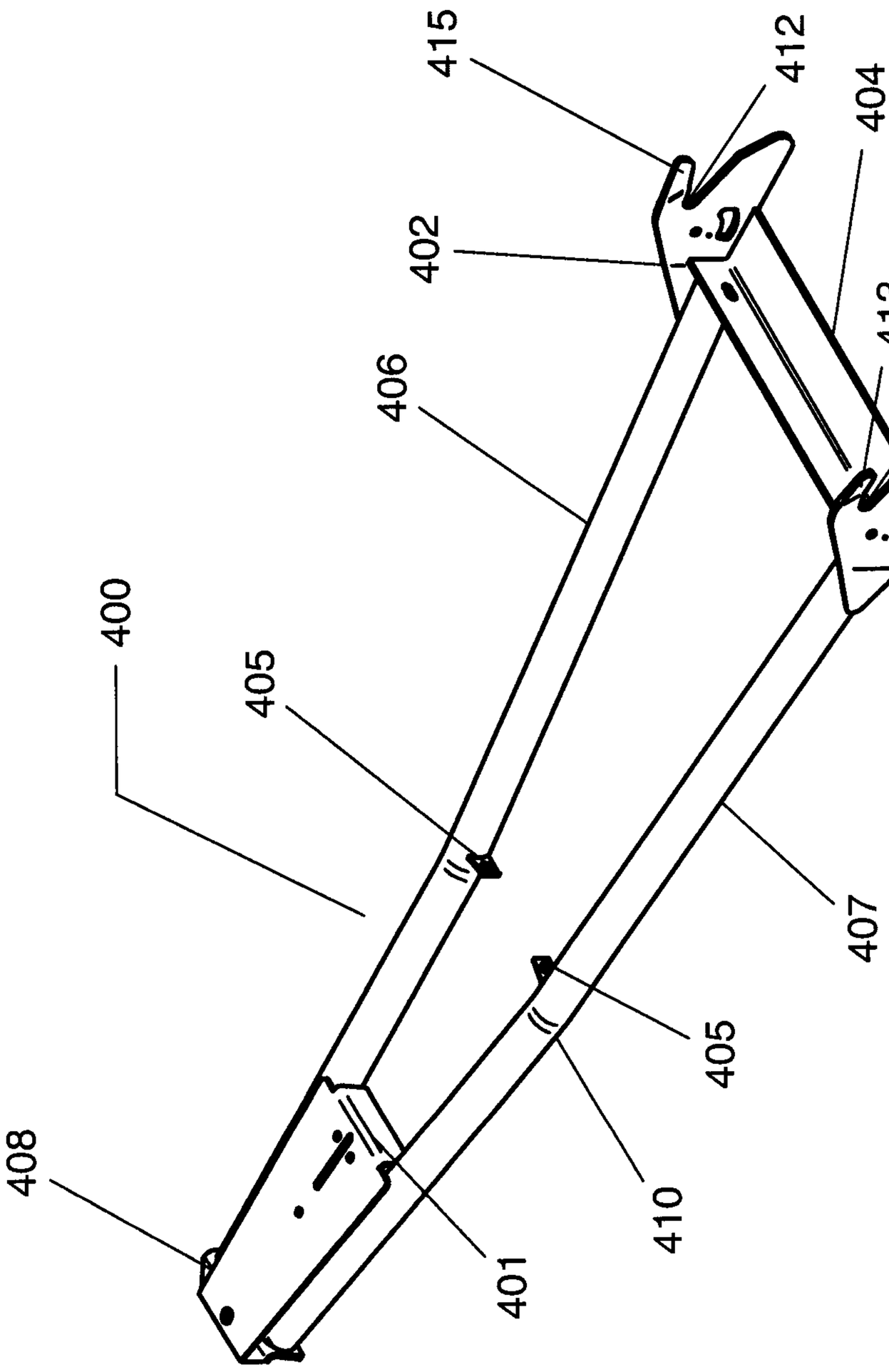


Fig. 6A

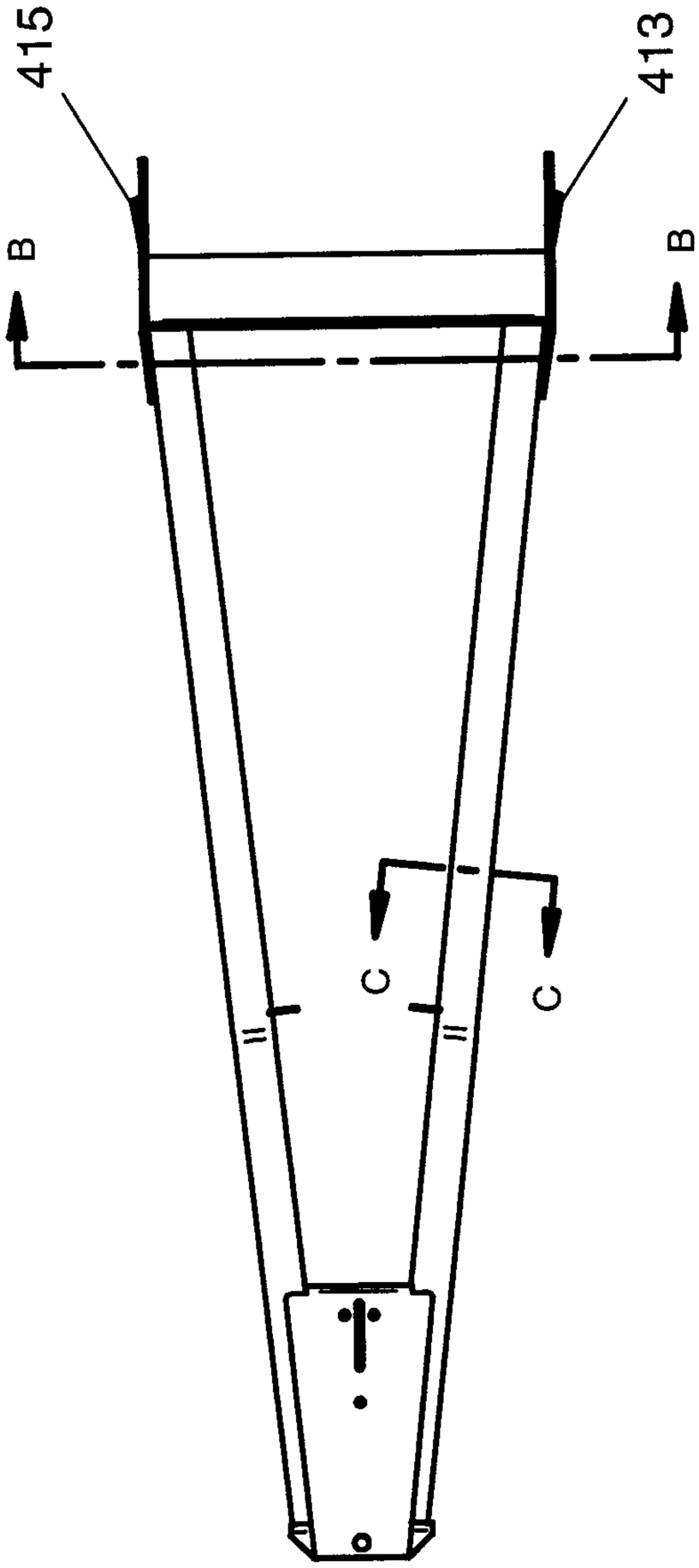


Fig. 6B

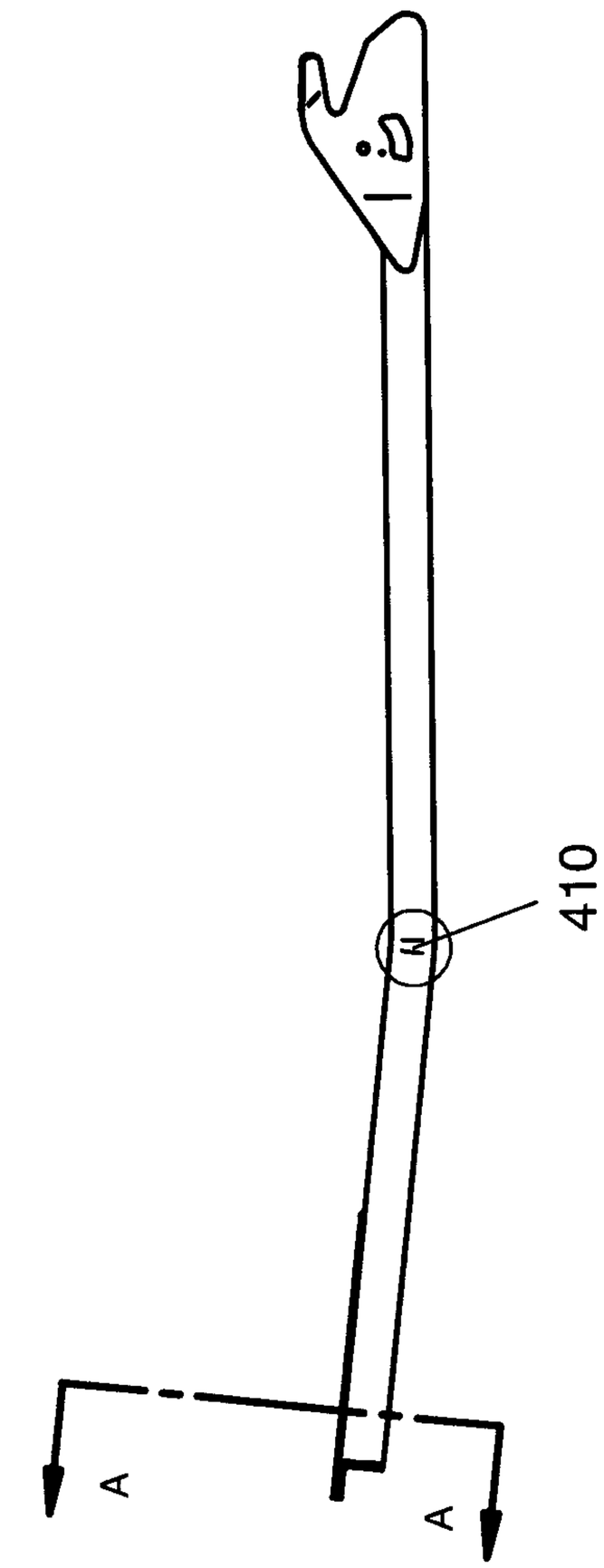


Fig. 6C

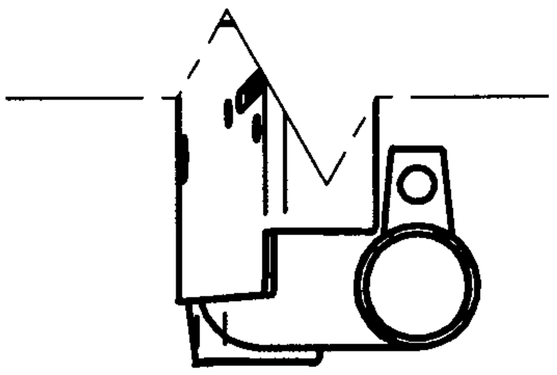


Fig. 6F

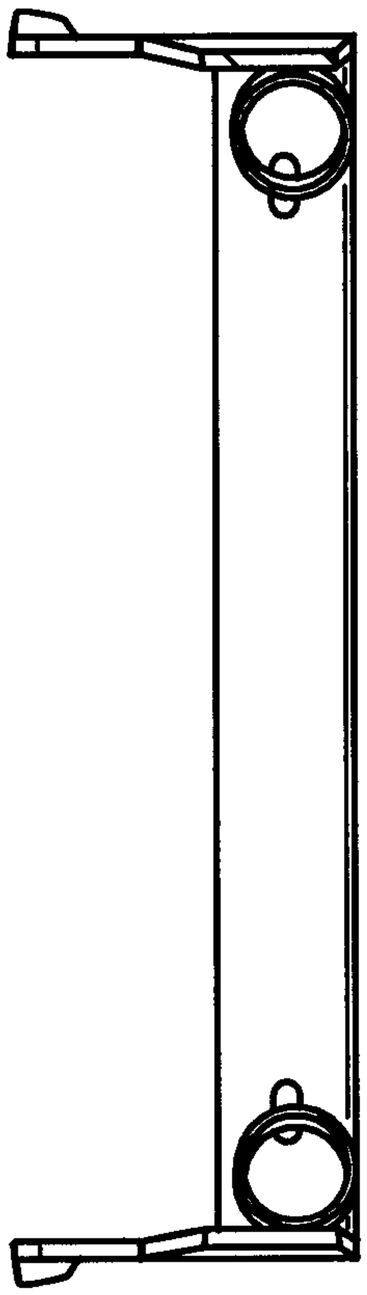


Fig. 6D.

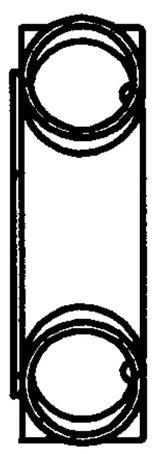


Fig. 6E

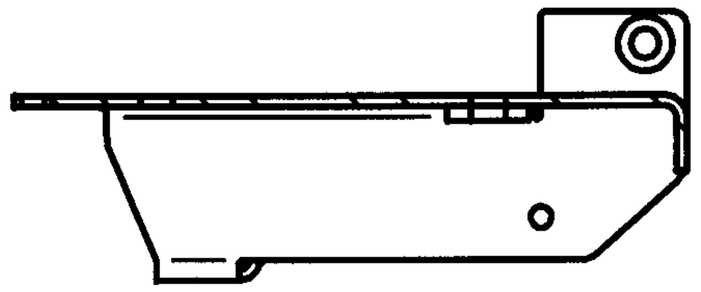


Fig. 7C

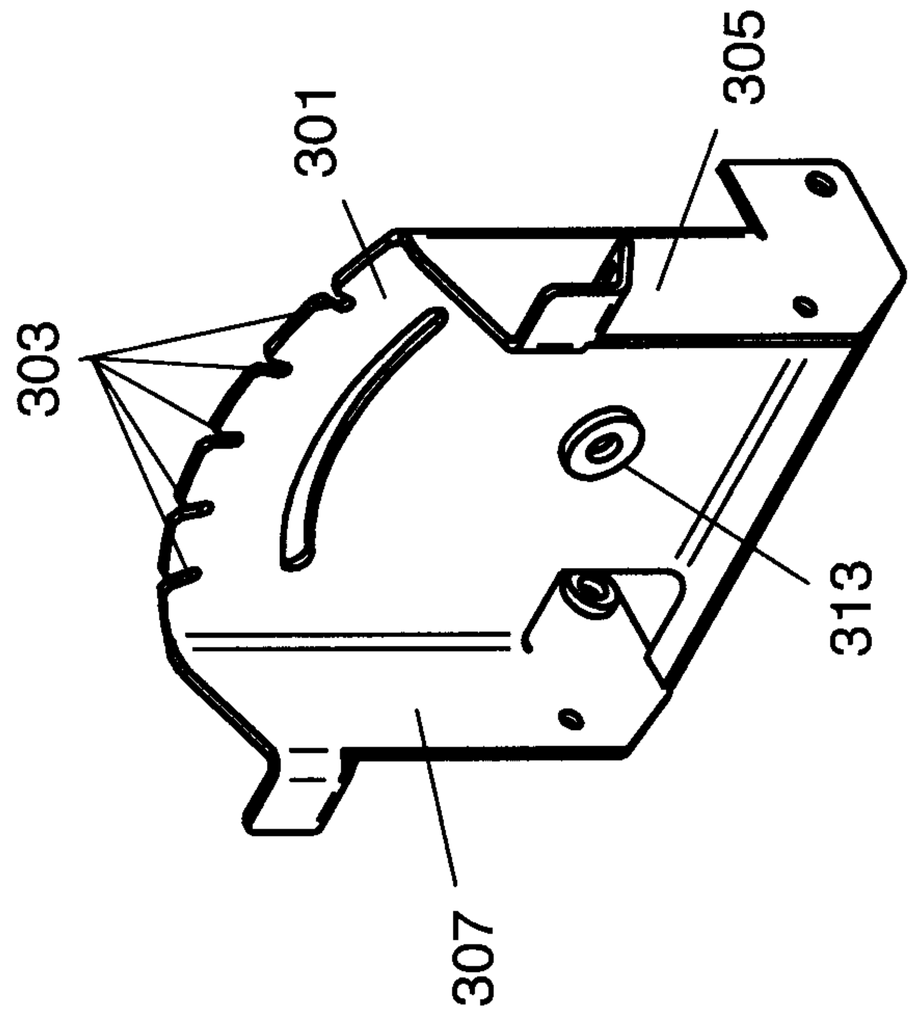


Fig. 7A

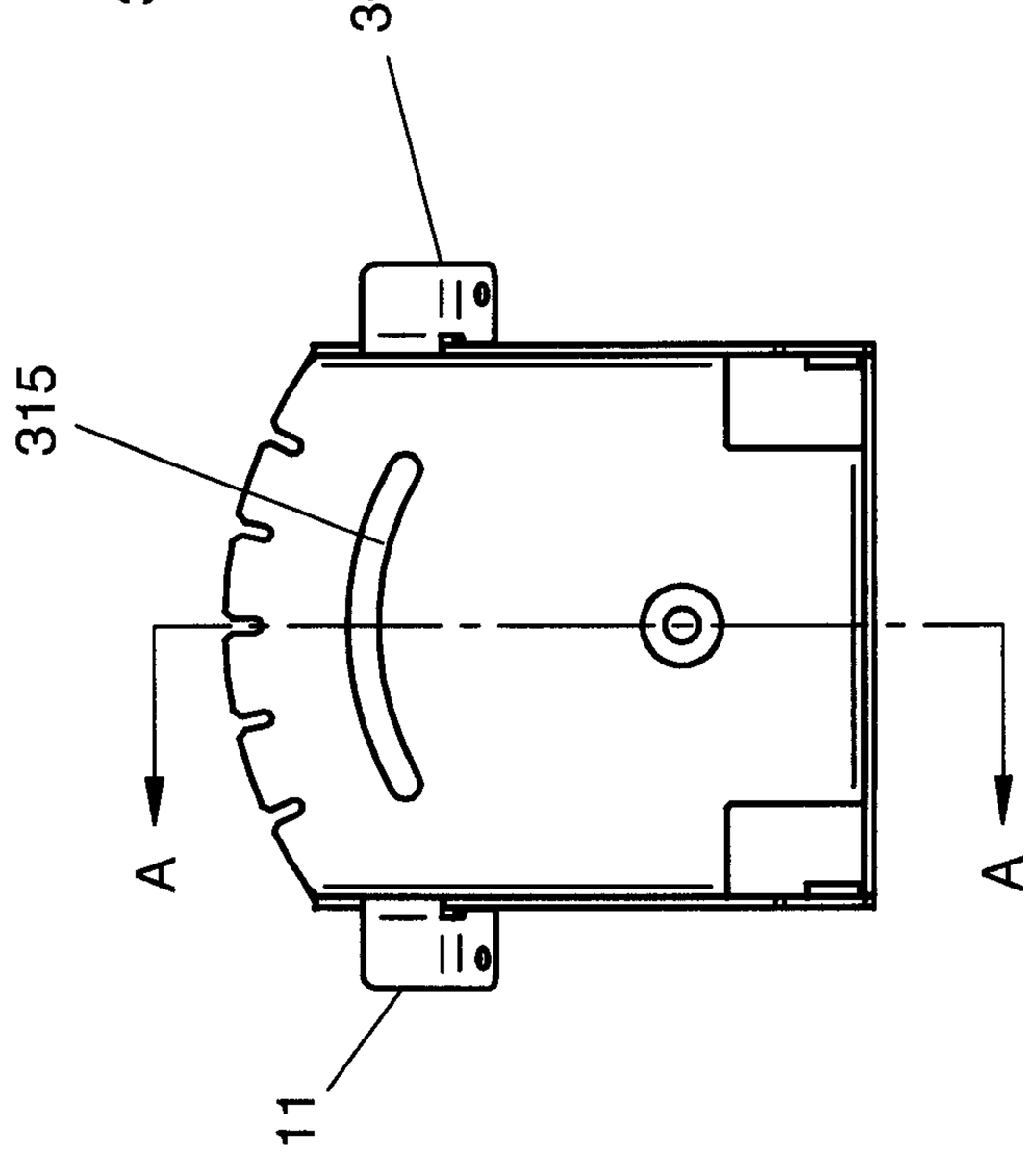


Fig. 7B

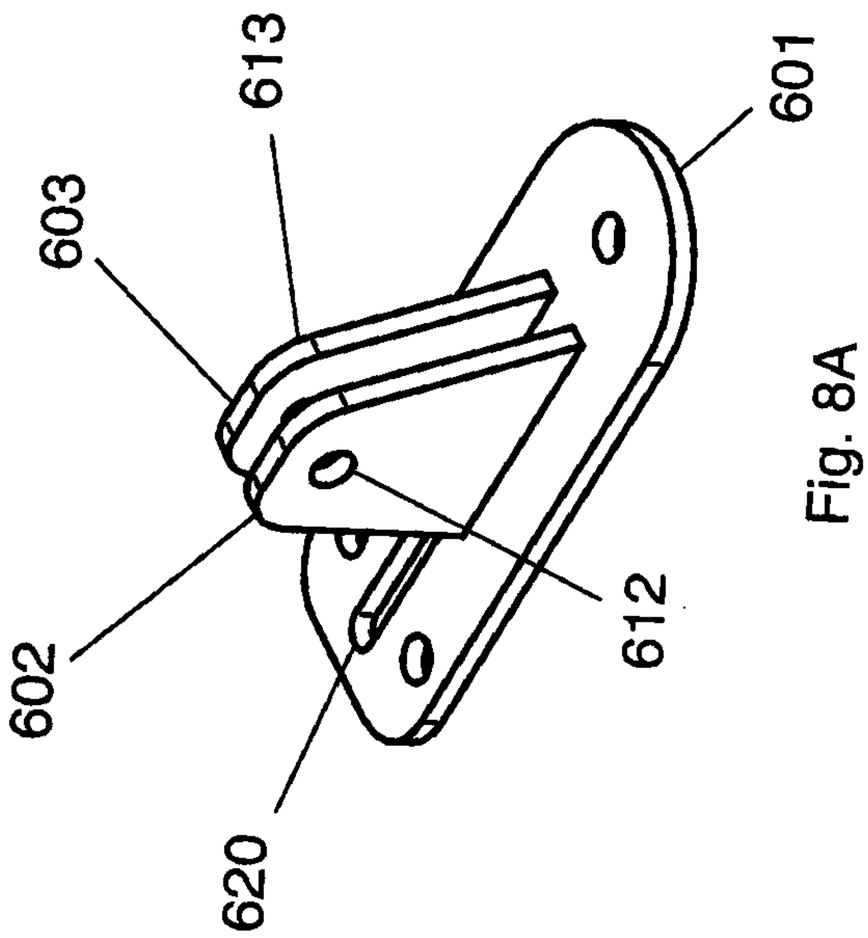


Fig. 8A

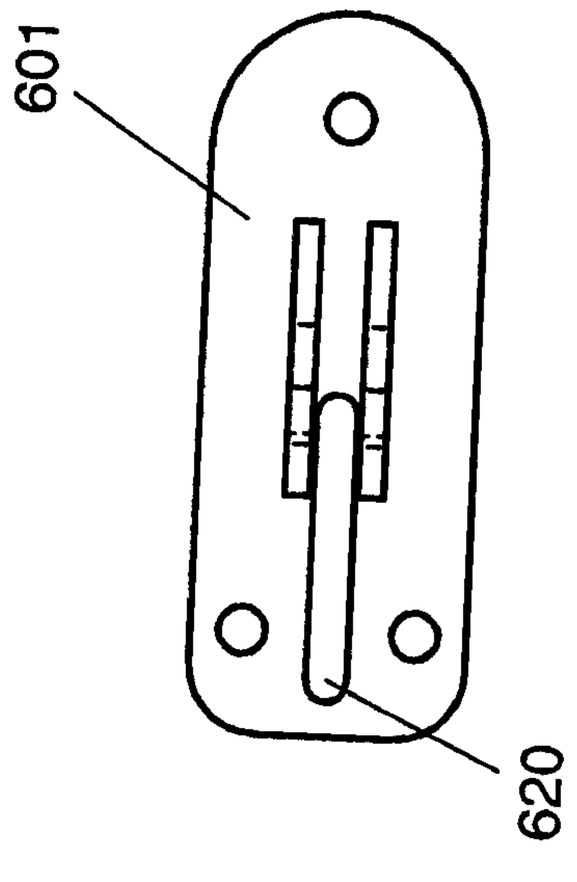
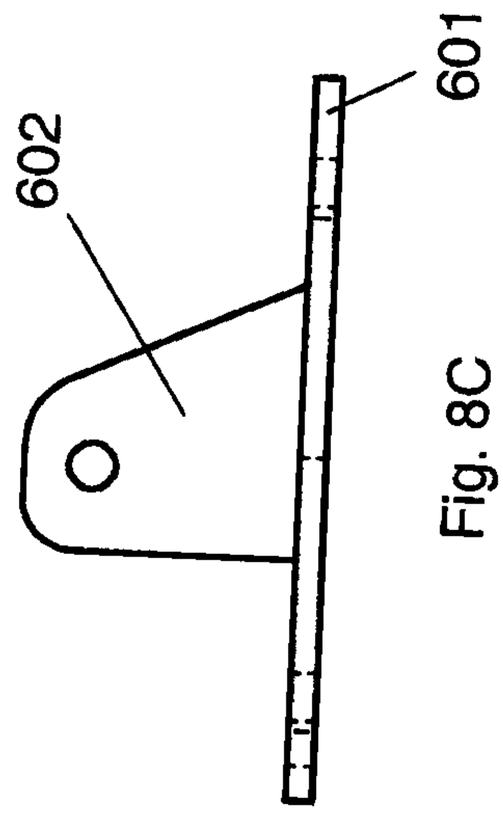


Fig. 8B



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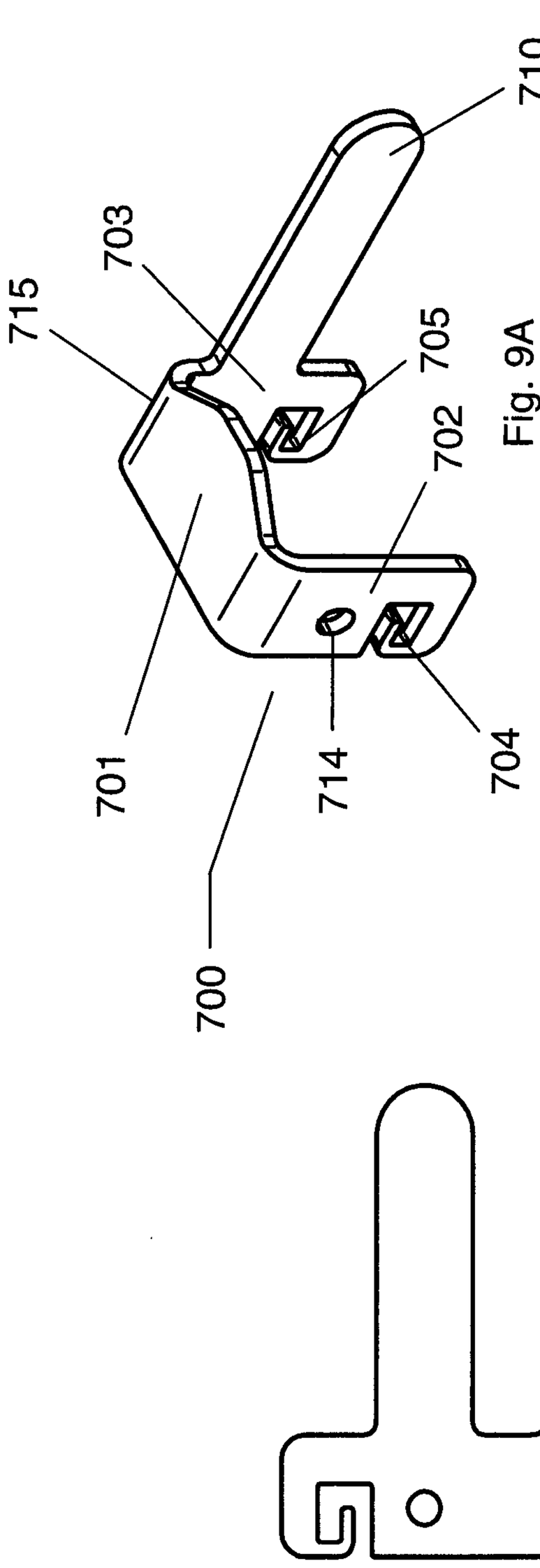


Fig. 9A

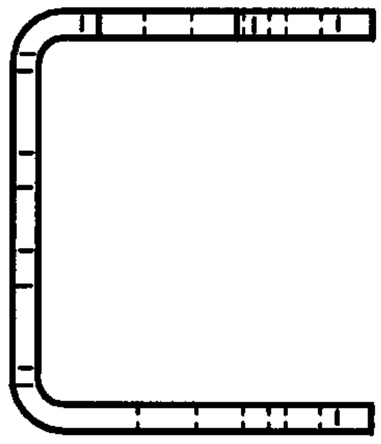


Fig. 9B

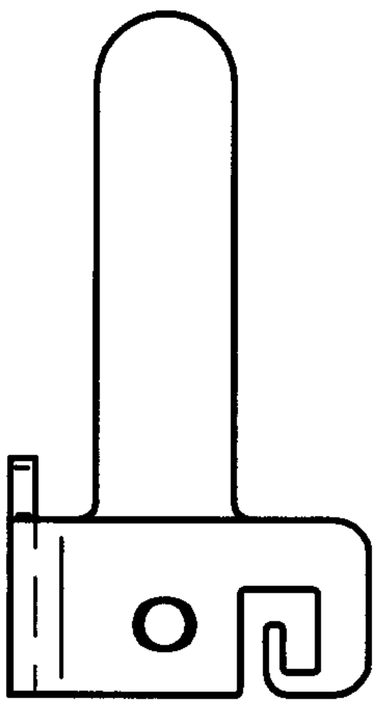


Fig. 9C

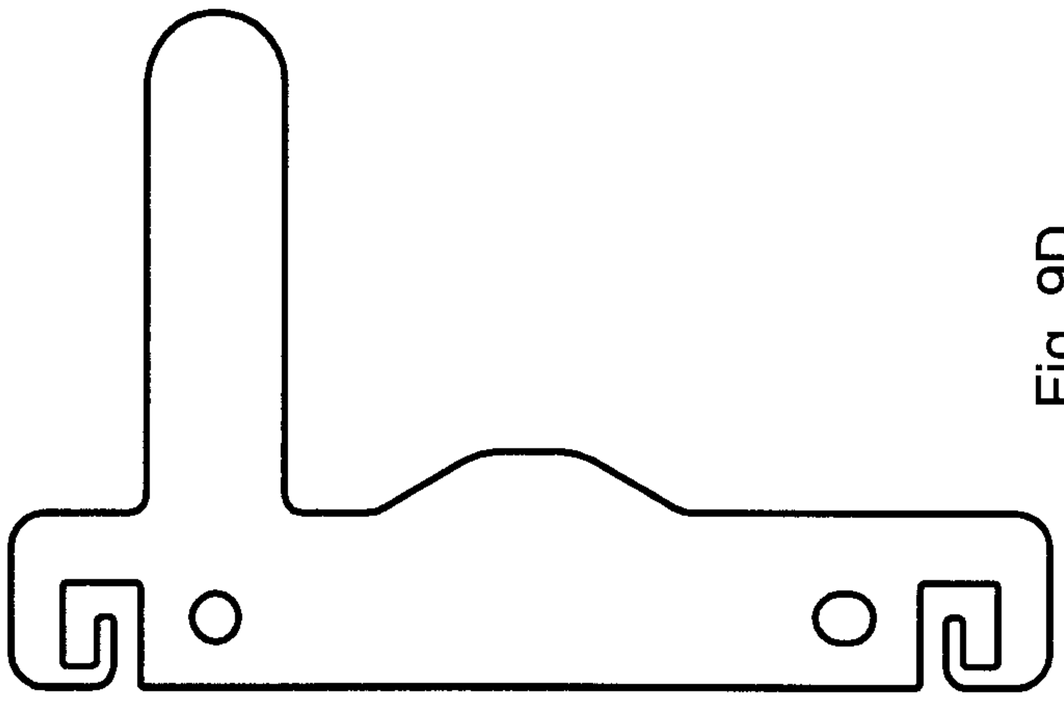


Fig. 9D

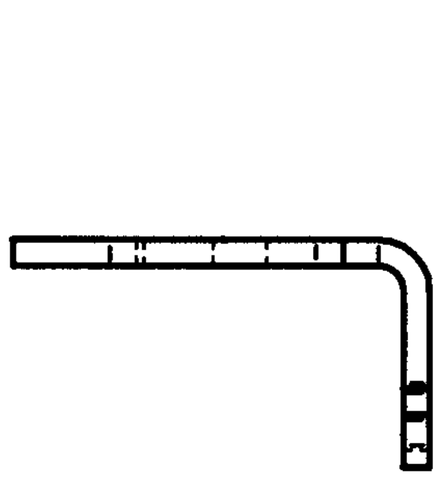
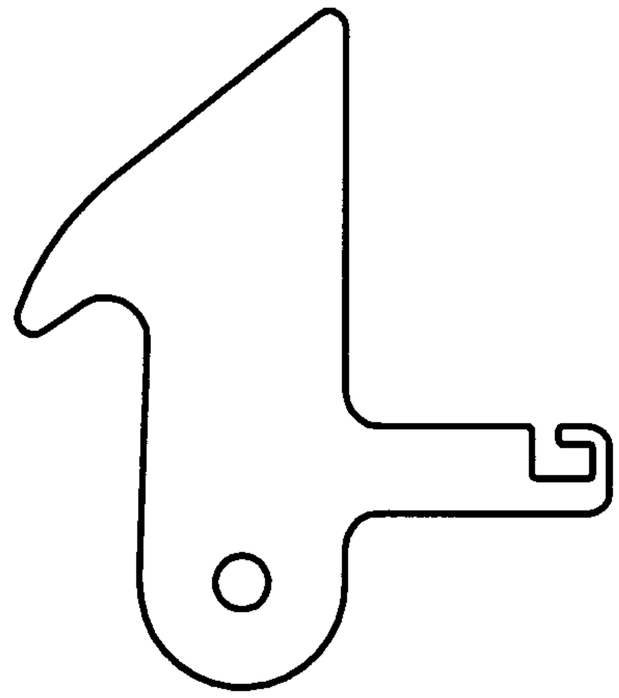


Fig. 10C



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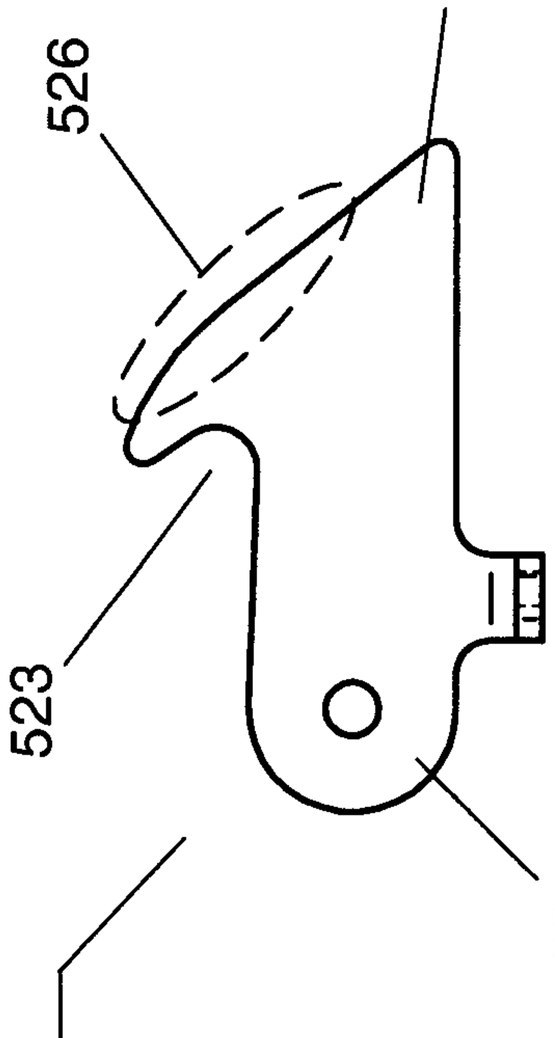


Fig. 10A

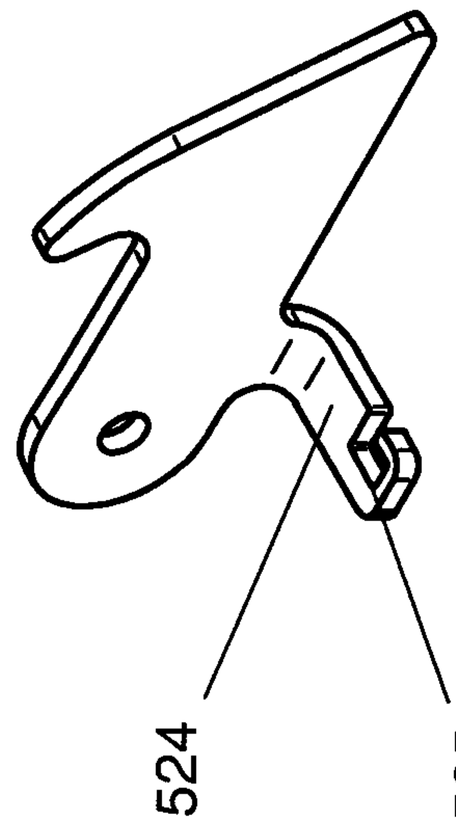


Fig. 10B

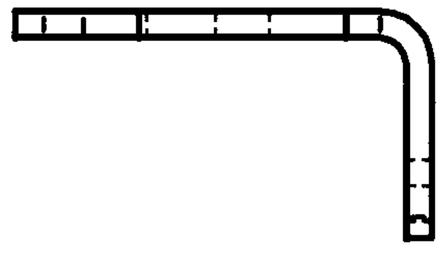
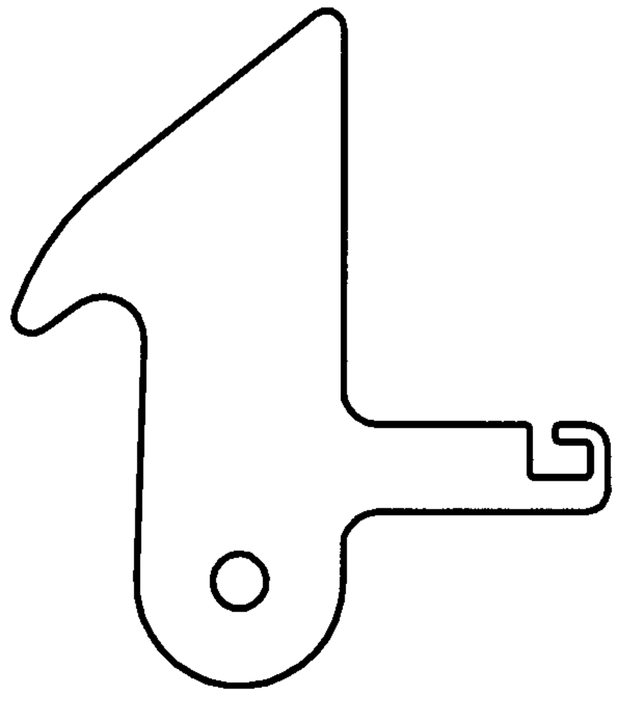


Fig. 11C



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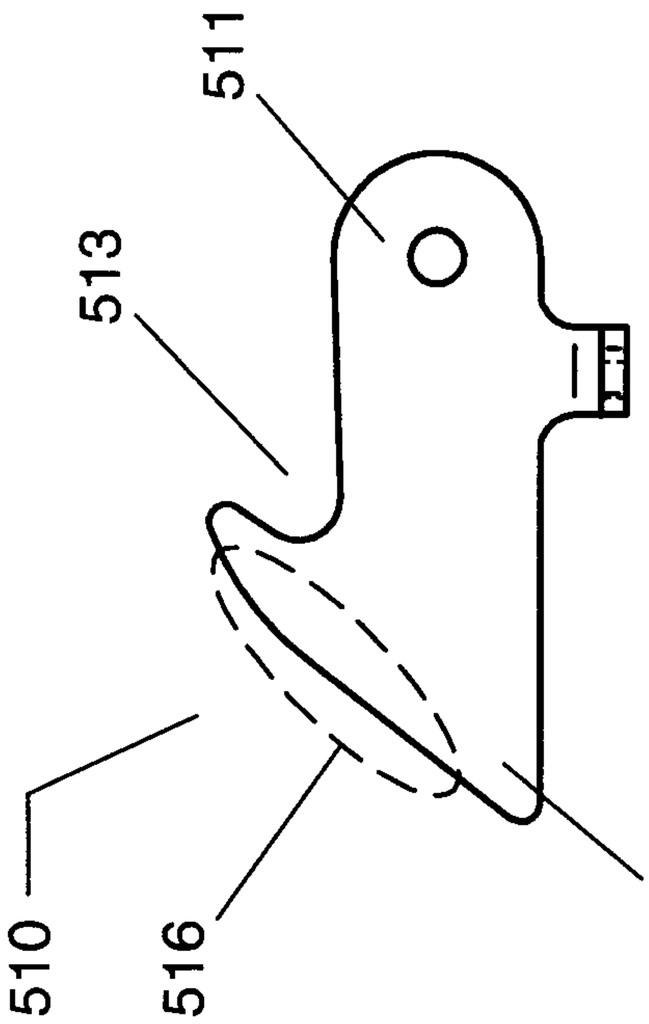

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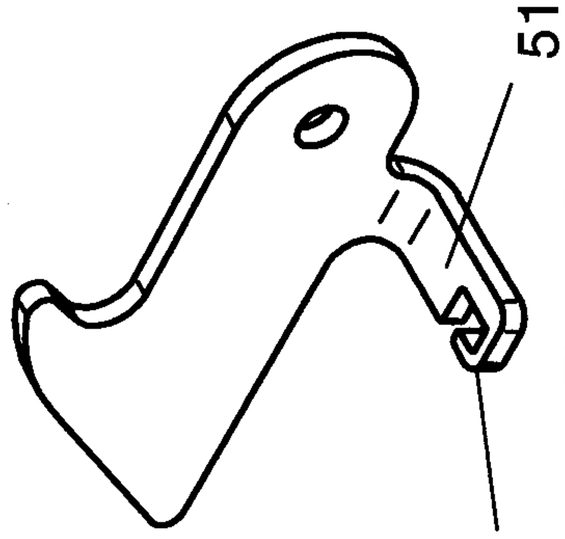
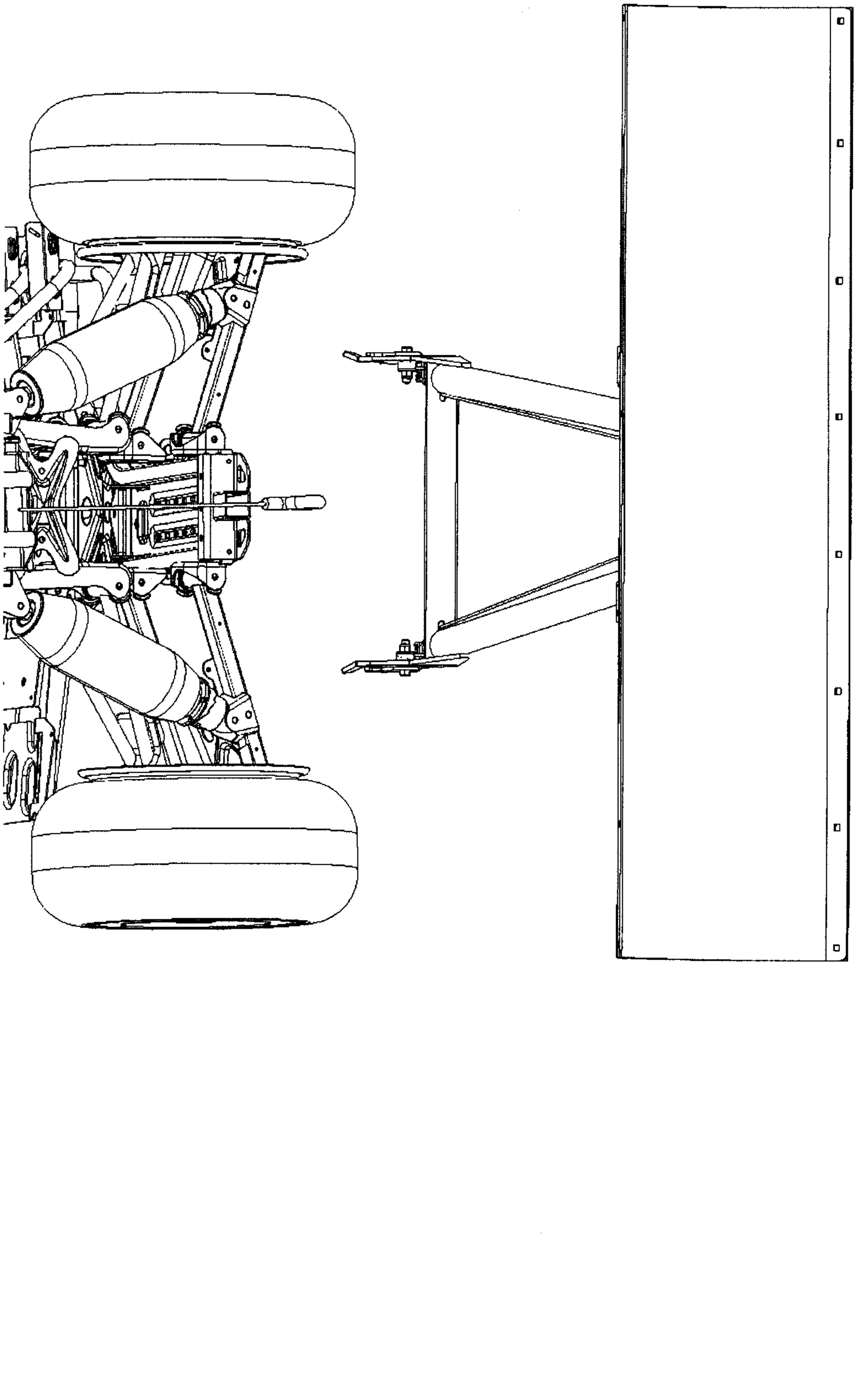


Fig. 11B



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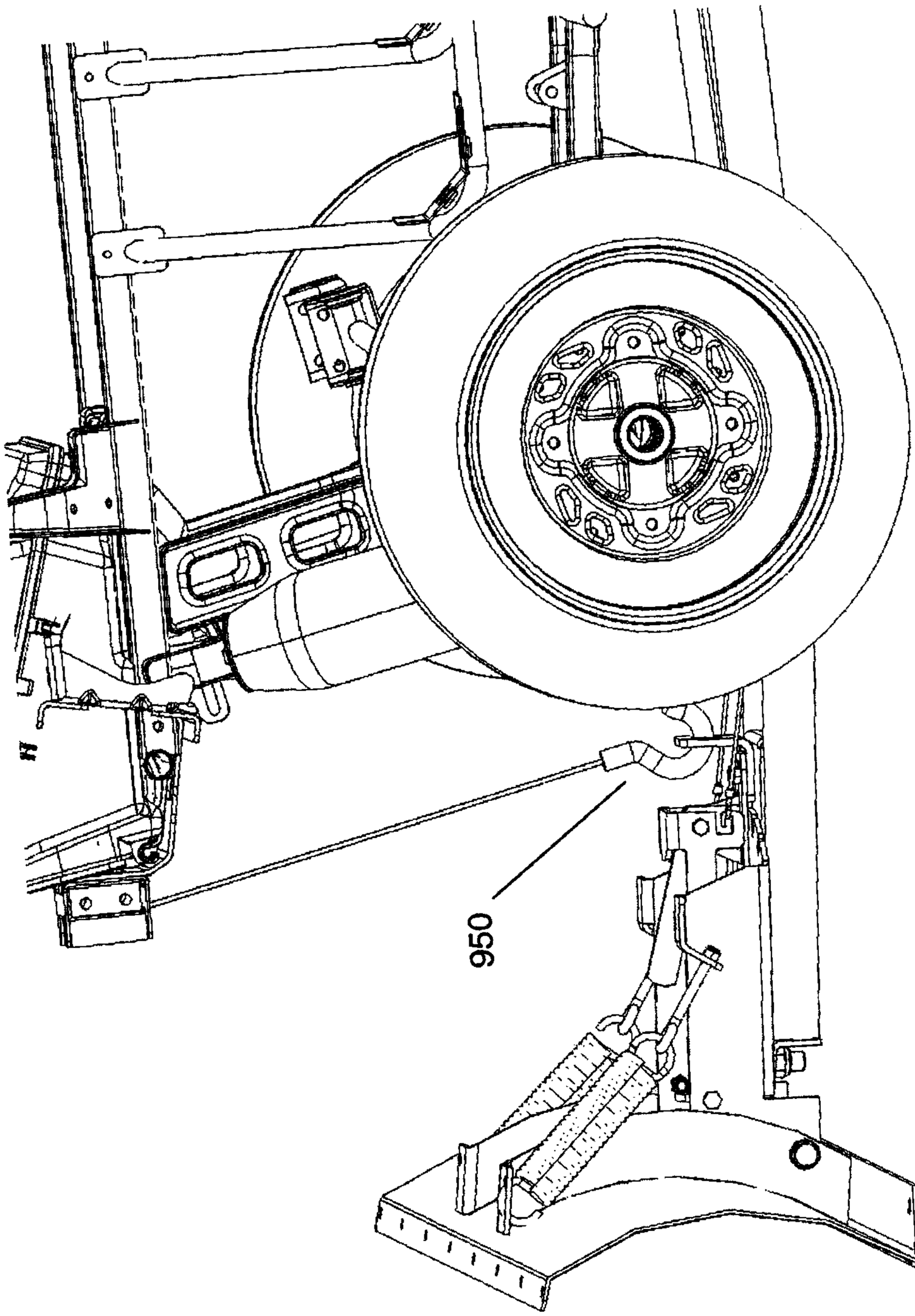


Fig. 13

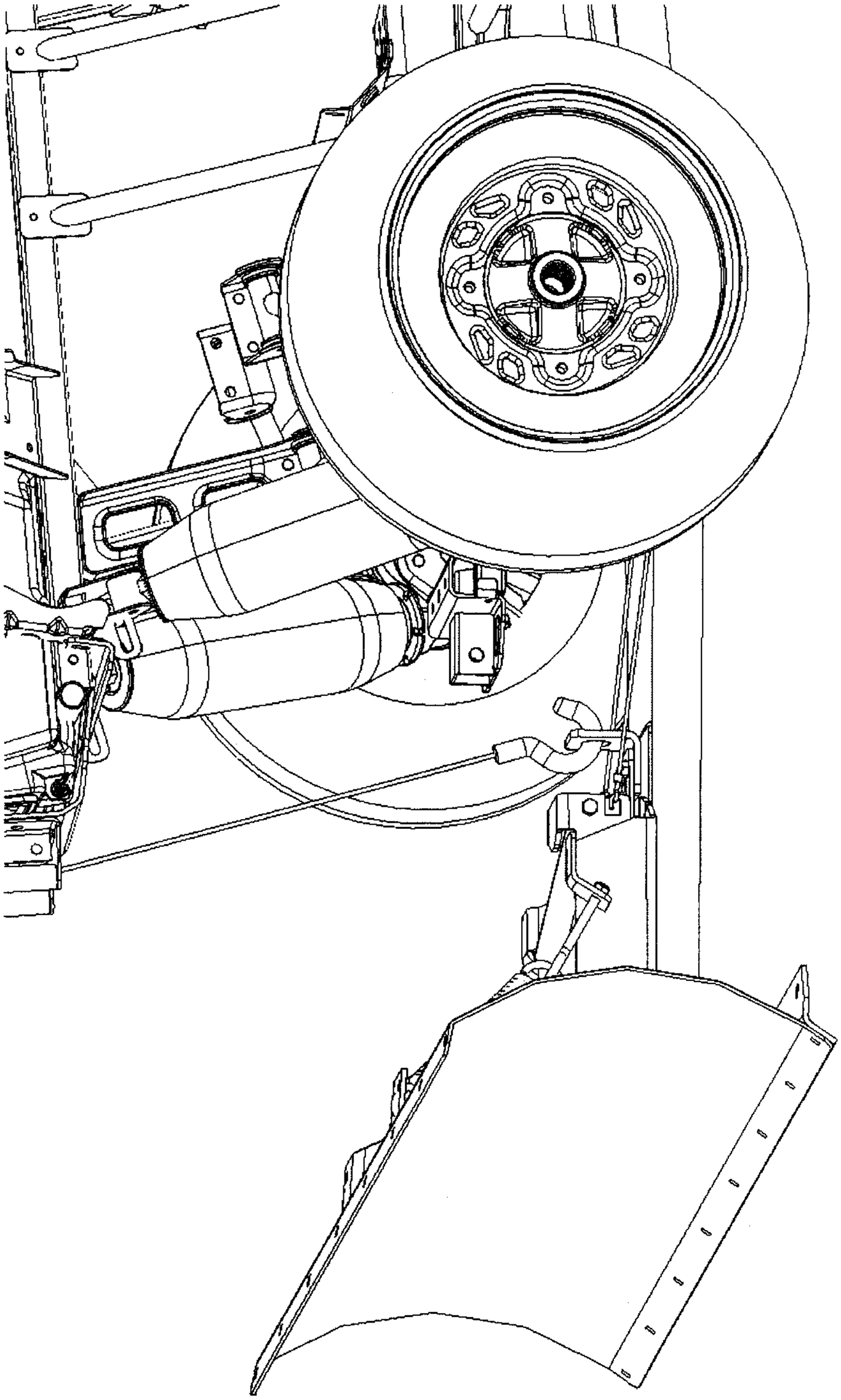


Fig. 14

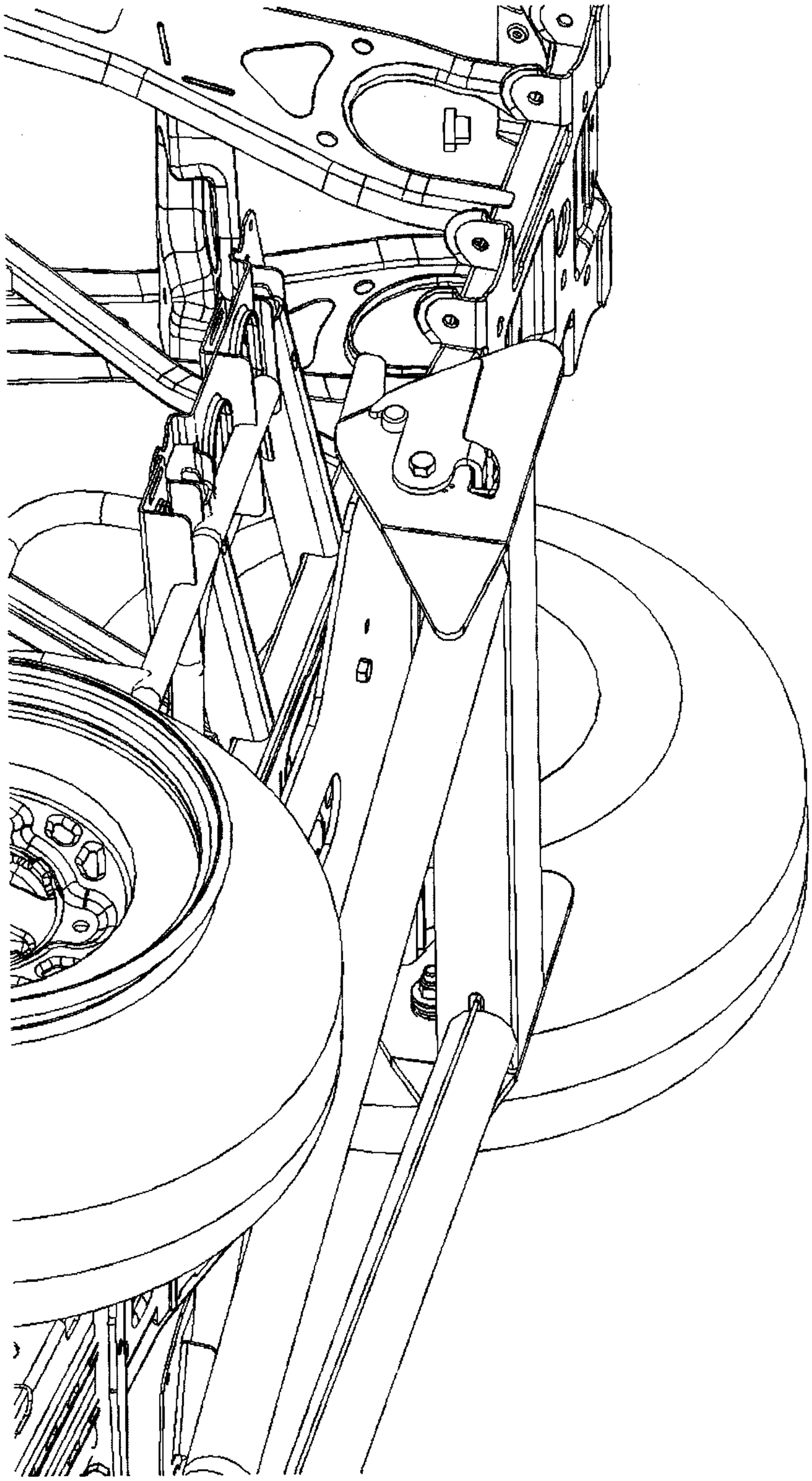


Fig. 15

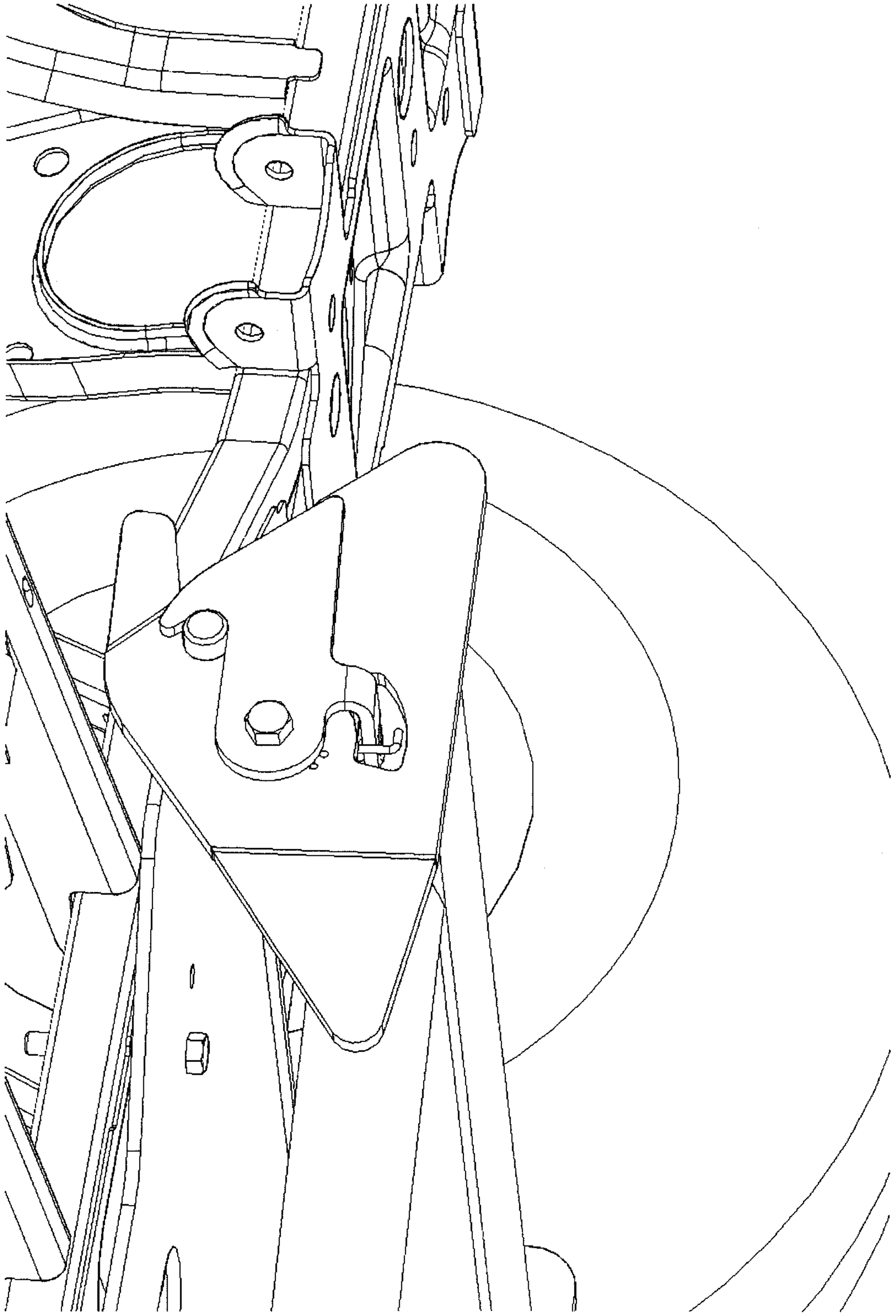


Fig. 16

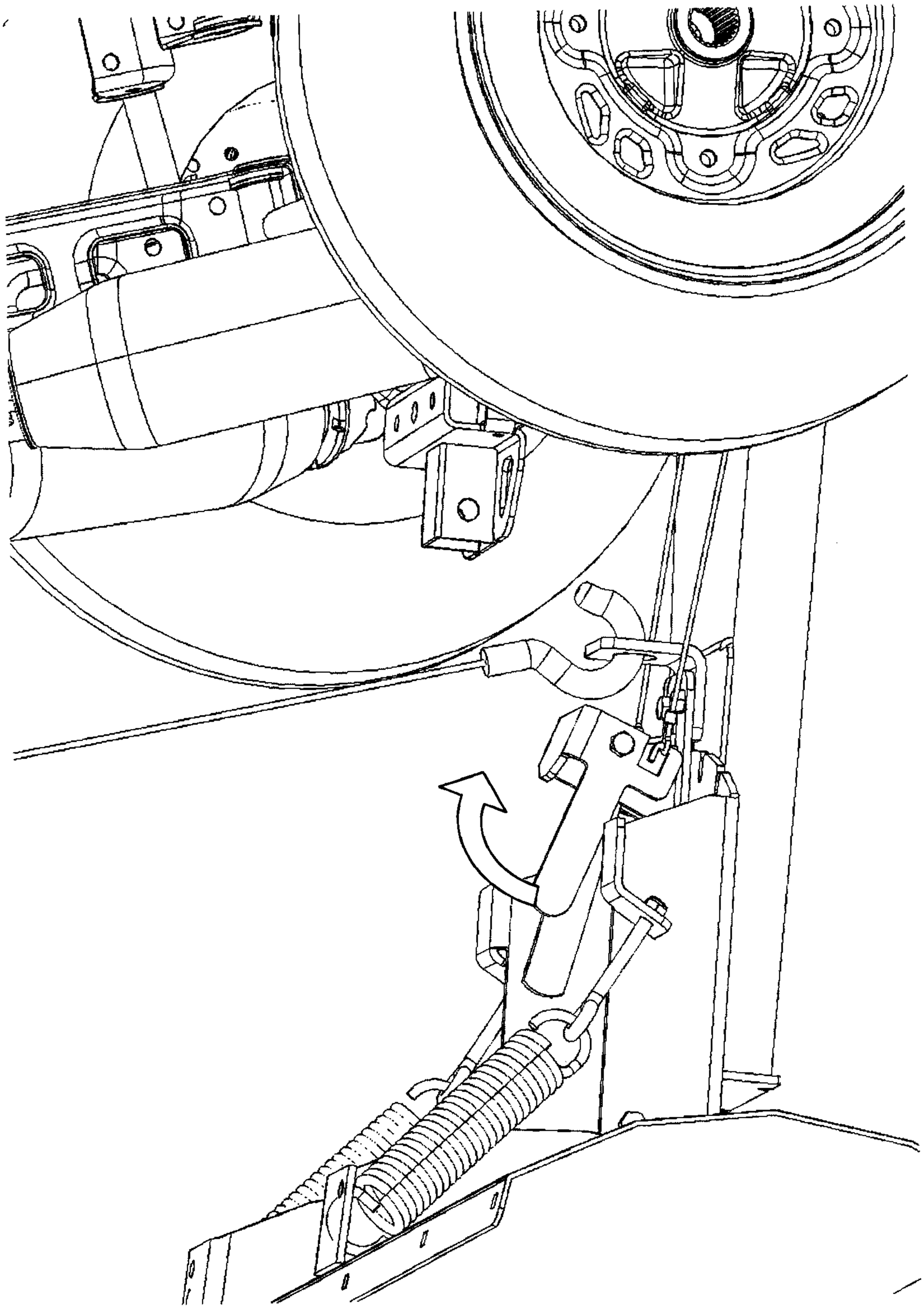
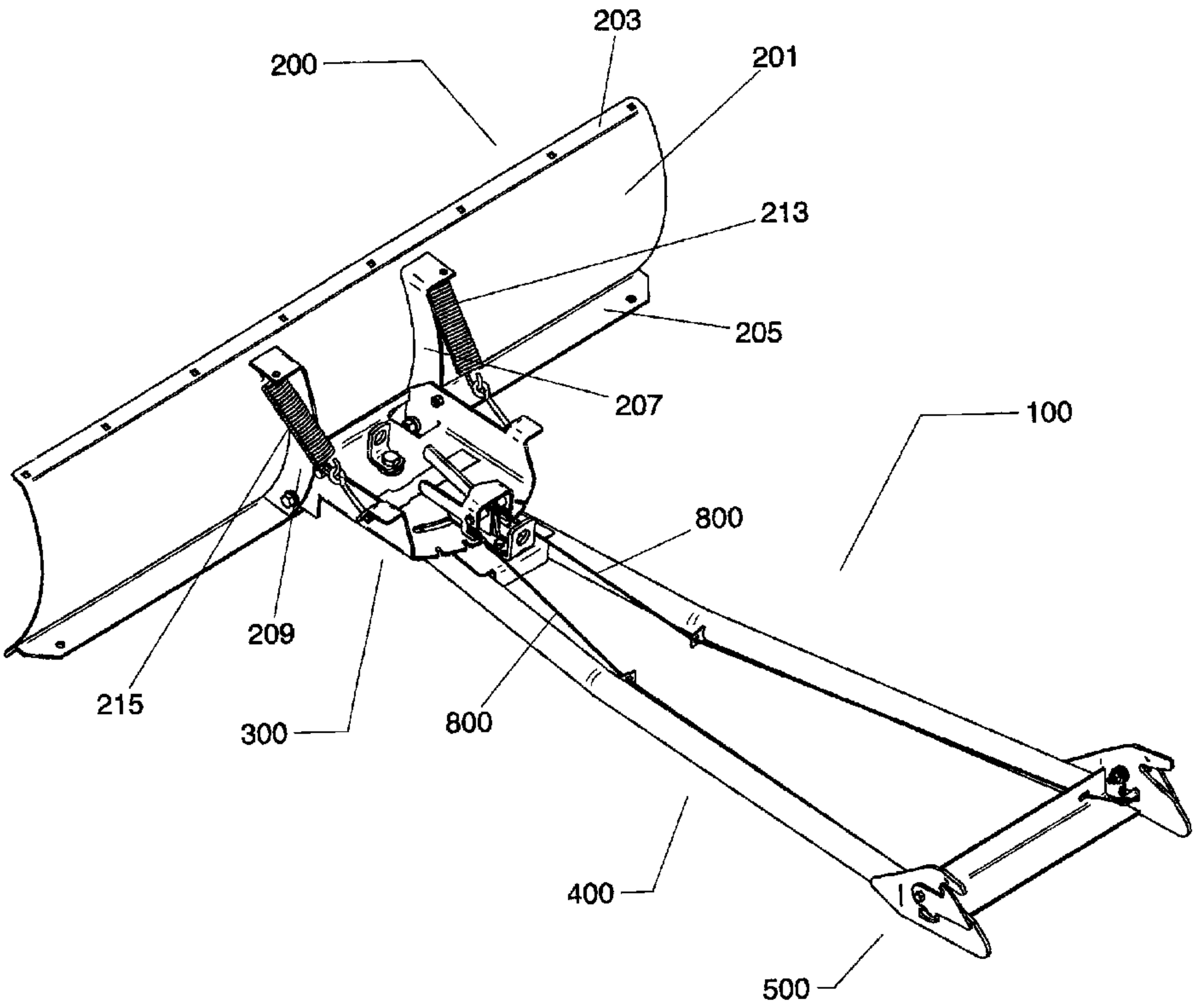


Fig. 17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