CLAIMS

1. - Mobile x-ray device with telescopic column comprising:

- ~~A~~ a chassis (1) which supports the telescopic column (2)~~.~~;
- ~~A~~ a telescopic column (2) comprising a lower fixed portion (5) which rotates with respect to a vertical axis, and at least one upper mobile portion (6)~~.~~;
- ~~A~~ a telescopic arm (3) which moves vertically along the upper mobile portion (6) of the telescopic column (2) and which supports at its end a head assembly (4) which contains the x-ray emitter~~.~~, ~~This~~ this arm on extending or retracting allows the x-ray emitter to be moved further away or brought closer horizontally~~.~~

~~Characterised in that:~~

- ~~The~~ the telescopic arm (3) and the head assembly (4) configuring an arm-head assembly can move from a minimum height at the lower position of the upper mobile portion (6) ~~telescopic column~~ in ~~its~~ the retracted position of the telescopic column (2) to a maximum height at ~~to~~ the upper position of the mobile ~~column~~ portion (6) in ~~its~~ an extended position of the telescopic column~~.~~;
- ~~Also~~ also all movements of the column are manual and have a mechanical balancing mechanism~~.~~

wherein:

the mechanical balancing system comprises:

- a first mechanism that balances the weight of two suspended bodies, with vertical movement, wherein the two suspended bodies are the mobile portion (6) on the one hand, and the telescopic arm (3) with the head assembly (4) on the other hand, wherein this first mechanism is housed in the fixed portion (5);
- a second mechanism that balances the weight of the arm-head assembly consisting of the telescopic arm (3) and the head assembly (4) and which is housed in each of the mobile portions (6) that the telescopic column (2) comprises.

wherein the first balancing mechanism comprises:

- a tension spring (11) which can use any type of traction technology, and which is fixed to a support (11.1) at its lower end;
- a block and tackle (12) consisting of one group of lower pulleys (12.1) and one group of upper pulleys (12.2). The lower pulleys (12.1) of the block and tackle (12) are joined to the tension spring (11);
- a variable radius pulley (13) wherein the cable that comes from the block and tackle (12) and is coiled in the grooves of the pulley whose radii vary throughout the run of the cable, thereby achieving that the cable at the output of the pulley (13) has a constant tension, this force will be the sum of the two weights to be balanced (that of the mobile portion (6) and that of the telescopic arm (3) with the head assembly (4)),

characterized in that:

The second balancing mechanism, housed in each of the mobile portions (6) of the telescopic column (2), comprises:

- a two-radii pulley (14) which takes charge of balancing the weight of the telescopic arm (3) and of the head assembly (4) with the traction at the input of this pulley (sum of the mobile portion (6) plus the assembly of the telescopic arm (3) and head assembly (4));
- a recovery pulley (15) that allows the cable that comes from the variable radius pulley (13) to pull upwards from the lower part of the mobile portion (6).

2._- Mobile x-ray device with telescopic column according to claim 1, characterised in that the chassis (1) has a system of wheels with manual or motorised movement, which allows the equipment to be moved.

3. - Mobile x-ray device with telescopic column according to claim 1, characterised in that the telescopic arm (3), comprises

- ~~A~~ a base portion (7) fixed to the mobile portion (6) of the telescopic column (2) by means of a joint moveable along the mobile portion (6)~~.~~;

- ~~Two~~ two portions (8) and (9) which slide horizontally with respect to the base portion (7) and each one of them also with respect to the immediately preceding portion.

~~4. - Mobile x-ray device with telescopic column according to claim 1, characterised in that the mechanical balancing mechanism comprises:~~

- ~~A first mechanism that balances the weight of the two suspended bodies with vertical movement (the mobile portion (6) on the one hand, and the telescopic arm (3) with the head assembly (4) on the other hand). This first mechanism is housed in the fixed portion (5).~~
- ~~A second mechanism that balances the weight of the assembly consisting of the telescopic arm (3) and the head assembly (4) and which is housed in each of the mobile portions (6) that the telescopic column (2) comprises.~~

~~5. - Mobile x-ray device with telescopic column according to claim 4, characterised in that the first balancing mechanism comprises:~~

- ~~A tension spring (11) which can use any type of traction technology, and which is fixed to a support (11.1) at its lower end~~
- ~~A block and tackle (12) consisting of one group of lower pulleys (12.1) and one group of upper pulleys (12.2). The lower pulleys (12.1) of the block and tackle (12) are joined to the tension spring (11).~~
- ~~A variable radius pulley (13) wherein the cable that comes from the block and tackle (12) and is coiled in the grooves of the pulley whose radii vary throughout the run of the cable, thereby achieving that the cable at the output of the pulley (13) has a constant tension. This force will be the sum of the two weights to be balanced (that of the mobile portion (6) and that of the telescopic arm (3) with the head assembly (4).~~

~~6. - Mobile x-ray device with telescopic column according to claim 4, characterised in that the second balancing mechanism, housed in each of the mobile portions (6) of the telescopic column (2), comprises:~~

~~- A two-radii pulley (14) which takes charge of balancing the weight of the telescopic arm (3) and of the head assembly (4) with the traction at the input of this pulley (sum of the mobile portion (6) plus the assembly of the telescopic arm (3) and head assembly (4)).~~

~~- A recovery pulley (15) that allows the cable that comes from the variable radius pulley (13) to pull upwards from the lower part of the mobile portion (6).~~

~~7~~4. - Mobile x-ray device with telescopic column according to claim ~~6~~1, characterised in that the two-radii pulley (14) achieves a balancing of forces by making the ratio between the input radius divided by the output radius equal to the sum of the weights of the telescopic arm (3) assembly and the weight of the head assembly (4) divided by the sum of the weights of the mobile portion (6), of the telescopic arm assembly (3) and of the head assembly (4), in other words the ratio between the input radius and the output radius is equal to the quotient between weight [(3)+(4)] divided by weight [(6)+ (3)+(4)], leaving the two-radii pulley (14) fixed to the upper part of the mobile portion (6).

~~8~~5. - Mobile x-ray device with telescopic column according to claim 4~~1~~, characterised in that the mobile portion (6) has linear guides (16) between the mobile portion (6) and the fixed portion (5), and linear guides (17) between the mobile portion (6) and the telescopic arm (3).

~~9~~6. - Mobile x-ray device with telescopic column according to claim 1, characterised in that the rotary joint between the lower fixed portion (5) and the chassis (1), which is embodied by means of a bearing (5.1), has an orifice (6.1) through which the system's electrical cables are made to pass from the chassis (1) to the inside of the fixed portion (5).

~~10~~7. - Mobile x-ray device with telescopic column according to claim 1, characterised in that

- on the fixed portion (5) of the telescopic column (2) disposed on both sides there are front bearings (18) and lateral bearings (19), which allow movement of the mobile portion (6) with respect to the fixed portion (5), without heaving or pitching~~.~~;
- on a base plate (20), for movement of the telescopic arm (3), both at its upper end and its lower end and on both sides front bearings (21) are disposed and other side bearings (22) to allow guiding of the telescopic arm (3) in its vertical movement over the mobile portion (6) to which it is associated.

~~11~~8. - Mobile x-ray device with telescopic column according to claim ~~5~~1, characterised in that the mechanical balancing mechanism has safety means in the event of the cable breaking~~.~~, ~~These~~ these safety means are a first parachute mechanism (25) between the telescopic arm (3) and the mobile portion (6), and a second parachute (26) between the mobile portion (6) and the fixed portion (5)~~.~~, ~~These~~ these two parachute mechanisms prevent the possible fall of the telescopic arm (3), of the head assembly (4) and of the mobile portion (6) in the event of the cable breaking.

~~12~~9. - Mobile x-ray device with telescopic column according to claim ~~5~~1, characterised in that the lower fixed portion (5) rotates with respect to the chassis (1) by means of a rotation bearing (5.1), having also in the rotary joint an orifice concentric with respect to the rotation bearing which allows passage of the system's electrical cables from the chassis (1) to the telescopic column (2).

~~13~~10. - Mobile x-ray device with telescopic column according to any of the preceding claims, characterised in that the ~~assembly~~ chassis of the mobile X-ray device comprises a user console (27).

~~14~~11. - Mobile x-ray device with telescopic column according to claim ~~13~~10, characterised in that the user console (27) rotates between 0º and 90º about the horizontal axis.

~~15~~12. - Mobile x-ray device with telescopic column according to claim ~~14~~11, characterised in that the user console (27) rotates between -180º and +180º about the vertical axis.