July 2, 1963 P. L. TORRE 3,096,058

OUTBOARD MOTOR TILT RELEASE

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Fig. 1

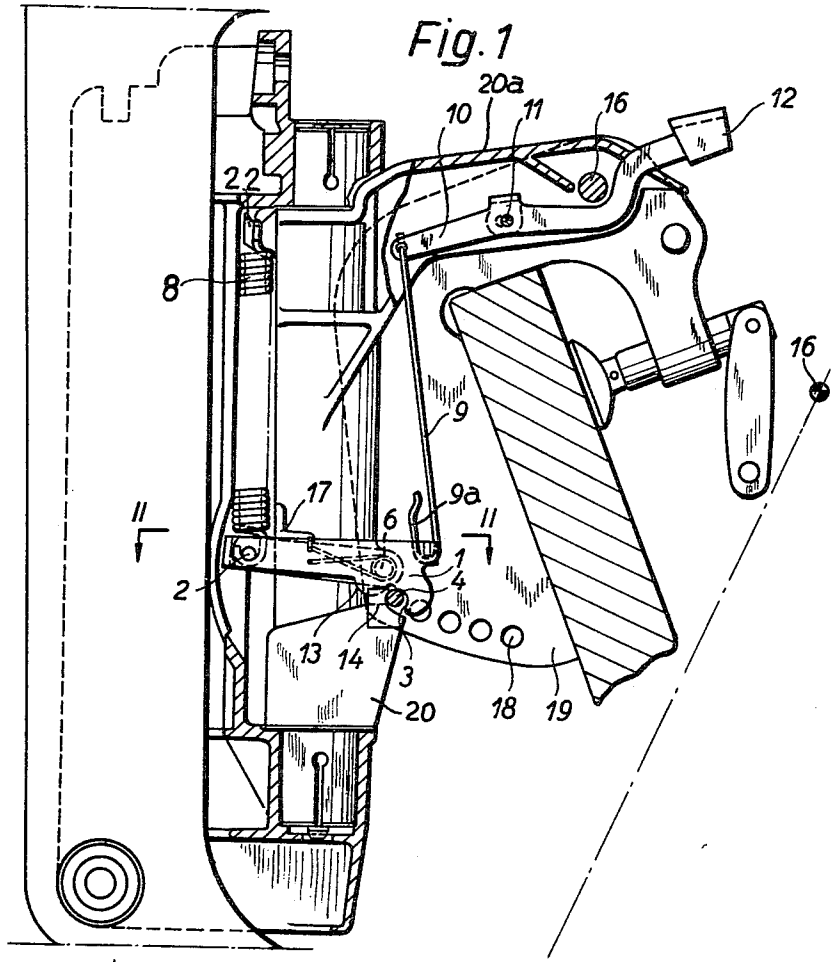
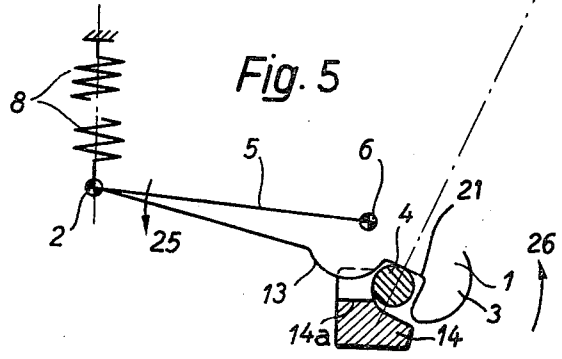


Fig. 5



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Fig. 2

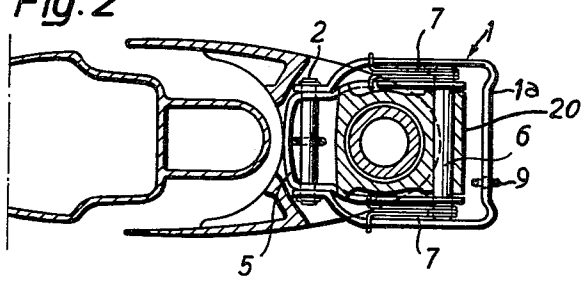


Fig. 3

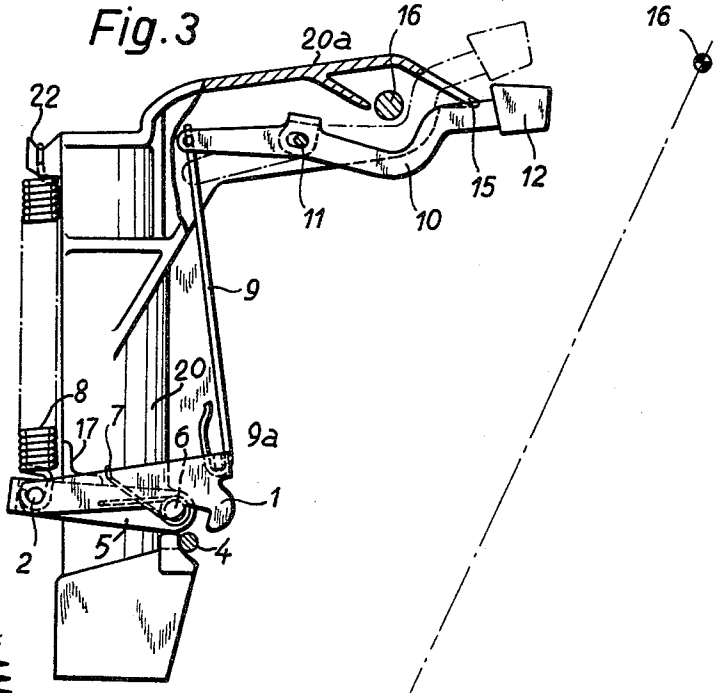
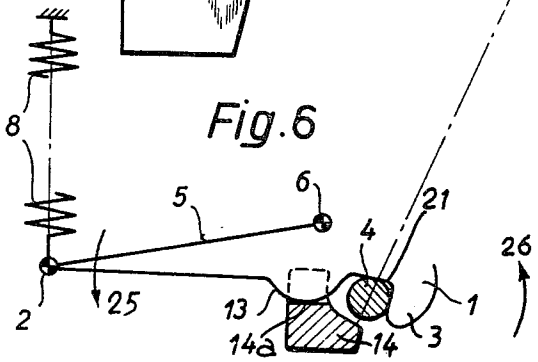


Fig. 6



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Fig. 4

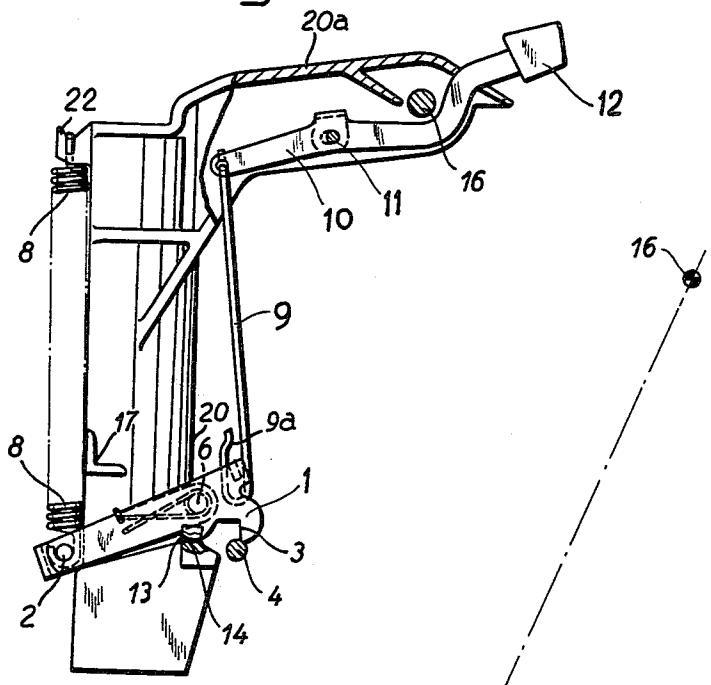
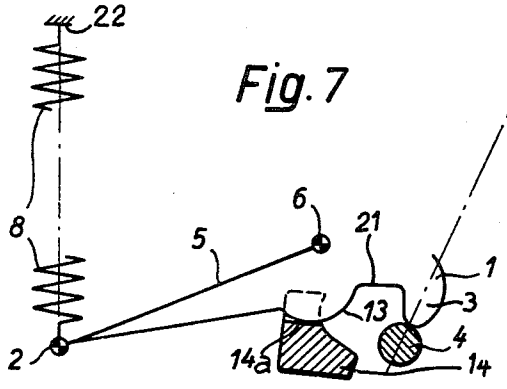


Fig. 7



United States Patent Office

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3,096,058

OUTBOARD MOTOR TILT RELEASE

Pier Luigi Torre, Milan, Italy, assignor, by direct and mesne assignments, to Bundy Marine S.p.A., Milan, Italy

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3 Claims. (Cl. 248—4)

This invention relates to a mechanism for automatic or hand operated tilt release of an outboard motor of the type comprising a latch lever having a hook engaging a pin on a transom bracket, the lever being hand operated through a linkage comprising a link and control lever or automatically operated independently of hand operation, when the propeller skeg striking against an obstacle receives a thrust strong enough to overcome an opposing spring, said spring being rated to oppose release on reverse rotation of the propeller.

Mechanisms of this kind, referred to as "selective action latch mechanisms," are known, by which the "leg" or transmission shaft housing of an outboard motor can be maintained in its normal or vertical position notwithstanding the propeller thrust in reverse, said mechanisms allowing of automatic release on striking of the skeg against an obstacle or the bottom in shallow water, and permitting hand release for beaching purposes. Such mechanisms are generally based on the action of a simple opposing spring causing a latch lever to keep engaged with the above mentioned pin. For release of the motor, which is tiltable about a horizontal axis, the opposing action of the spring should be overcome, which may take place either by a violent thrust from the outside or by manual operation.

Both manual and automatic control ultimately stretch the opposing spring, the latch lever being so arranged as to afford a most favorable lever arm for manual control in order to reduce the effort required to overcome the spring.

It is an object of this invention to provide a tilt release mechanism for outboard motors, wherein automatic and manual controls are independent of each other, each of them being restored by its own spring. A further object of this invention is to provide a device of the type referred to, wherein automatic release swinging movement of the latch lever is assisted by a special configuration of latching surfaces provided on the latch lever.

The mutual independence of manual and automatic controls in respect of their restoring springs is advantageous under many aspects. So, when the automatic control spring breaks, an emergency repair can be effected by substituting therefor wire or other inextensible material, while leaving handiness of the hand control for releasing the motor in case of danger unaffected. With this mechanism the motor can moreover be equipped with a higher-powered engine within certain limits which are merely set by toughness of the transmission and leg, without changing the levers of the release mechanism. Said levers are quite independent in size from the engine power, so that on adopting higher-powered engines it will be sufficient to change the automatic control spring, the rating of which should be selected in accordance with the traction effort in reverse.

A further advantage lies in increased simplicity in construction and assembly.

The release mechanism according to this invention essentially comprises a forked latch lever having its bridge section connected with a link for hand operation and having its arm ends pivoted to opposite ends of a pivot suspended on the automatic control tension spring. The same pivot has moreover pivoted thereto the bridge section of an auxiliary forked lever having its ends

pivoted to a second pivot secured to the swivel bearing. The two pivots are located at diametrically opposite sides of the swivel bearing so that the latter is embraced by the arms of the two forked levers. The arms of the latch lever and auxiliary lever are interconnected by hairpin springs tending to oppose upward deflection of the latch lever. The hooks on the latter engage a pin securedly fixed to the transom bracket which simultaneously bears on abutment surfaces fast with the swivel bearing.

Further characteristic features and advantages of the improved release mechanism will be understood from the appended detailed description and accompanying drawings showing an embodiment of this invention. On the drawings:

FIGURE 1 is a part-sectional side view of the mechanism in its engaged condition;

FIGURE 2 is a horizontal sectional view on line II—II of FIG. 1;

FIGURE 3 is a part view of FIG. 1 with the mechanism in hand release condition;

FIGURE 4 is a view similar to FIG. 3 with the mechanism in automatic release condition;

FIGURES 5, 6 and 7 show diagrammatically the positions taken by the latch lever during subsequent stages of automatic release process.

The latch lever **1** is bent to forkshape (FIG. 2) to embrace the swivel bearing **20**. The lever **1** is pivoted by the free ends of its arms to a pivot **2** to which the automatic control tension spring **8** is hooked. The bridge-turned end portions of the two lever arms are each formed with a hook **3** and a rounded projection **13** of generally convex semicircular shape enclosing therebetween a flat-bottomed seating **21** (FIGURES 5–7) for a pin **4**. The pin **4** is located downwardly offset with respect of the plane passing through pivots **2** and **6** and is received by either coaxial pair of apertures **18** formed in the transom bracket **19** for adjustment of the motor leg inclination. The apertures **18** are located on an arc traced from a centre represented by pivot **16**.

In addition to the latch lever **1** an auxiliary lever **5** is pivoted on pivot **2**, the lever **5** being likewise forkshaped and arranged oppositely to latch lever **1**, the fork opening towards the transom bracket. The free ends of the two arms of lever **5** are pivoted to a horizontally extending pivot **6** seated in a transverse bore in the swivel bearing **20** approximately tangential to the bearing. The auxiliary lever **5** has therefore two fulcra, one being common to latch lever **1** and comprising pivot **2** which is movable, the other being stationary and comprising pivot **6** fast with the swivel bearing.

Two hairpin springs **7**, the loops of which encircle the end portions of pivot **6**, afford a resilient link between the latch lever **1** and auxiliary lever **5** and urge the former to its pin engaging condition.

Abutment projections **17** cast with the swivel bearing act as stops for the lever **5** which bears thereon by its arms under the pull exerted by spring **8** on pivot **2**. Said spring has its upper end anchored on a hook **22** cast with the swivel bearing **20** and is assembled under a determined preliminary tension.

An upwardly extending link **9** engages the bridge section **1***a* (FIG. 2) of latch lever **1** and is connected at its upper end to a hand control lever **10** having a handle **12**. An intermediate point of the control lever **10** is fulcrumed on a pin **11** fixed in a hollow bracket arm **20***a* integral with the swivel bearing **20**. The arm **20***a* has a pivot **16** horizontally extending therethrough for a pivotal tilting connection with the transom bracket **19**.

The link **9** ends at its lower end by an elongated loop **9***a* so that, as clearly shown in FIG. 4, during automatic release the bridge section **1***a* on lever **1** is freely movable

within the loop without transmitting motion to the link **9** and lever **10**. In latched condition, the pin **4** lies between the hooks **3** and a pair of stop bosses **14** on swivel bracket **20**.

For manual release (FIG. 3) the handle **12** is depressed, thereby rotating the lever **10** clockwise and pulling upwardly the link **9** which causes the latch lever **1** to swing upwardly on pivot **2** disengaging the hooks **3** from the pin **4**. It will be seen that in these conditions latch lever **1** only is involved, both the lever **12** and automatic control spring **8** being left unaffected. As the action of the link **9** ceases the latch lever **1** is restored to its engaged position by the load of hairpin springs **7**. Manual release conditions, when necessitated by travelling requirements, can be maintained in a known manner by causing the lever **10** to be engaged by a conventional notch in the bracket arm **20***a*. For automatic release (FIG. 4) a powerful backward thrust on the propeller skeg is required, which results in a backward force applied from the hook **3** to the pin **4**. Since this force is offset from the fulcrum **6** it generates a moment about fulcrum **6** which involves both levers **5** and **1** and rotates them about said fulcrum and the contact point of the hook **3** and pin **4**, respectively, whereby the pivot **2** goes lowering against the pull of spring **8**.

Since the two centers of rotation do not coincide, the levers **5** and **1** are at the same time rotated relatively to each other about the pivot **2**.

For ease in understanding, rotation of levers **1** and **5** could be considered as subdivided into following steps: during a first step (FIG. 5) the profile of the hook **3** engages the pin **4** thereby causing a general displacement indicated by arrow **25** in virtue of which the hook slightly raises (arrow **26**); at the second step (FIG. 6) the camming projections **13** on latch lever **1** each contact an abutment surface **14***a* on the respective stop boss **14**, whereby the projection **13** provides a temporary fulcrum for latch lever **1** causing the hook **3** to further rise in the direction **26** while sliding on the pin **4**; finally, at the third step (FIG. 7) on further rotation of the latch lever **1** about the projection **13**, the said lever takes an angular position such as to disengage the end of the hook **3** from the pin **4**.

Obviously, throughout the automatic release operation the spring **8** is prevailingly involved, said spring being therefore pre-tensioned to generate a predetermined preload sufficient to oppose the contrary thrust by the propeller in reverse, but capable of stretching and affording automatic release on striking of the skeg against an obstacle or the bottom in a shallow water.

What I claim is:

1. In an outboard motor support, a transom bracket, a swivel bearing having a bracket arm, a pivot tiltably connecting the bracket arm to the transom bracket, a latching pin carried by the transom bracket, a latch lever having a fulcrum pivot at one end and a hook at its opposite end normally engaging the pin thereby to prevent tilting of the motor, an auxiliary lever arm on the swivel bearing having a free end carrying the fulcrum pivot, the auxiliary lever arm extending transversely of the swivel bearing from a separate pivot, spring means effective between the latch lever and lever arm urging the former to its pin-engaging condition, hand-controlled release means associated with the hook-carrying end of the latch lever, further spring means effective between the swivel bearing and said fulcrum pivot in co-operation with the first named spring means to urge the latch lever to its pin-engaging condition, and abutment surfaces on the latch lever and the swivel bearing providing a temporary fulcrum for the latch lever under the action of an automatic release pull applied from the swivel bearing to the hook and pin whereby the latch lever is capable of swinging on the said temporary fulcrum against the action of the said further spring means in a direction disengaging the hook from the pin.

2. In the outboard motor as claimed in claim 1, a stop boss on the swivel bearing cooperating with the hook for jointly gripping the pin in operative travel condition of the motor, the stop boss providing one of the abutment surfaces, and a projection extending from an intermediate portion of the latch lever towards the said boss providing the other of the abutment surfaces.

3. In the outboard motor as claimed in claim 1, the latch lever and auxiliary lever arm both extending transversely of the swivel bearing at a location above the pin, a stop projection on the swivel bearing providing a stop abutment for the auxiliary lever arm in respect of the action of the said further spring means, and the said first mentioned spring means consisting of a hairpin spring extending between the lever arm and latch lever.

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