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(54) **LOCOMOTIVE FOR SHUNTING OF ROLLING STOCK**

LOKOMOTIVE ZUM RANGIEREN VON ROLLENDEM MATERIAL

LOCOMOTIVE POUR LA DERIVATION D'UN MATERIEL ROULANT

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Description

FIELD OF THE INVENTION

[0001] The patent concerns the railway transport and more specifically a locomotive for shunting of rolling stock and has an application in shunting, loading and unloading of wagons and is especially applicable for shunting of wagons for in-yard railway transport.

PRIOR ART

[0002] From prior art (RU No 2150399 C1 и RU No2162039 C1) it is estimated that locomotives for loading and shunting service are used for shunting and loading of wagons as well as for their composition, movement and repair. These locomotives are equipped with heavy and expensive aggregates, machinery and devices, feeding and leading systems. The shunting with such locomotives is difficult and is connected with a great consumption of fuel, cooling and lubricating fluid. It also requires highly trained personnel - an engine-driver, a second engine-driver, and a shunter for each locomotive. The high operational expenses, the difficult shunting and servicing makes these locomotives extremely unsuitable for servicing of rolling stock for in-yard railway transport.

[0003] From prior art is known a shunting locomotive 6LDH, specified in our country as series 55-00 according to the Bulgarian State Railways (BSR) nomenclature. It is designed to shunt wagons and rolling stock weighting 1200-1500 tones and to position a respective wagon on a specific place of the railway. The underframe of the known shunting locomotive 55-00 has a coil-spring suspension on a standard wheeled sets, which are 4, connected by two in groups. The diesel engine on the underframe is connected with the starter generator, the hydrodynamic transmitter and the reversing reducer by short elastic gross. The reversing reducer transmits with the help of the respective cardan shaft the motion to a respective wheeled pair by a group wheeled pair reducer and an individual wheeled pair reducer. The underframe is designed to have a cooling group, water and fuel tanks, piston compressor and on-board control deck. The aggregates, fixed on the underframe, are covered with a metal basket provided with servicing openings closed by doors. The buffers and the draw-bars are stationary fixed on the underframe and there are compressor system, arresting system, electrical system, heating system and lubricating system.

[0004] The known shunting locomotive 55-00 has a high self-weight (68 tones) and dimensions (13,7m) which leads to an ineffective consumption of diesel fuel - 25,5 l/h at idle running of the engine or about 180 l per work shift. The high self-weight and dimensions make the storage of the locomotive in covered spaces difficult. Moreover, a diesel engine is used to put the locomotive in motion, which has a great power (920 kW) and which

provides a speed of 72 km/h whereas the real speed of the shunting work is from 4 to 8 km/h.

[0005] The shunting locomotive needs a lot of cooling fluid (1 ton), which is necessary for the cooling of the engine. On the other side, the cooling system has a great length and a lot of connections which results in sufficient loss of cooling fluid. All of the above makes the usage of antifreeze unjustifiably expensive and a mellow water is used instead. During the winter the locomotive must be kept warm 24 hours which results in unproductive fuel consumption or the water from the locomotive must be drained and refilled every day which costs an unproductive loss of about two working hours per day. The operating mode of locomotive 55-00 requires the temperature of the cooling fluid to be in the range of 30-40° C. To reach these temperatures during the winter the engine must run idle at least half an hour. The fuel consumption is unjustified.

[0006] The access to the actuation groups and aggregates in the locomotive 55-00 is hampered and this respectively hampers the maintenance and the repair of the machinery. Moreover, the separate lubricating system provided for each of the aggregates makes the construction even more complicated. The arresting system operates in the standard way via block brakes which are easily abraded. The piston compressor is an outdated system and causes operational problems. Another drawback of this shunting locomotive is the need of highly trained personnel - an engine-driver, a second engine-driver, and a shunter who perform the operations of shunting, positioning, loading and unloading without any visibility using only their personal experience. The commands from the operating desk are transmitted via the traditional methods - sound and visual signals and the execution of the commands is difficult.

[0007] Known from the prior art is also a shunting locomotive (US 4067264), with underframe suspended on standard wheel sets. The buffers and the draw-bars are stationary fixed on the underframe, on which are also fixed all essential aggregates and groups present in the previously described shunting locomotive 55-00 (engine, hydrodynamic transmitter, hydro-reversing and wheeled pair reducers, cooling group, piston compressor, water and fuel tanks, compressor system, arresting system, electrical system and lubricating system, metal basket for covering the aggregates with openings shut by doors, all fixed on the underframe) That known shunting locomotive is operated by radio control.

[0008] It enables the engine-driver to walk freely on the locomotive's deck and to operate from various points depending on the performed operations - to get closer to the first wagon /in pushing/ or to the last one /in pulling/ with the purpose of having better visual contact with the pulled/pushed wagon. As the engine-driver has direct visibility to/ eye contact with the first wagon only, the majority of the operations like shunting, positioning, loading and unloading are performed without any visibility, relying only on his personal experience. Besides, there is a second

engine-driver who via sound and visual signals directs the engine-driver in operations like the positioning, hitching and unhitching of wagons. This necessitates the presence of at least two highly qualified operators - an engine-driver and a second engine-driver.

[0009] Another drawback of this shunting locomotive is its heavy self-weight (over 90 tons) and large dimensions, which results in ineffective fuel consumption and makes the storage of the locomotive in covered places difficult. What is more, a very powerful engine is needed to set the locomotive in motion, providing a speed of 28 km/h whereas the real speed of the shunting work is from 4 to 8 km/h. It also leads to ineffective fuel consumption.

TECHNICAL FIELD OF THE INVENTION

[0010] The objective of the invention is to construct a compact locomotive for shunting of rolling stock, especially for in-yard railway transport. The locomotive can perform the shunting functions at lower operational expenses, can be more effectively and easily operated, and at the same time can provide the necessary traction.

[0011] This objective is fulfilled by constructing a locomotive for shunting of rolling stock consisting of - underframe with coil-spring suspension on standard railway wheels and wheeled sets. The engine, fixed on the - underframe, is connected with the starter-generator and hydrodynamic transmitter which itself is connected with a hydro-reversing reducer. The hydro-reversing reducer transmits via cardan shaft the motion to a respective wheeled pair reducer and wheels. The underframe is designed to have a cooling group, compressor, on-board control deck and fuel and water tanks. All aggregates, fixed on the underframe, are covered with a metal basket with openings closed by doors providing the access to the aggregates. The buffers and the draw-bars are stationary fixed on the underframe. It is provided for all systems necessary for the functioning of the machine - compressor system, arresting system, electrical system and lubricating system.

[0012] According to the invention the underframe forms constructively the fuel tanks and the air tanks are situated under it. On the underframe are fixed more than one engines each one provided with transmission system. Each of the engines together with its respective transmission forms a separate actuator group. Each group actuates the respective wheeled pair. The power groups are connected with a shared lubricating system. The doors on the covering basket providing access to the aggregates are designed to be of a type "butterfly".

[0013] The present invention provides for the on-board control deck to be placed sideways on the covering basket and to enable a remote control from a remote control deck. The remote control shall ensure the remote turning on of the engine, respectively the engines and the remote control of the operating modes of the shunting locomotive. Moreover, the range of the receiving signal for radio-control from the on-board control deck is adjustable and

can be changed depending on the shunting area.

[0014] A light-indication device for the respective operating mode of the power groups is placed sideways on the locomotive.

5 **[0015]** According to a preferred embodiment, the shunting locomotive's on-board control deck includes receiver with processor enabling the receiving and performing of the commands given by the remote control deck via a radio-signal. The locomotive is designed to have a protection for all aggregates, as well as Dead man's handle. The radio-signal coming to the on-board control deck receiver can be codified.

10 **[0016]** In a preferred embodiment of the locomotive it is provided for two power groups fitted on the underframe mirror imaging each other. Each of the power groups consists of diesel engine and transmission which includes hydrodynamic transmitter, reducer, elastic connector fixed between the hydrodynamic transmitter and the reducer and cardan shaft connected to wheeled pair reducer fixed to the respective wheeled pair. A helical compressor is installed by each of the engines and disc brakes are provided for the arresting system. The power groups can function separately as well as together to ensure the necessary traction.

25 **[0017]** The shunting locomotive according to the invention has a frame that forms constructively the necessary fuel tanks and is suspended on two wheeled sets. This makes the locomotive compact and it has almost twice smaller dimensions. The overall length including the buffers is 7 270 mm whereas the known shunting locomotives have a length of over 13000 mm. The weight of the present locomotive (16600 kg) is 4 to 5 times less than the weight of the known shunting locomotives.

30 **[0018]** The locomotive according to the patent is based on separate aggregates - in the preferred embodiment the separate power groups with two separate engines can work together as well as separately. Meanwhile the servicing operator can choose the proper operating mode. This results in reducing the fuel consumption because the second engine turns on only if a higher traction is required. The fuel consumption of the locomotive according to the invention is 2.5 - 3 l/h at a tractive effort of 1 500 tones, whereas the consumption at idle running is merely 0.700 l/h.

35 **[0019]** The lubricating system shared by the power groups provides double protection because the two engines can lubricate the four reducers. Instead of block brakes the more modern arresting system uses disc breaks, which are fixed at each of the two reducers where the rotation speed is 30 times higher and it results in higher work efficiency and reliability. The smaller dimensions and the compactness of the locomotive according to the invention result in a strong reduction of the length of the cooling system. It leads to a reduction in the amount of the circulating cooling fluid that is 16 l respectively, whereas by the known shunting locomotives this amount is 1 tone. Because of the reduced amount of circulating cooling fluid in the locomotive according to the invention

the usage of antifreeze is economically effective. Its usage enables the normal functioning of the equipment even at low temperatures without the need to keep the engine warm or to drain and refill water daily. This saves on average two unproductive hours a day for preparation of the equipment and idle running.

[0020] The easy and overall access to all aggregates and systems of the present locomotive is enabled by the doors type "butterfly" which gives 100 % visibility and accessibility to each of the aggregates.

[0021] An advantage of the invention is the fact that highly trained personnel is not required for the locomotive's operating and control. A single operator can service the locomotive manually or via a remote control and can perform all operations for positioning, loading and unloading of the wagons. The shunting locomotive has high operational reliability that together with the small dimensions and low operational expenses makes it particularly suitable for in-yard railway transport.

DESCRIPTION OF ENCLOSED DRAWINGS

[0022]

Fig. 1 shows schematically a longitudinal view of the shunting locomotive with the position of the aggregates, the equipment and the systems on the underframe.

Fig 2 shows a plan of the shunting locomotive.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] The locomotive for shunting of rolling stock shown on fig. 1 and 2 consists of underframe with coil-spring suspension 2 on standard wheeled sets 3 and wheels 4. The - underframe 1 forms constructively the fuel tanks 5 and the air tanks 6 are situated under it. The construction is compact and has dimensions twice smaller than the locomotive 55-00. By a preferred embodiment the locomotive's overall length including the buffers is 7270 mm, the wheel-gauge is 1435 mm and the widest part is 2330 mm. The locomotive's weight including the service reserves is 16600 kg.

[0024] On the - underframe 1 are placed two engines 7 mirror imaging one another, each one provided with a transmission system. Each transmission system includes hydrodynamic transmitter 8, reducer 9, elastic connector 10 fixed between the hydrodynamic transmitter 8 and the reducer 9, and a cardan shaft 11 connected to wheeled pair reducer 12 fixed on the respective wheeled pair 3. Each engine 7 together with its transmitting system forms a separate actuator group setting to motion the respective wheeled pair 3 and wheels 4.

[0025] The power groups, in this case two, can function separately as well as simultaneously to provide the necessary traction. By a preferred embodiment of the invention the locomotive will have the following configuration:

diesel engine type D 3900 K, 52 kW and rotation speed of 2250 rev/ min, hydrodynamic transmitter type HDT 6870.2.S3-02, elastic connector type Vialstic 370-120, reducer type RDC 650, cardan shaft type 367/ 6.5 and wheeled pair reducer type A35 K.

[0026] The power groups - engine 7 and the transmitting system - are connected to a shared lubricating system that provides a double protection because the two engines 7 can lubricate the four reducers 9 and 12. The oil pressure pumps installed on the diesel engines 7 suck oil from the respective wheeled reducer 12 and pass it for pressure lubrication of the cogged wheels and bearings in all reducers.

[0027] A helical compressor 13 is installed to each engine 7 and it supplies the air installation for unloading of the respective wagon and the servicing of the arresting system. The compressors 13 are actuated by the diesel engines 7 via trapezium-shaped belts. Each actuator group is supplied with a disk break 14. In a preferred embodiment the compressors are type ESB 5/8.

[0028] A cooling group, single-leader electrical system including starter storage batteries 15 and all necessary for the locomotive's functioning manifolds - air, arresting, lubricating, etc are placed on the underframe 1. According to a preferred embodiment, the storage battery is 12V/ 35 Ah. The remote desk for radio control works with a storage battery type 12V/9 Ah.

[0029] All aggregates, equipment and machinery installed on the underframe 1 are covered with a metal basket 16 with openings. They are closed with doors 17 type 'butterfly' and thus providing the required access for operating and servicing. The metal basket 16 can be dismantled from the underframe 1.

[0030] The buffers and the draw-bars 19 are stationary installed on the fore-beams 18 on the - underframe 1. The fore-beams 18 are fitted to the - underframe 1 via pass-bolts.

[0031] The present invention provides for the on-board control deck 20 to be placed sideways from the covering basket 16. The operator can control the shunting locomotive directly from the on-board control deck 20, standing on a foolproof step 21 or by a remote control deck. The remote control is performed via a remote control deck ensuring the turning on of the engine 7, respectively the engines 7 and the remote control of the operating modes of the shunting locomotive. Moreover, the range of the receiving signal for radio-control from the remote control deck is adjustable and can be changed depending on the shunting area.

[0032] A light-indication device 22 for the respective operating mode of the power groups is placed sideways on of the locomotive.

[0033] The shunting locomotive's on-board control deck 20 includes receiver with processor enabling the receiving and performing of the commands given by the remote control deck via a radio-signal. The locomotive is designed to have a protection for all aggregates, as well as Totmann protection (Dead man's handle) - active

and passive. The radio-signal coming to the command desk receiver can be codified making impossible the locomotive's activation by an unwanted source.

[0034] The shunting locomotive according to the invention gives possibility for an easy servicing. The locomotive is based on aggregates thus the separate power groups in the preferred embodiment can operate simultaneously as well as separately. Meanwhile the servicing operator can choose the proper operating mode. This results in reducing the fuel consumption because the second engine turns on only if a higher traction is required. On a horizontal plot the locomotive can shunt a train composition up to 1500 tones at the speed of 8 km/h at fuel consumption of 2,5 - 3 l/h.

[0035] The smaller dimensions and the compactness of the locomotive according to the invention result in a strong reduction of the length of the cooling system. It leads to a reduction in the amount of the circulating cooling fluid that is 16 l respectively. In this respect the usage of antifreeze as a cooling fluid is economically effective. Its usage enables the normal functioning of the equipment at low temperatures without the need to keep the engine warm or to drain and refill water daily. This saves on average two unproductive hours a day for preparation of the equipment and idle running.

[0036] The control of the shunting locomotive is simplified and can be performed by the operator directly from the on-board control deck as well as via the remote control. At a remote control operating mode the starting process of turning the engines on is performed by the processor in the following sequence:

the process is started by pressing the button 'start' from the remote control deck;

during the first 15 seconds the air pre-heaters turn on;

the starters are activated and work for 5 seconds; if the engine does not turn on the process is repeated;

when the engine turns on the starter is turned off via two protections.

[0037] The engine actuates a special generator that reaches a tension corresponding to a speed rotation of 550 rev/min. This tension activates a relay that stops the starting process.

[0038] When the generator for charging the batteries reaches 14V tension corresponding to a speed rotation of the crankshaft of 600 rev/min, the same relay is activated and stops the starting process.

[0039] The operator monitors the success of the starting process and the other operations via a light-indication device 22.

[0040] The provided protections ensures the turn off of the engine and the activation of the locomotive's brake in the following cases:

when the shunting locomotive leaves the range of the remote control;

when over 15 seconds there is no other command from the remote control deck and

when the temperature of the cooling water in any of the power groups increases above a given value, when the oil pressure of the engine or the reducers drops below the permissible range, or the air temperature in the compressors rises above the permissible limits.

[0041] In cases when commands and operations with longer duration are in progress the processor on the on-board control deck 20 automatically confirms the command every 14 seconds.

[0042] The operator can service easily and precisely the locomotive and can perform all operations for positioning, loading and unloading of the wagons.

[0043] The shunting locomotive has high operational reliability that together with the small overall dimensions and low operational expenses makes it particularly suitable for in-yard railway transport.

Claims

1. A shunting locomotive for shunting of rolling stock consisting of an underframe (1) with coil spring suspension (2) on standard railway wheeled sets (3), with engine (7), fixed on the underframe (1) connected with the hydrodynamic transmitter (8) which itself is connected with a hydro-reversing reducer (9) that transmits via cardan shaft (11) the motion to a respective wheeled pair (3) by a wheeled pair reducer (12) and the underframe (1) is designed to have a cooling group, compressor (13), and fuel tanks (5) and water tanks (6) and all aggregates, fixed on the underframe (1), are covered with a metal basket (16) with openings which are closed with doors (17) providing the access to the aggregates, and buffers and the draw-bars (19) are stationary fixed on the underframe (1) and provided for are compressor system, arresting system, electrical system and lubricating system, as well as on-board control deck (20) adapted for radio control, **characterised in that** the underframe (1) forms constructively the fuel tanks (5) and under it are situated the air tanks (6) and on the underframe (1) are fitted more than one engines (7), each one provided with transmission system, forming with the respective engines (7) a separate power group, which sets in motion the respective wheeled pair (3), and the power groups are connected with a shared lubricating system, and/ the basket (16) covering the aggregates has doors (17) type "butterfly" and the on-board control deck (20), placed sideways

on the covering basket (16), and installed on the locomotive is a light-indication device (22) for the respective operating mode of the power groups.

2. A shunting locomotive in accordance with claim 1 wherein the on-board control deck (20) includes a receiver with processor enabling the receiving and performing of the commands given by the remote radio control deck via a radio-signal and a protection is ensured for all aggregates, as well as dead-man's function. 5
3. A shunting locomotive in accordance with claim 2 wherein the radio-signal coming to the command desk (20) is codified. 10
4. A shunting locomotive in accordance with claim 1 and 2, wherein each power group includes a diesel engine (7) and transmitting system consisting of hydrodynamic transmitter (8), a reducer (9), elastic connector (10) fixed between the hydrodynamic transmitter (8) and the reducer (9), and a cardan shaft (11) connected to wheeled pair reducer (12) fixed on the respective wheeled pair (3). 15
5. A shunting locomotive in accordance with any of the claims 1, 2, and 4 wherein on each engine (7) a helical compressor (13) is installed and the arresting system includes disc brakes (14). 20
6. A shunting locomotive in accordance with any of the claims 1, 2, 4 or 5 wherein the power groups can function separately as well as simultaneously. 25
7. A shunting locomotive in accordance with any of the claims 2 or 3 wherein the receiving range of the signal for radio control from the on-board control deck (20) is adjustable. 30

Patentansprüche

1. Rangierlokomotive zum Rangieren von rollendem Material, bestehend aus Untergestell (1) mit Spiralfederabhängung (2) der Standardradsätzen (3), mit Motor (7), montiert auf dem Untergestell (1) und verbunden mit der hydrodynamischen Sender (8), der seinerseits mit hydraulischem Wendegetriebe (9) verbunden ist, das per Kardanwelle (11) die Bewegung des entsprechenden Radsatzes (3) durch das Radsatzgetriebe (12) übergibt, und das Untergestell (1) ist so entworfen, dass es eine Kühlungsgruppe, einen Kompressor (13) und Kraftstoff- (5) und Wasserbehälter (6) gibt, und alle Aggregate, die auf dem Untergestell (1) montiert wurden, sind mit einem Metallkorb (16) gedeckt, mit Öffnungen, die mit Türen (17) geschlossen werden, die ihrerseits einen Zugang zu den Aggregaten ermöglichen, und die 45

Stoßdämpfer und die Zugstangen (19) sind unbeweglich auf dem Untergestell (1) montiert, und außerdem gibt es ein Verdichtungssystem, eine Notbremsanlage und Schmieranlage, sowie auch ein Bedienungspult (20), das zur Funkkontrolle adaptiert ist. Dieser Rangierlokomotive **zeichnet sich dadurch aus**, dass das Untergestell (1) die Kraftstoffbehälter (5) konstruktiv formiert, und unter ihm befinden sich die Druckluftbehälter (6), und auf dem Untergestell (1) wurden mehr als ein Motor (7) montiert, jeder von diesen Motoren wird mit einer Sendeanlage ausgerüstet und mit den entsprechenden Motoren (7) bilden sie eine einzelne Antriebsgruppe, die den entsprechenden Radsatz (3) in Bewegung bringt, und die Antriebsgruppen sind mit einer gemeinsamen Schmieranlage verbunden, und der Korb (16), der die Aggregate deckt, ist mit Türen (17) der Art "Schmetterling" und mit Bedienungspult (20) ausgerüstet, die sich auf den Seiten der Deckungskorb (16) befinden, und an der Lokomotive befindet sich ein montiertes Lichtanzeigergerät (22) für die entsprechende Betriebsart der Antriebsgruppen.

2. Rangierlokomotive, laut Patentanspruch 1, aber das Bedienungspult (20) besteht aus Sendeanlage mit Prozessor, mit dessen Hilfe der Erhalt und die Ausführung von Befehlen, von einem Abstand von dem Bedienungspult durch Funksignal gegeben, realisiert wird und es gibt Sicherung für alle Aggregate, sowie auch eine Sicherung "Totmann". 25
3. Rangierlokomotive, laut Patentanspruch 2, aber das Funksignal, das von dem Bedienungspult (20) kommt ist kodiert. 30
4. Rangierlokomotive, laut Patentansprüche 1 und 2, aber jede Antriebsgruppe besteht aus Dieselmotor (7) und Sendeanlage, ihrerseits bestehend aus einem hydrodynamischen Sender (8), aus Wendegetriebe (9), aus elastischem Konnektor (10), der zwischen dem hydrodynamischen Sender (8) und dem Wendegetriebe (9) fixiert ist, und die Kardanwelle (11) ist zu dem Radsatzgetriebe (12), montiert auf dem entsprechenden Radsatz (3), verbunden. 40
5. Rangierlokomotive, laut Patentansprüche 1, 2 und 4, aber an jedem Motor (7) ist einen Spiralkompressor (13) montiert, und die Bremsanlage besteht aus Scheibenbremsen (14). 45
6. Rangierlokomotive, laut einer von den Patentansprüchen 1, 2, 4 oder 5, aber die Antriebsgruppen können sowie einzeln als auch zusammen funktionieren. 50
7. Rangierlokomotive, laut einer von den Patentansprüchen 2 oder 3, aber der Umfang der Signalaufnahme zur Funkkontrolle von dem Bedienungspult 55

(20) ist regulierbar.

Revendications

1. Locomotive pour la dérivation d'un matériel roulant se composant d'un châssis (1) avec la suspension de ressort hélicoïdal (2) sur les essieux montés standards (3), avec le moteur (7), fixé sur le châssis (1) lié à l'émetteur hydrodynamique (8) qui de sa part est lié à un réducteur hydraulique réversible (9) qui transmet par l'intermédiaire de l'axe de cardan (11) le mouvement à l'essieu monté respectif (3) par un réducteur des essieux montés (12) et le châssis (1) est conçu de tel façon que d'avoir un groupe de refroidissement, le compresseur (13), et des réservoirs de carburant (5) et des réservoirs d'eau (6) et tous les agrégats, fixés sur le châssis (1), sont couverts de panier en métal (16) avec les ouvertures qui sont clôturées par les portes (17) fournissant l'accès aux agrégats, et les amortisseurs et les barres extensibles (19) sont fixés immobile sur le châssis (1) et en outre il y a un système de compresseur, système d'arrêt d'urgence et système de lubrification, ainsi que le tableau de bord de contrôle (20) adapté pour la radio commande **se caractérisant par** cela que le châssis (1) forme de manière constructive les réservoirs de carburant (5) et sous le châssis sont situés les réservoirs d'air comprimé (6) et sur le châssis (1) sont fixés plus d'un moteur (7), chacun équipé d'un système de transmission, formant avec les moteurs respectifs (7) un groupe de mise en marche séparé, qui met en mouvement l'essieu monté respectif (3), et les groupes de mise en marche sont liés à un système de lubrification partagé, et le panier (16), couvrant les agrégats, possède des portes (17) de type "papillon" et le tableau de bord de contrôle (20), placés à côté du panier couvrant (16), et sur la locomotive un dispositif de lumière - indication est installé (22) pour le mode d'opération respectif des groupes de mise en marche.
2. Locomotive pour la dérivation d'un matériel roulant selon la revendication 1 mais le tableau de bord de contrôle (20) est constitué d'un récepteur avec un processeur permettant la réception et l'exécution des commandes lancées à distance du tableau de radio commande par l'intermédiaire d'un radio - signal et une protection est assurée pour tous les agrégats, ainsi qu'une "protection de Totman".
3. Locomotive pour la dérivation d'un matériel roulant selon la revendication 2 mais le radio - signal venant du tableau de commande (20) est codifié.
4. Locomotive pour la dérivation d'un matériel roulant selon les revendications 1 et 2 mais chaque groupe de mise en marche contient un moteur diesel (7) et

système de transmission se composant de l'émetteur hydrodynamique (8), un réducteur (9), le connecteur élastique /partie liant/ (10) fixé entre l'émetteur hydrodynamique (8) et le réducteur (9), et un axe de cardan (11) lié au réducteur d'essieu monté (12) fixé à l'essieu monté respectif (3).

5. Locomotive pour la dérivation d'un matériel roulant selon les revendications 1, 2, et 4 mais sur chaque moteur (7) un compresseur hélicoïdal (13) est installé et le système de freinage contient des freins à disque (14).
6. Locomotive pour la dérivation d'un matériel roulant selon n'importe quelle des revendications 1, 2, 4 ou 5 mais les groupes de mise en marche peuvent fonctionner séparément aussi bien que simultanément.
7. Locomotive pour la dérivation d'un matériel roulant selon n'importe quelle des revendications 2 ou 3 mais les limites de réception du signal pour la radio commande du tableau de contrôle de bord (20) sont réglables.

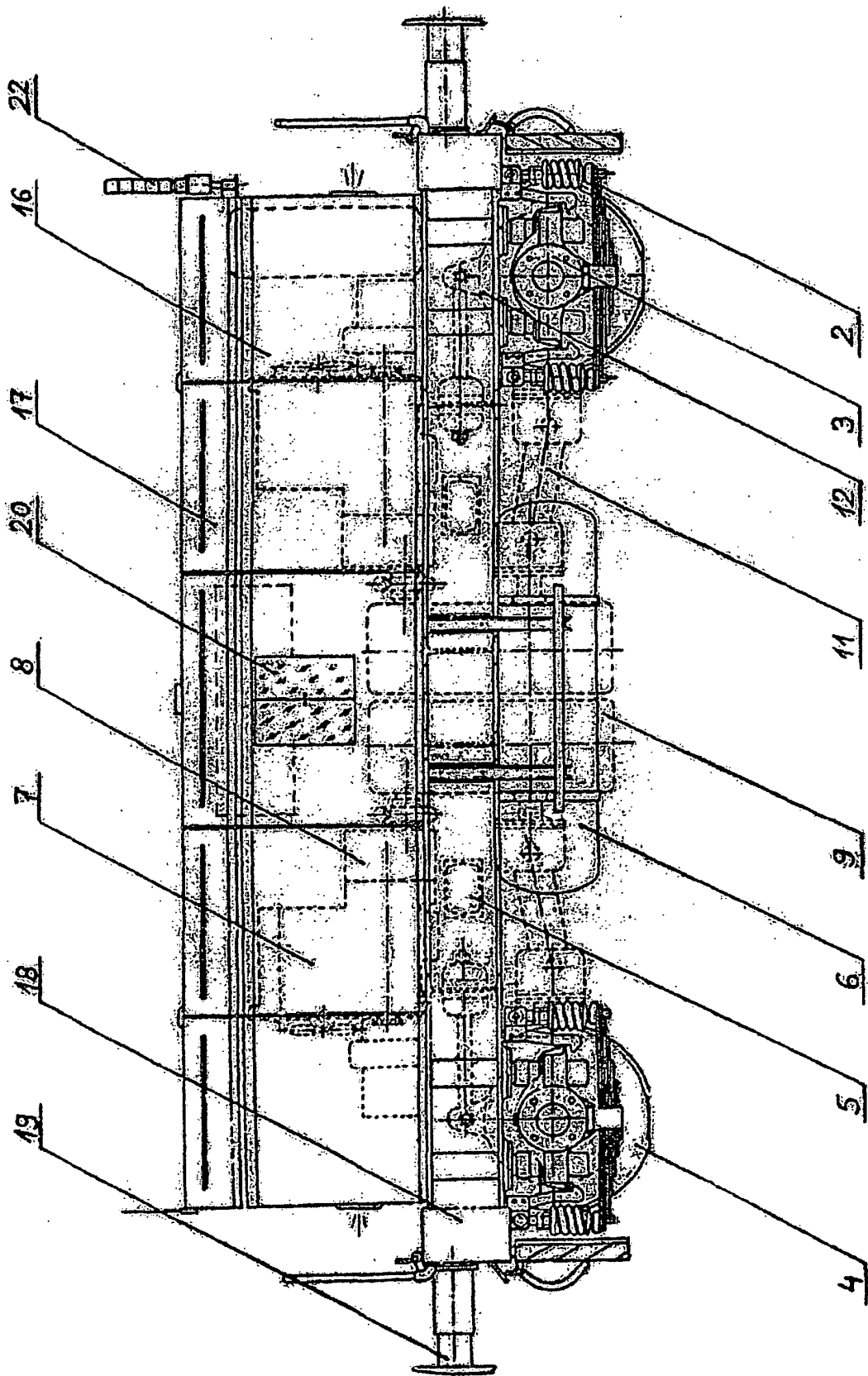


Fig. 1

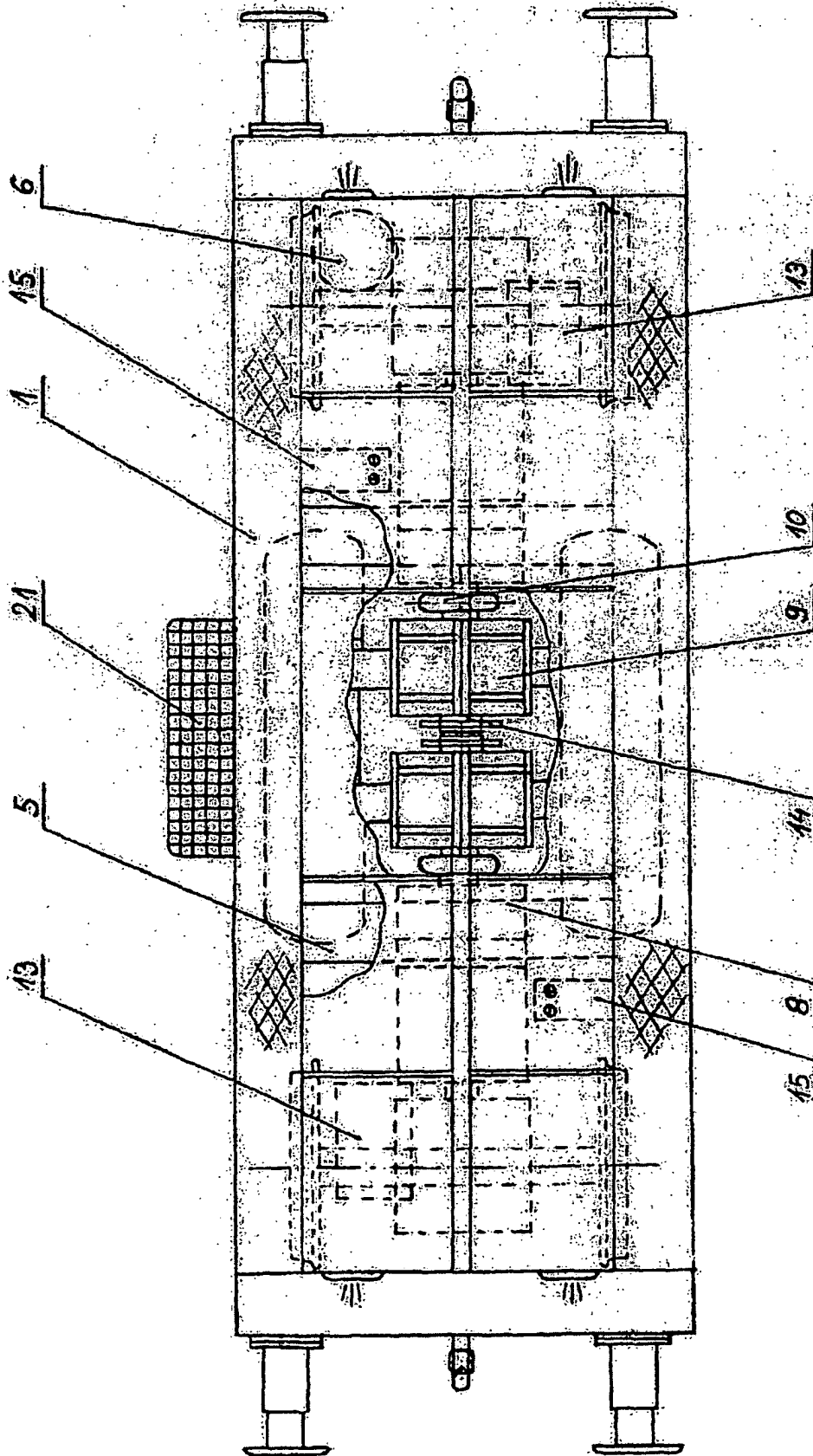


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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