## Claims

1. Gear train unit for coupling a drive motor with an automatic punching press or with a punching press, respectively, with a plurality of planetary gear train stages connected one after the other, which each comprise a ring gear, a sun gear (2a, 21, 21a) and a plurality of planet gears (3, 3a, 3b) supported on a planet carrier (5, 5a, 6), wherein the sun gear (2a, 21, 21a) of each following planetary gear train stage is formed by the planet carrier (5, 5a) of the preceding planetary gear train stage or is connected or connectable with said planet carrier (5, 5a) in a torsionally rigid manner in rotational direction of the latter,

with a driving element (2) which forms the sun gear (2a) of the first planetary gear train stage or which is connected or connectable with said sun gear (2a) in a torsionally rigid manner in rotational direction of the latter,

and with an output element (6, 17) which forms the planet carrier (6) of the last of the planetary gear train stages connected one after the other, or which is connected or connectable with said planet carrier (6) in a torsionally rigid manner in rotational direction of the latter,

wherein the gear train unit is surrounded by a drum-type housing (6, 17) which forms the output element (6, 17) of the gear train unit and which is supported by second bearings (9, 16), particularly roller bearings (9, 16), arranged in the area of the ends of its drum shape, in a rotatable manner about an axis (X) extending in the center of its drum shape,

wherein the driving element (2) is supported by means of first bearings (9a, 24), particularly roller bearings (9a, 24), arranged in the region of its ends, in a rotatable manner about its longitudinal axis and wherein at least a part of the planet carriers (5a, 5b,

6) of the planetary gear train stages is supported on the driving element (2) in the region between the first bearings (9a, 24) by means of bearings (19, 20), particularly by means of roller bearings (19, 20),

wherein the driving element (2) is supported with the first bearings (9a, 24) in each case at a component (22, 44, 44b) which is stationary during operation.

2. Gear train unit according to claim 1,

wherein the fixed components (22, 44, 44b), to which the driving element (2) is supported with the first bearings (9a, 24), are part of a contiguous rigid supporting structure (22, 23, 25, 26, 27, 44, 44b) of the gear train unit.

3. Gear train unit according to one of the preceding claims, wherein the driving element (2) is supported with the first bearings (9a, 24) in a statically determinate manner.

4. Gear train unit according to one of the preceding claims, wherein the driving element (2) is formed at one end for coupling to a driving motor (46) and wherein the stationary component (44), at which the driving element (2) is supported with one of the first bearings (9a) in the area of this end, is formed for carrying the driving motor (46).

5. Gear train unit according to one of the preceding claims, wherein the section of the driving element (2), on which the planet carriers (5, 5a) are supported, transmits the torque for driving the sun gear (2a) of the first planetary gear stage during operation as intended.

6. Gear train unit according to one of the preceding claims, wherein the sun gear (2a) of the first planetary gear train stage is arranged in the area of an end of the driving element (2).

7. Gear train unit according to claim 6, wherein at least a part of the first bearing (24) arranged in the area of this end of the driving element (2) is arranged inside the sun gear (2a) of the first planetary gear train stage.

8. Gear train unit according to one of the claims 6 to 7, wherein the first bearing (24) which is arranged in the area of the end of the driving element (2), in the area of which the first sun gear (2a) of the first planetary gear train stage is arranged, is formed as fixed bearing, particularly with a cylindrical roller bearing (24).

9. Gear train unit according to one of the preceding claims, wherein the section of the driving element (2), on which the planet carriers (5, 5a) are arranged, particularly together with the sun gear (2a) of the first planetary gear train stage, is formed as a one-piece component.

10. Gear train unit according to one of the preceding claims, wherein the drum-type housing (6, 17) with the second bearings (9, 16) is supported in a statically determinate way.

11. Gear train unit according to one of the preceding claims, wherein the drum-type housing (6, 17) is supported directly or indirectly on the driving element (2) with at least one of the second bearings (9, 16), particularly with both second bearings (9, 16).

12. Gear train unit according to one of the preceding claims, wherein the drum-type housing (6, 17) is supported in each case at a component (25, 44b) which is fixed during operation with at least one of the second bearings (9, 16), particularly with both second bearings (9, 16).

13. Gear train unit according to claim 2 and according to claim 12, wherein the fixed component or components (25, 44b), at which the drum-type housing (6, 17) is supported with the second bearings (9, 16), are part of the supporting structure (22, 23, 25, 26, 27, 44, 44b) at which the driving element (2) is supported with the first bearings (9a, 24).

14. Gear train unit according to claim 13, wherein the supporting structure (22, 23, 25, 26, 27, 44, 44b) encompasses the drum-type housing (6, 17) in a U-shape.

15. Gear train unit according to one of the preceding claims, wherein the drum-type housing (6, 17) has at its outer circumference a running surface for a V-belt or a flat belt, or a toothing (41) for a toothed belt (18, 18a, 18b), a chain or a gear wheel, for coupling to a corresponding driving element of a work machine.

16. Gear train unit according to one of the preceding claims, wherein the planetary gear train stages are arranged inside an interior space of the gear sealed towards the outside, which is connectable with a lubricating oil circuit via supply lines and discharge lines leading to the outside.

17. Gear train unit according to claim 16, wherein the supply and discharge lines are guided through

the components (22, 25, 26, 27; 44) which are fixed during operation, at which the driving element (2) is supported with the first bearings (9a, 24).

18. Gear train unit according to one of the preceding claims, wherein the gear train unit is switchable in such a way that a first or a second transmission ratio is selectively settable.

19. Gear train unit according to claim 18, wherein the ability to switch is given in such a way that the ring gears of the planetary gear train stages can selectively be coupled with a component (25) which is fixed during operation or with the driving element (2), for selectively retaining or rotating the latter together with the driving element (2).

20. Arrangement comprising a gear train unit according to one of the preceding claims, and further comprising

a) a punch press with a crank drive or an eccentric drive for transforming the rotational motion of a drive shaft of the punch press into the punching motion of the tool and with a flywheel connectable or connected with the drive shaft; and

b) a drive motor (46) for driving the drive shaft of the punch press;

wherein the driving element (2) of the gear train unit is connected or connectable via a coupling with the drive motor (46) and the output element (17) of the gear train unit is connected or is connectable via a coupling with the drive shaft of the punch press or the flywheel.

21. Arrangement according to claim 20 with a gear train unit according to claim 18, wherein the drive motor (46) and the transmission ratios of the gear train

unit are dimensioned in such a way that the maximum punching force which can be generated at the plunger of the punch press in operation with the transmission ratio of the gear train unit at which the slower rotation of the drive shaft results, is equal to or greater than the maximum punching force which can be generated at the plunger of the punch press in operation with the transmission ratio of the gear train unit at which the faster rotation of the drive shaft results.

22. Arrangement according to one of the claims 20 to 21, wherein the flywheel is formed by the drum-type housing (6, 17) of the gear train unit.