Sept. 13, 1932. W. F. MacGREGOR 1,877,520

COMBINATION HARVESTER THRESHER

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Fig. 1.

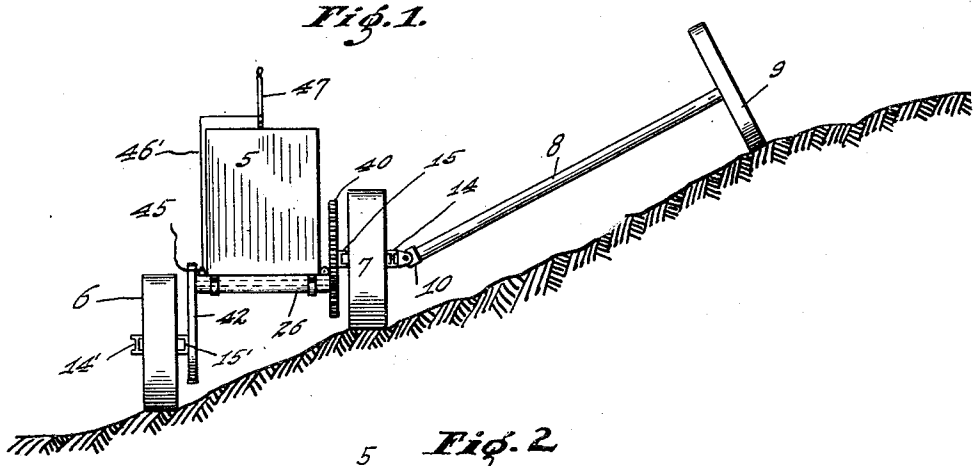
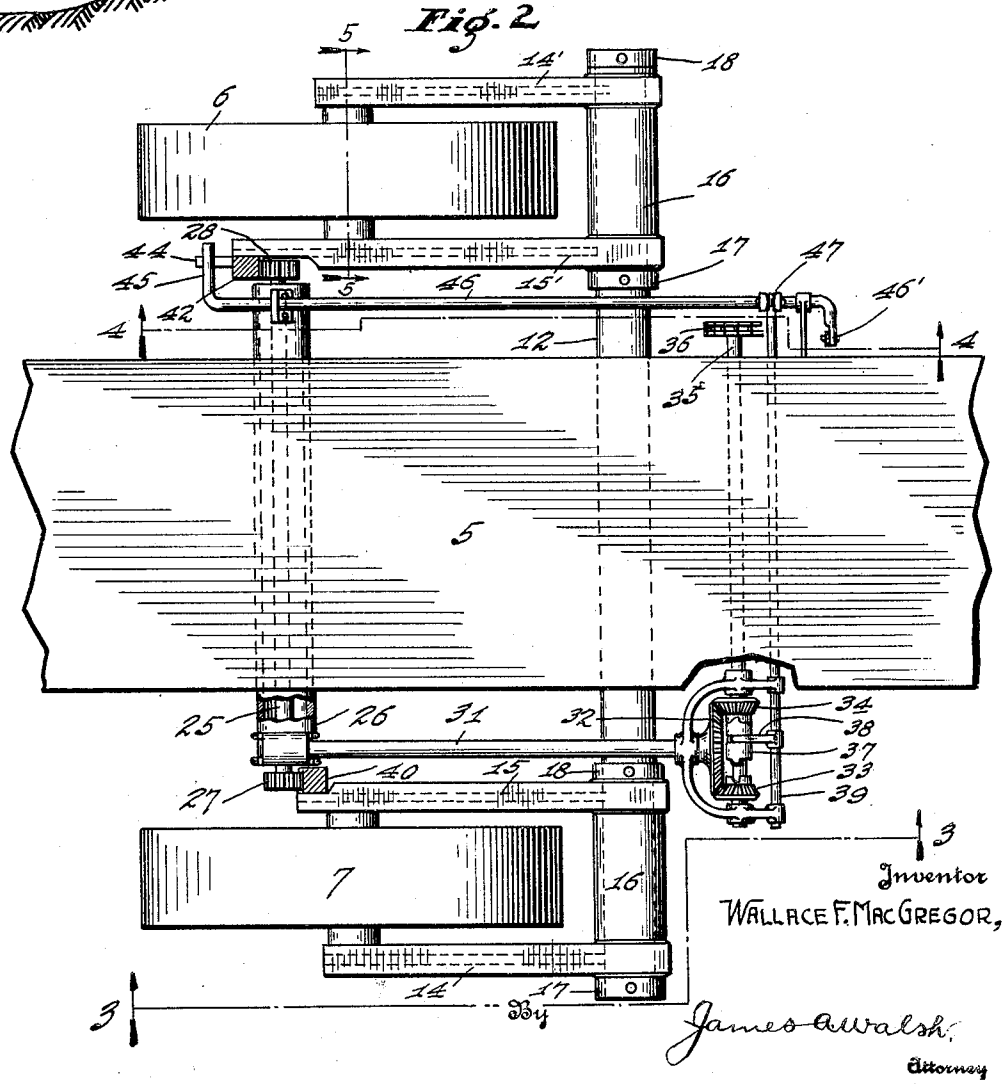



Fig. 2.




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Fig. 3.

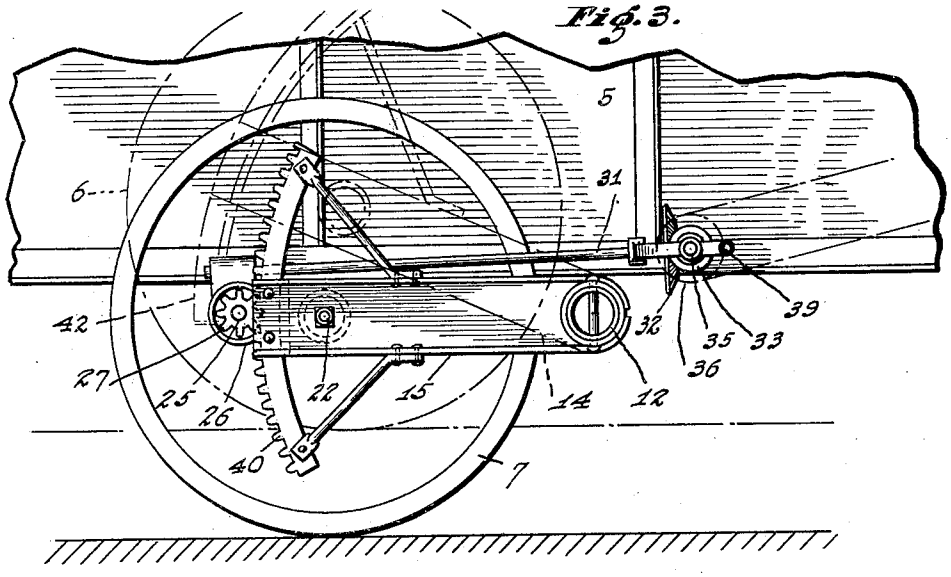



Fig. 4.

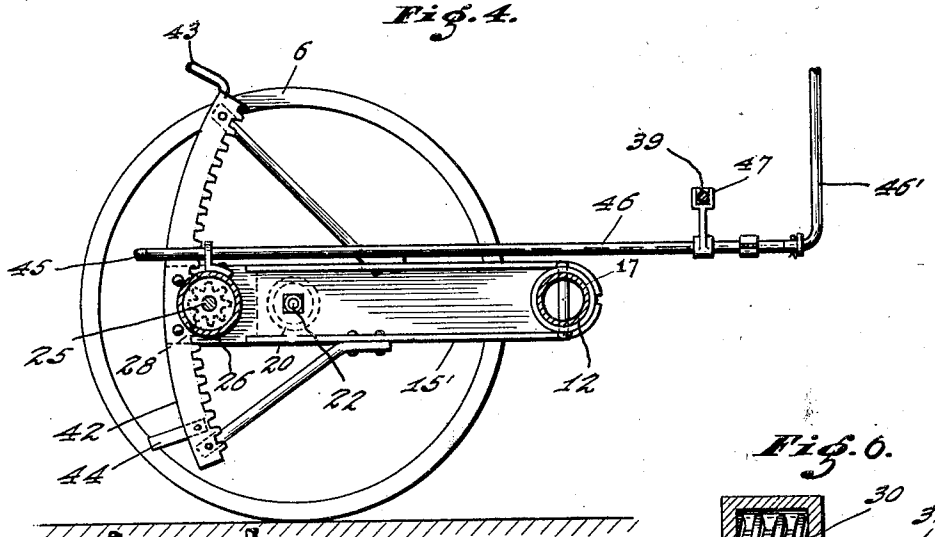



Fig. 5.

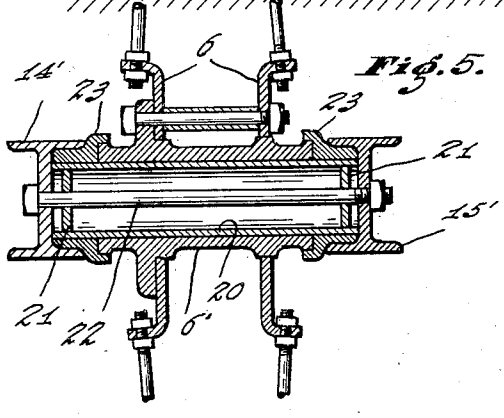
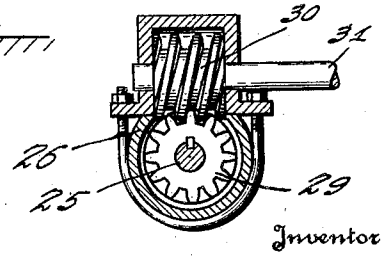



Fig. 6.




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# UNITED STATES PATENT OFFICE

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## COMBINATION HARVESTER-THRESHER

Application filed October 20, 1930. Serial No. 489,855.

By invention relates to improvements in that type of combination harvester-thresher employed for hillside harvesting, and particularly to the means for maintaining the thresher body in equipoise when traversing sloping terrain or ground inequalities, which consists in certain details of construction, arrangement and operation of parts as will be hereinafter specifically described.

In the accompanying drawings, forming part hereof, Figure 1 is a rear elevation of a combine equipped with my improvements; Fig. 2 a plan view; Fig. 3, a fragmentary side elevation of the right-hand side of the thresher when looking forwardly from the rear thereof, and taken on the dotted line 3—3 in Fig. 2; Fig. 4, an elevation of the wheel on the left side of the machine, and associated parts, taken on the dotted line 4—4 in Fig. 2; Fig. 5, a longitudinal section through the wheel-hub and bearings therefor on the dotted line 5—5 in Fig. 2; and Fig. 6, is a detail sectional view of the means for actuating parts of my improvement.

In said drawings the numeral 5 indicates the thresher element of the combine supported by the wheels 6 and 7, and 8 the axle and 9 the grain-wheel of the harvester, indicated in Fig. 1, illustrating the relation of the two elements when traversing a hillside, which elements are flexibly connected by the universal joint 10 in a well known manner. The thresher body is provided with a supporting axle 12 extending from opposite sides thereof, but it will be understood that a stub-axle at each side of the thresher may be employed.

As indicated in Fig. 1, it is necessary for efficient grain separation to maintain the thresher in level condition, and as such machine is heavy and of a cumbersome character it is my object to provide supporting and leveling means of maximum strength so mounted as to move vertically in relation to the thresher body and without swerving under its weight and the many ground irregularities encountered during harvesting operations, for which purpose I mount swinging wheel-supporting frames upon the axle 12 at each side of the machine. As said frame structures and associated parts are substantially counterparts it will only be necessary in the main to specifically describe one of such equipments. Upon said axle 12, which is preferably composed of metal piping, I pivotally mount frame members 14, 15, and 14′, 15′, spaced apart by a sleeve 16 and which members are prevented from undue lateral movement by the collars 17, 18, and in order to produce a highly rigid unit for the purpose I overlap the ends of the frame members about said sleeve 16 and weld them together so that such frame parts will together freely pivot about support 12. In the opposite ends of the frame I mount an axle of reinforced construction for the wheel, as 6, said axle comprising a tube 20 having strengthening heads 21, which heads and the members 14′, 15′, preferably composed of I-beams, are securely connected by a bolt 22, and in the assemblage of the parts the wheel-hub 6′ is fitted closely within the flanged collars 23 which underlap the webs of the I-beams as clearly indicated in Fig. 5. It will thus be seen, and I have so demonstrated in practice, that the wheel mounting in the I-beams as described, for my especial purpose, is of requisite strength and highly efficient for the rough usage to which such a device must be subject, and also that by simply withdrawing the bolt 22 the wheel with its axle may be readily removed.

In parallel relation to the axle 12 I secure to the thresher a shaft 25 having pinions, 27, 28, mounted upon each of its ends, said shaft being preferably enclosed within a tube 26, and provided with a worm-wheel 29, Fig. 6, positioned within said tube which meshes with a worm 30 on shaft 31, the latter having a bevel gear 32 at its opposite end adapted to be driven in reverse directions by the drive gears 33, 34, actuated by the shaft 35 driven at 36 from a suitable source of power on from the thresher. The direction of rotation of said shaft 31 is governed by the clutch 37 which is shifted by the arm 38 extending from the shifter-rod 39. Connected to the frame 15 is a curved rack-bar 40, Fig. 3, the teeth being on its convex or rear edge, while a curved rack-bar 42 is mounted upon the opposite frame 15′, Fig. 4, the teeth of which bar

is on its concave or front edge. The bar 40 engages pinion 27 on shaft 25, and the rack-bar 42 is engaged by pinion 28 on the opposite end of said shaft, said bar 42 having stops 43, 44, respectively, at its upper and lower ends adapted to contact with the end 45 of a trip-rod 46 which is connected at 47 to the shifter-rod 39.

From the foregoing description it will be understood that when the thresher is on level ground, and the clutch 37 in neutral position, the wheel frames will have assumed parallel relation horizontally to the thresher as indicated in Figs. 3 and 4, but as the machine encounters irregular sloping ground and either of the drive gears 33, 34, are engaged by the clutch 37, through manipulation of trip-rod 46 and shifter-rod 39 the shaft 31 will be rotated so that its worm 30 will in turn rotate shaft 25 and the pinions 27, 28, thereon, all rotating in the same direction. As the teeth of the rack-bars 40 and 42 are arranged in reverse relation the pinion 27 will actuate rack-bar 40 (and consequently the frame and wheel associated therewith) either upwardly or downwardly, while pinion 28, rotating in the direction of pinion 27, will lower or raise rack-bar 42 in a direction opposite to that of the bar 40, as indicated in Fig. 1, so that as wheel 7 is passing over gradually increasing high ground, and therefore rising, the wheel 6 will be simultaneously lowering to follow the incline over which it passes, and consequently under all undulating conditions of the ground the frames 14, 15, and 14′, 15′, acting as cranks, adapt the wheels to the varying terrain, in which manner the thresher body is constantly poised and maintained in level position without raising or lowering irrespective of ground inequalities. In circumstances where the wheel 6 descends sufficiently so that the stop 43 strikes the trip-rod 45 the latter through its connection with the shifter-rod 39 declutches whichever of the drive gears 33, 34, may be in engagement with driven gear 32, whereupon shaft 31 will cease to rotate, and by its worm connection with shaft 25 will prevent further actuation of the rack-bars by the pinions on said latter shaft. However, should said wheel 6 encounter a steep grade so that it is accordingly raised by its rack-bar to the upward limit of movement of the latter its lower stop 44 will contact with trip-rod 45 to declutch the drive gears in the manner before stated. It will therefore be seen that the up and down movements of said wheel are controlled by its rack-bar and that the thresher will always maintain its level position, neither moving upwardly nor downwardly, and while I have described the automatic manner of actuating trip-rod 45–46 it will also be understood that said rod may be manipulated by other means, for example, it may be provided with an extension 46′ extending to or over the top or other part of the machine and provided with a hand lever 47 so that an attendant on the machine employed for steering the same may readily control the action of the rack-bar from his position according to conditions.

I claim as my invention:

1. In a machine of the class described, a thresher, a frame embodying a wheel connected to one side of the thresher, a curved rack-bar on the frame having teeth in its convex edge, a wheeled suplemental frame on the opposite side of the thresher, a rack-bar on said latter frame having teeth in its concave edge, a continuous axle upon which the wheels of said frame are mounted, a shaft having pinions at its opposite ends engaging the rack bars, and power operated means for actuating each of said pinions to adjust the rack-bars in opposite directions to position the wheel associated therewith in such relation as to maintain the equipoise of the thresher when traversing irregular and sloping ground.

2. The combination, with a machine of the class described, of supporting means at each side of the machine, frames pivoted to the supporting means, a wheel mounted in each frame, a rack-bar on each frame one of said bars having teeth in its convex edge and the other embodying teeth in its concave edge, a shaft supported by the machine, means at each end of the shaft engaging the teeth of said rack-bars respectively, and means for rotating said shaft and engaging means to adjust said frames vertically in opposite directions to each other.

3. In a machine of the class described, a thresher, wheeled frames pivotally connected to opposite sides of the thresher, a curved rack-bar on each of said frames the teeth of said bars being disposed in reverse relation to each other, and a shaft on the thresher having pinions at its opposite ends engaging with and simultaneously actuating said bars in opposite directions so that the wheel of one of the frames will descend while the opposite wheel ascends to maintain the thresher in level position and vertically immovable when traversing ground inequalities.

4. In a machine of the class described, wheeled frames pivotally connected to the opposite sides of said machine, a curved rack-bar on each of said frames, a shaft on the machine having pinions at its opposite ends engaging with and simultaneously actuating said rack-bars in opposite directions so that the wheel of one of said frames will descend while the other wheel ascends to maintain the machine in level condition, and means for driving said shaft.

5. In a machine of the class described, wheeled frames pivotally connected to the opposite sides of said machine, a curved rack-bar on each side of said frames, a shaft on

the machine having pinions at its opposite ends engaging with and simultaneously actuating said rack-bars in opposite directions so that the wheel of one of said frames will descend while the other wheel ascends to maintain the machine in level condition, and means for discontinuing the actuation of the rack-bars to maintain the wheels in predetermined position.

In testimony whereof I affix my signature.

WALLACE F. MacGREGOR.