The present invention relates to a new or modified construction of power gas generating blank cartridges such as are suitable for the generation of gases under pressure in the actuation of mechanical devices, for instance internal combustion engine starter cartridges. In particular the invention relates to an improved or modified method of assembling power gas generating blank cartridges provided with certain successive kindling elements, to which reference will be made hereinafter, whereby the risk of failure of an electric fuzehead or a percussion cap to bring about the proper ignition of said kindling elements is minimised.

The combustible gas producing charges in power gas generating blank cartridges usually consist mainly of smokeless powder forms of comparatively large grain sizes that cannot be directly ignited by the electric fuzehead or percussion cap employed as ignition means for the cartridges. More generally, it may be stated that it is impracticable to employ for any substantial portion of the combustible charge a combustible material of such form or composition as to be easily ignited directly by the electric fuzehead or percussion cap, since otherwise the rate of combustion of such material would become explosive as the pressure increased, so that the rate of pressure generation would become sufficient to damage the mechanism it is required to operate. A small quantity of a composition directly ignitable by the electric fuzehead or percussion cap is therefore used as an intermediate kindling charge, and it is frequently necessary to employ a gas producing charge comprising more than one portion of differing forms or compositions in successive ignition relationship with said intermediate kindling charge and with one another. For instance the combustible gas producing charge for an engine starter cartridge whereof the contents are intended to be ejected in flaming condition from the cartridge case frequently comprises smokeless powder pellets of two differing sizes or compositions, one of which is less easily extinguished on ejection, or more easily ignited, than the other, as well as an intermediate kindling composition directly ignitable by the electric fuzehead or percussion cap.

In practice, electrically ignitable power gas generating blank cartridges frequently include for kindling purposes in the proximity of a fuzehead at the base of the cartridge a disc or cup of combustible material extending across the cartridge case and having a deaerating powder-coating capable of direct ignition from the fuzehead, a portion of a combustible charge in the form of grains capable of being ignited from said coating being haphazardly disposed around the fuzehead and the remainder of the combustible charge being situated on the distal side of the partition. Hitherto it has been the practice to support the disc or cup bearing the coating directly ignitable by the fuzehead, for instance a Celluloid disc or cup coated with black powder, on the side next to the fuzehead upon the haphazardly disposed grains of smokeless powder or the like surrounding the fuzehead, which is protected by an open ended sheath.

It is easier to insert this disc properly in position within the cartridge case if the diameter is substantially equal to the internal diameter of the said case. If during the insertion the disc is slightly crumpled ready escape of gas from beneath it is permitted when the disc is ignited but it is uncertain that this crumpling will always occur. Furthermore, if, for example, the black powder coated disc is supported clear of the fuzehead by means of a tubular spacing member of combustible material resting on the base of the cartridge gas escapes past it still less readily and it is sometimes found that the gas pressure beneath the disc just after the fuzehead is ignited may be such that on occasion the disc is blown forward a little and instead of getting properly ignited it merely fizzles and goes out again, thus giving rise to a misfire.

The object of the present invention is to provide a well fitting disc or cup of the aforesaid kind in electrically or percussion ignitable power gas generating blank cartridges which will permit the ready escape of gas from beneath it.

According to the present invention power gas generating blank cartridges of the kind wherein there is provided in the proximity of an exposed portion of the electrical or percussion ignition means at the cartridge base a partition of combustible material extending across the cartridge and bearing on its proximal side a deaerating powder coating capable of direct ignition from said electrical or percussion ignition means and of igniting a portion of the combustible charge disposed on said proximal side of the partition is characterised in that the said partition is provided with at least one perforation.

The said partition of combustible material is preferably of Celluloid coated on its proximal side with black powder and where more than one perforation is provided the said perforations are preferably regularly disposed and well spaced one from the other.

If desired, especially in the case where ignition means are electrical, the perforated partition is supported clear of the electrical ignition means i.e. the fuzehead by means of a tubular spacing member of combustible material resting on said base.

The said tubular spacing member may advantageously be made of smokeless powder or of Celluloid and may take the form of a cylindrical annulus of outer diameter slightly less than the internal diameter of the cartridge case. It will be
understood that the wall of the tubular spacing member is thin enough to allow of the haphazard disposition of grains of smokeless powder or the like around the fuzehead, which is desirably protected by means of an open-ended tubular sheath, in the space between the base of the cartridge and the forward side of the partition so that the deflagrating powder coating can be ignited by the fuzehead and in turn ignite the powder grains. The length of the tubular spacing member is sufficient to ensure that even under loading pressure the powder coated partition will nowhere touch the exposed portion of the fuzehead, nor compress any solid particles against it.

In loading the cartridge, the tubular spacing member may be inserted into the base of the cartridge case already containing the electric fuzehead provided with its open-ended protecting sheath, a portion of the combustible charge in the form of grains may then be poured or run into the cartridge in quantity insufficient to extend as far as the end of the tubular spacing member. The powder coated perforated partition may then be seated on the end of the tubular spacing member with the powder coated surface facing the exposed end of the fuzehead.

The remainder of the combustible charge may then be loaded on the diameter extending from the center of the partition to the end of the cartridge case turned over a terminal disc of Celluloid or other combustible material in known manner.

Two forms of electrically ignitable power gas generating blank cartridges according to the invention are illustrated in the diagrammatic drawing accompanying the specification in which Fig. 1 is a vertical axial cross section of a cartridge provided with a perforated Celluloid cup, supported by a Celluloid ring. Fig. 2 is a vertical axial cross section of a blank cartridge provided with a perforated Celluloid cup supported on haphazardly disposed smokeless powder pellets, and Fig. 3 is a plan view of the base of the Celluloid cup.

Referring to Fig. 1, 1 is a metal cartridge case having a central perforation 2. 2 and 4 are base wads of insulating material. 3 is a paper cartridge case wall. 7 is an electric fuzehead of which one of the terminal leading strips 10 is earthed to the metal cartridge case 1 while the other wholly insulated with wads 2 and 4 is exposed as a live terminal at the aperture 9. 14 is a tubular spacing member in the form of a Celluloid ring and 13 is a tubular protecting sheath for the fuzehead in the form of a piece of rubber tubing. 6 is a Celluloid cup provided with perforations 1 and bearing a coating of black powder 8 attached to it. 5 are haphazardly disposed smokeless powder pellets. The powder coating 5 is capable of direct ignition from the fuzehead 12 and the pellets 5 are capable of direct ignition from the powder coating 8. 11 is a further layer of smokeless powder pellets similar to the pellets 5. 15 is a longitudinal perforated cylindrical rod of smokeless powder composition and 16 is a Celluloid disc.

Fig. 2 is similar to Fig. 1 except that there is no Celluloid ring 14. Fig. 3 is a plan view of the base of the perforated Celluloid cup 6 shown in Figs. 1 and 2 showing the seven perforations 7 provided therein.

We claim:
1. An electrically ignitable power gas generating blank cartridge comprising a cylindrical paper casing, a metal base at one end of the casing, an electric fuzehead supported within the casing near the base, an open-ended, tubular sheath surrounding the fuzehead, a partition of combustible material extending across the cartridge bearing on its proximal side a deflagrating powder-coating capable of direct ignition from said electric fuzehead, said combustible partition being provided with a plurality of perforations regularly spaced from one another across the area of the partition, a tubular spacing member for retaining the partition at a predetermined distance from the top of said fuzehead, smokeless powder pellets haphazardly distributed in the space between said partition and the cartridge base, and a second charge of smokeless powder positioned within the cartridge casing above said perforated partition.
2. A power gas generating blank cartridge of the type wherein there is provided, in the proximity of an exposed portion of an ignition means at the cartridge base, a partition of combustible material extending across the cartridge and bearing on its proximal side a deflagrating powder coating capable of direct ignition by said ignition means and of igniting a portion of the combustible charge disposed on said proximal side of the partition characterized in said partition is provided with at least one perforation.
3. A power gas generating blank cartridge as set forth in claim 1 wherein the cartridge is electrically ignitable and the perforated partition is supported clear of the electric ignition means by means of a tubular spacing member of combustible material resting on said base.
4. A power gas generating blank cartridge as set forth in claim 3 wherein the tubular spacing member comprises smokeless powder.
5. A power gas generating blank cartridge as set forth in claim 4 wherein the said partition of combustible material is of Celluloid coated on its proximal side with black powder.
6. A power gas generating blank cartridge as set forth in claim 2 wherein the said partition of combustible material is of Celluloid coated on its proximal side with black powder.
7. A power gas generating blank cartridge as set forth in claim 2 wherein a plurality of perforations is provided and the said perforations are regularly disposed and well spaced one from the other.
8. A power gas generating blank cartridge as set forth in claim 2 wherein said ignition means is protected by means of an open-ended tubular sheath in the space between the base of the cartridge and the coated end of the partition in direct ignition relationship with the said ignition means.

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