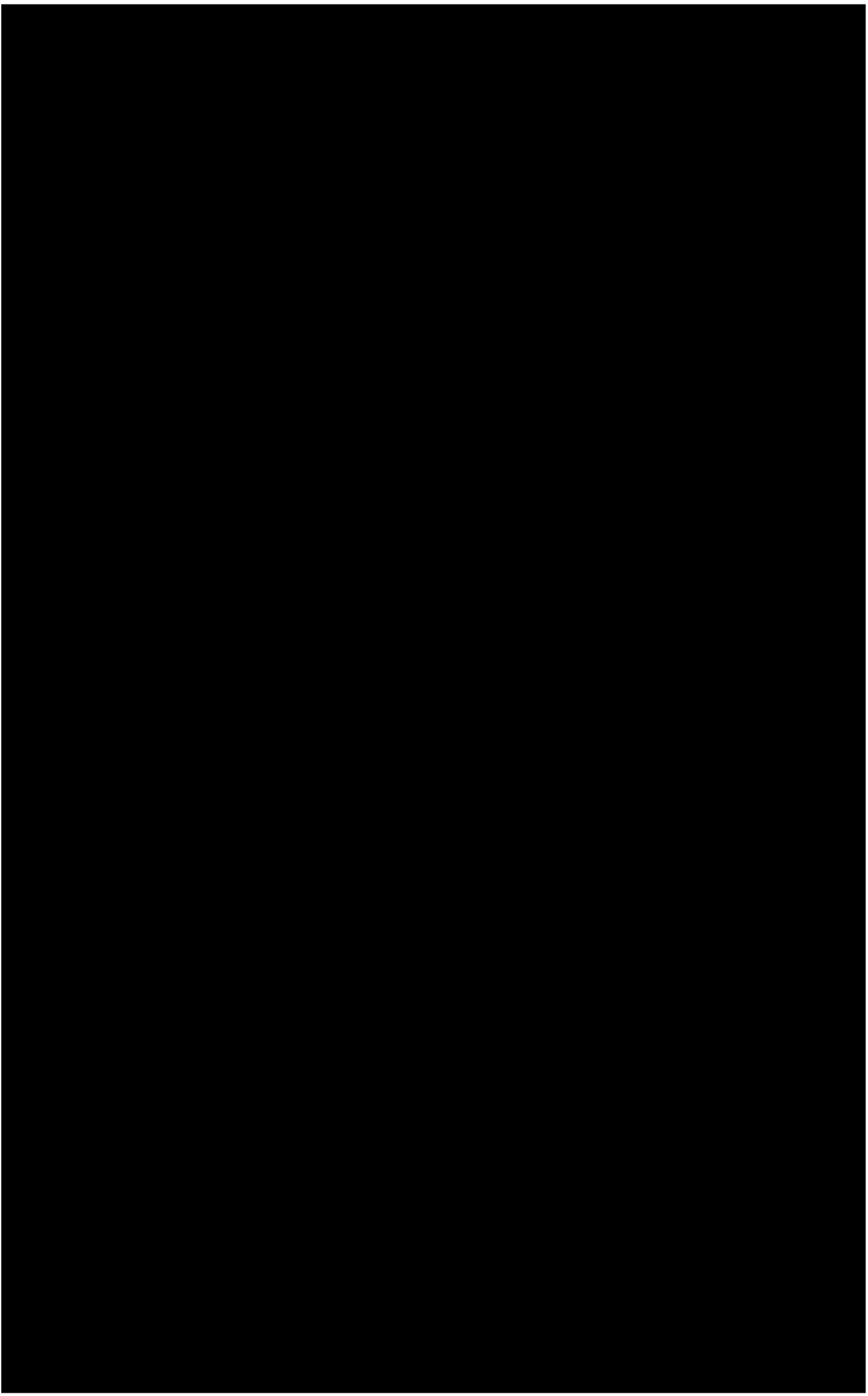
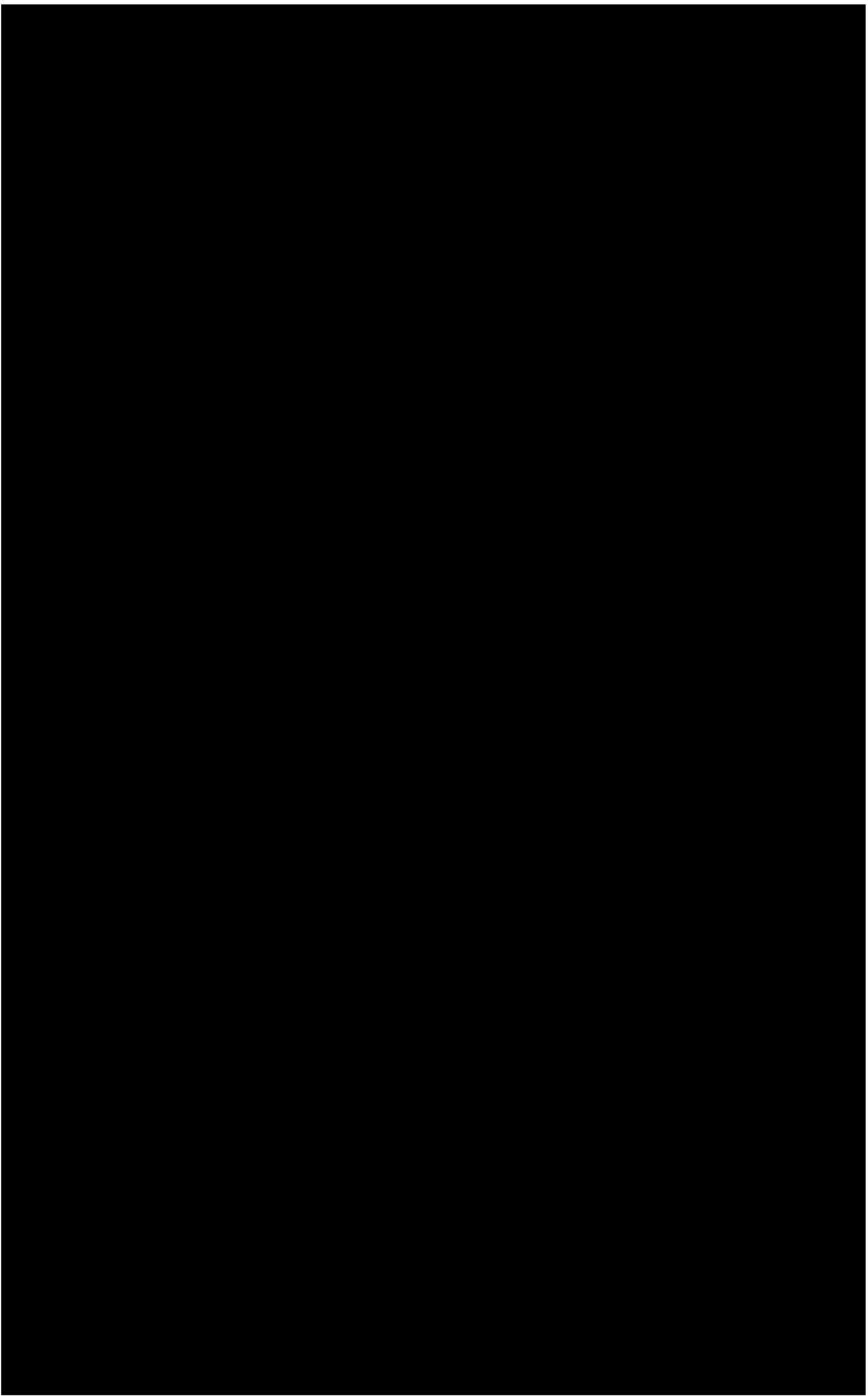
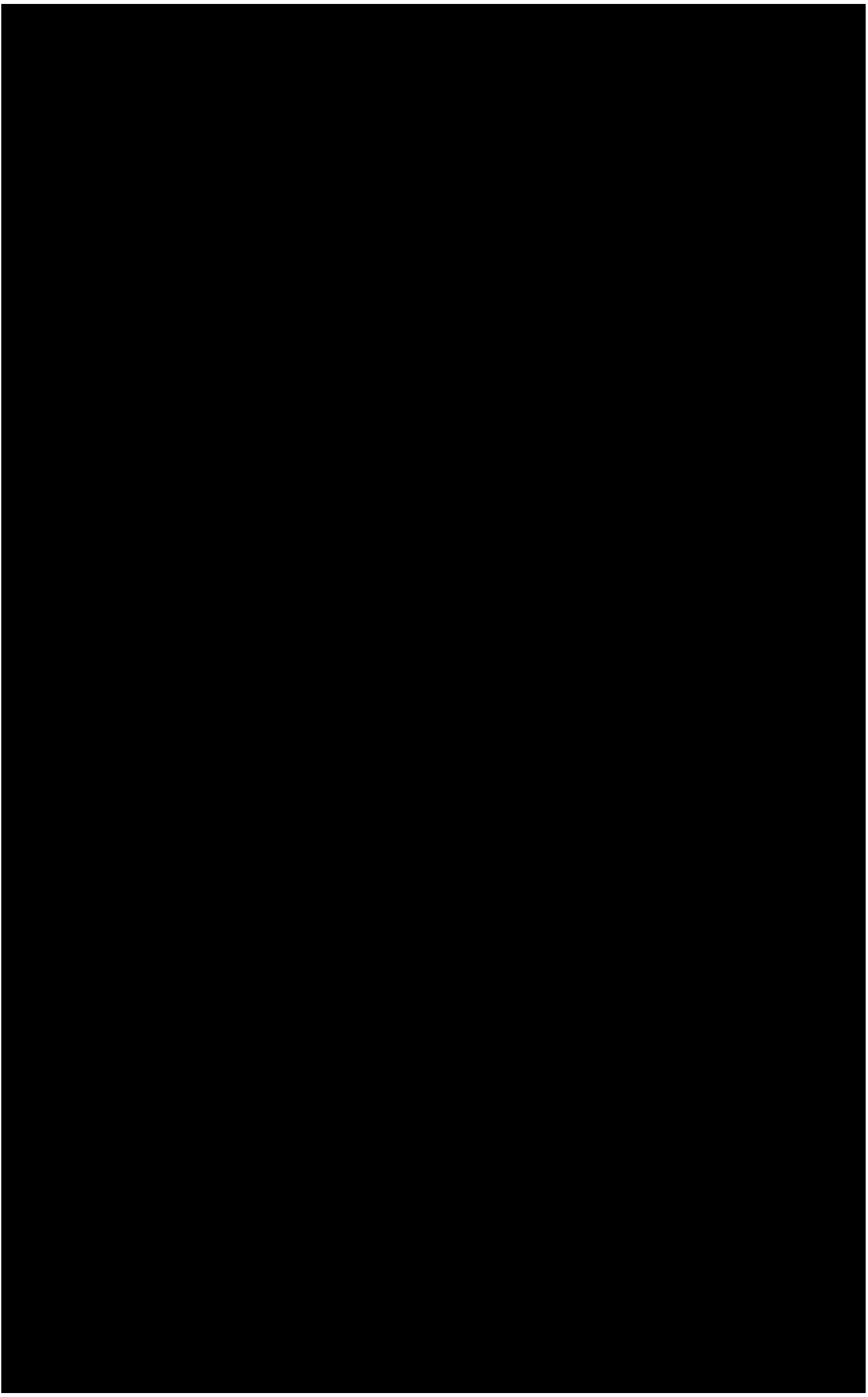
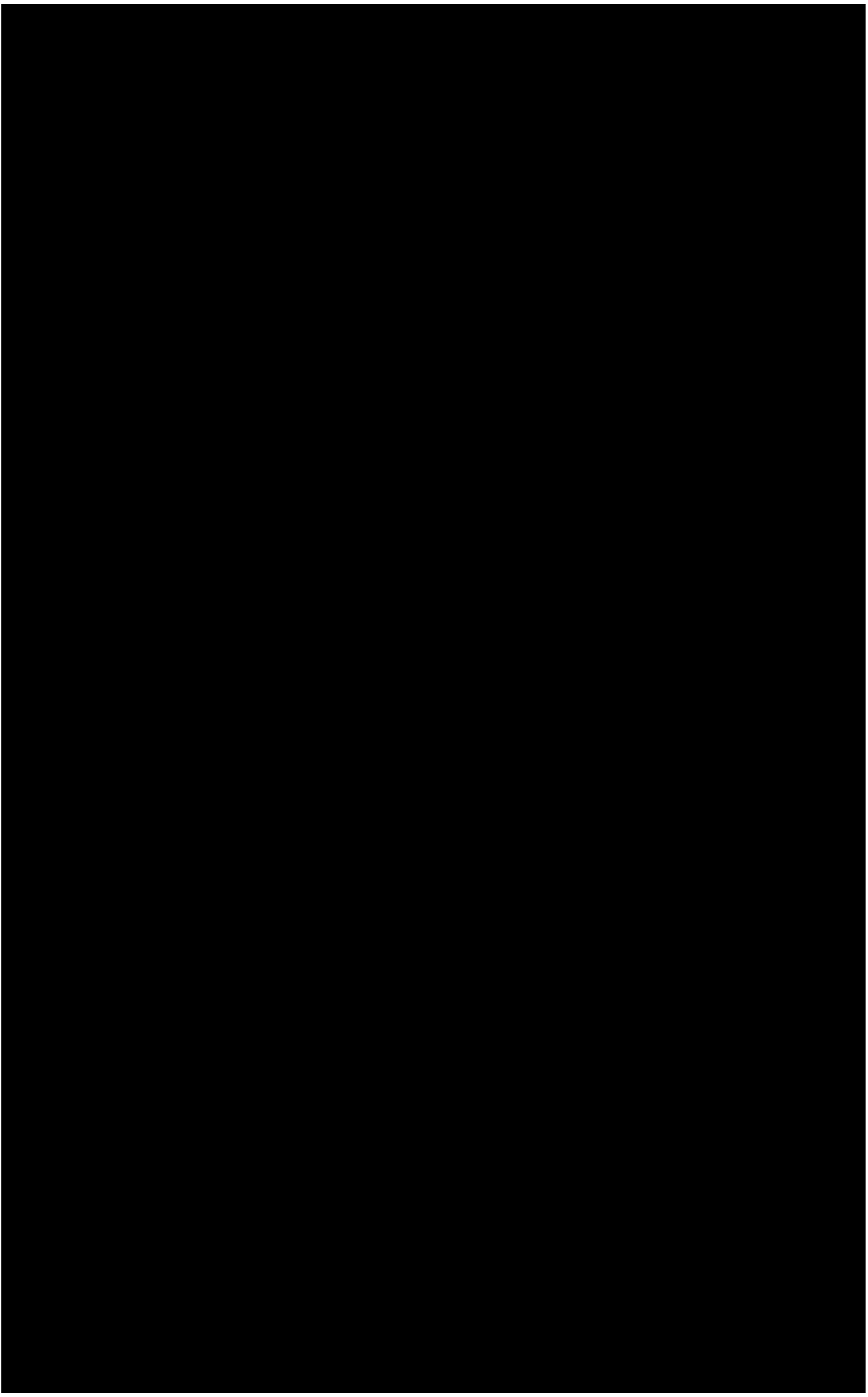








journalled. The latter is made of insulating material and is formed with an annular rim 26 which is supported from the hub by a web 27. The conductor 20 connects the gear lever 16 and the base 23 to earth, and the conductor 21 has an insulated covering 28 and is led through a bore 29 in the gear lever 16, and a radial slot 30 in the threaded end portion 22, to a pawl 31 of electrically conducting material. The pawl 31 is carried, by combined journal and thrust washers 32 of insulating material, from a stud 33 supported by the base 23, and is biased into contact with the hub 25 by a leaf spring 34 acting against the rim 26.

When the control lever 18 is moved as indicated by arrow A, the pawl 31 will be biased by its spring 34 to enter gate 35 in the hub 25 and make contact with boss 24 which is connected to earth. The position of the control lever 18 will indicate the ratio engaged in the auxiliary gearbox 15 by its position relatively to the knob 19, and the driver of the vehicle will be able to appreciate this information by touch alone.

The control shown in FIGURE 5 is arranged to actuate lever 36 of the operating means 17 through a cable 37. The control lever 18 is rotatively locked on to a rod 38 which extends through the gear lever 16 and has a radially extending arm 39 fast with its lower end. Rotation of the control lever 18 rotates arm 39 and moves cable 37 axially.

The control shown in FIGURE 6 is arranged to actuate the operating means 17 by supplying pressurised fluid to it from pump 41 through pipe 40. The control lever 18 is rotatively locked on to a rod 42 which extends through the gear lever 16 and is fast with a rotary valve member 43. Rotation of the control lever 18 rotates the valve member 43 to make or break the supply of pressurised fluid to the operating means 17.

FIGURES 7 and 8 illustrate a control similar to that described with reference to FIGURE 5 in that lever 36 of the operating means 17 is actuated through a cable 37. A base 44 is supported by the gear lever 16 and carries a stud 45 which supports the knob 19 and acts as a pivot for the control lever 18. The cable 37 extends through a bore 46 in the gear lever and has its end connected to an operating rod 47 which extends through a bore in the base 44 and a slot 48, which is arcuate about the axis of the stud 45, in the control lever 18. The rod 47 has two rollers 49, journalled from its upper end, which engage ramps 50 at the sides of slot 48. A spring 51 acting on the rod 47 urges the rollers into engagement with the ramps. When the control lever 18 is rotated the ramps 50 act under the rollers 49 and cause the cable 37 to actuate the operating means 17.

An electrical switch mounted at the top of the gear lever 16 has been described with reference to FIGURES 2, 3 and 4. It will be seen from FIGURE 9 that the electrical switch can alternatively be applied to the bottom of the gear lever. In FIGURE 9, control lever 18 is rotatively locked on to a rod 52 which carries a cam 53, of insulating material, at its lower end. Rotation of the control lever 18 causes the cam 53 to act on contact member 54 to make or break the circuit between conductors 20 and 21 whereby to energise or deenergise the electrical operating means 17.

As will be seen from FIGURE 1, the clutch 13 can be disengaged or reengaged by clutch operating means 55. It is known to provide a gear lever with an upper portion which can rock relatively to the gear lever, when gear ratios in the main gearbox are being changed, whereby to actuate the clutch operating means 55 so that the clutch 13 is appropriately disengaged. Such an arrangement is shown in FIGURE 10 combined with the switch, described with reference to FIGURES 2, 3 and 4, for actuating the operating means 17 of the subsidiary gearbox 15. The threaded portion 22 is fast with a ball 56 which is supported for universal rocking motion in an extension 57 of the gear lever 16. The base 23 has a part-spherical recess 58 formed in it for coaction with a corresponding part-spherical surface 59 on the extension 57, the recess 58 and the surface 59 being concentric with the ball 56. A spring 60 reacts between the base 23 and the extension 57 to bias the knob 19 to a central position as shown. An insulating member 61, having a frusto-conical contact surface 62 of conducting material, is located between the extension 57 and the gear lever 16. The conductor 20 connects extension 63 of the ball 56 to earth, and a conductor 64 connects the contact surface 62 to clutch operating means 55. It will be observed that, whenever the knob 19 is moved by the driver for engaging a ratio in the main gearbox 14, the gear lever will articulate, against the bias of spring 60, about the ball 56 to cause extension 63 to make electrical contact with surface 62 and complete the circuit between conductors 20 and 64 whereby to actuate clutch operating means 55 and cause the clutch 13 to become disengaged. As soon as the knob 19 is released by the driver the spring 60 returns the knob to its central position and causes the extension 63 to break the circuit between conductors 20 and 64 whereby to allow the clutch 13 to reengage.

When the auxiliary gearbox 15 is a planetary gearing it is usually unnecessary for the clutch 13 to be disengaged during ratio changes. Under these circumstances, and when the gear lever is provided with a clutch control as shown in FIGURE 10, it is desirable that the operation of the control for the auxiliary gearbox should not cause the control for the clutch to be actuated. This condition may be achieved in several ways. The control lever 18 may be arranged, as shown in FIGURE 10, to be movable in a different sense from the clutch control 19. Thus, the lever 18 rotates about an axis passing through the centre of ball 56 and pure rotation of the lever about this axis cannot cause the extension 63 to make contact with the surface 62 to disengage the clutch 13. If the ball 56 were replaced by a transverse pivot passing through the centre of the ball and at right angles to the lever 18, actuation of the latter again would not necessarily cause the clutch to disengage. Another manner in which the said condition may be achieved is by arranging the force of the spring 60 to be larger than the force necessary to operate the control lever 18 so that the latter may be operated without causing the clutch to disengage.

If the auxiliary gearbox 15 is of a type which requires the clutch 13 to be disengaged and reengaged when ratio changes are made, the control lever 18 may be arranged to be operable only by a force larger than that necessary to cause the clutch 13 to disengage so that, whenever the control lever 18 is actuated to change ratios in the auxiliary gearbox, the clutch 13 disengages before the ratio change takes place.

Whereas FIGURE 1 shows the auxiliary gearbox 15 placed between the main gearbox 14 and the output shaft 12, the auxiliary gearbox may be placed in other positions and, in particular, between the clutch 13 and the main gearbox.

It will be readily appreciated that if the auxiliary gearbox has more than two engageable ratios the control lever 18 could be provided with a corresponding number of operative positions, and the means for signalling to the operating means 17 could be adapted to give a desired control of the auxiliary gearbox from the gear lever.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. A motor vehicle transmission system including a main change-speed gearing, an auxiliary change-speed gearing, a drive transmission clutch, a gear lever, a hand-grippable knob provided on said gear lever, said gear lever connected to engage selectively the ratios of said main change-speed gearing, a selector means actuable to engage selectively the ratios of said auxiliary change-speed gearing, a first control connected to actuate said selector means, said first control mounted on said knob,

