substrate 6 to admit cool air into the space between the combustible carbonaceous heat source 4 and the aerosol-forming substrate 6.

In use when a user draws on the mouthpiece 10 of the smoking article 32 according to the second embodiment of the invention, air is drawn downstream through the central airflow channel 16 of the combustible carbonaceous heat source 4 and air is also drawn into the space between the combustible carbonaceous heat source 4 and the aerosol-forming substrate 6 through the first air inlets in the cigarette paper 12 and heat conducting element 24. Mixing of cool air drawn through the first air inlets with heated air drawn through the central airflow channel 16 of the combustible carbonaceous heat source 4 reduces the temperature of the air drawn through the aerosol-forming substrate 6 of the smoking article 32 according to the second embodiment of the invention during puffing by a user.

The airflow pathways through the smoking article 32 according to the second embodiment of the invention are illustrated by the dotted arrows in Figure 1b). The non-combustible, substantially air impermeable, first barrier coating 14 provided on the rear face of the combustible carbonaceous heat source 4 and the non-combustible, substantially air impermeable second barrier coating 18 provided on the inner surface of the central airflow channel 16 isolate the combustible carbonaceous heat source 4 from the airflow pathways such that, in use, air drawn through the smoking article 32 along the airflow pathway does not directly contact the combustible carbonaceous heat source 4.

The smoking article 34 according to the third embodiment of the invention shown in Figure 1c) is also of largely identical construction to the smoking article according to the first embodiment of the invention shown in Figures 1a) and 2. However, in the smoking article 34 according to the third embodiment of the invention a circumferential arrangement of second air inlets is provided in the cigarette paper 12 and filter plug wrap 22 circumscribing the aerosol-forming substrate 6 to admit cool air into the aerosol-forming substrate 6.

In use when a user draws on the mouthpiece 10 of the smoking article 34 according to the ~~second~~third embodiment of the invention, air is drawn downstream through the central airflow channel 16 of the combustible carbonaceous heat source 4 and air is also drawn into the aerosol-forming substrate 6 through the second air inlets in the cigarette paper 12 and filter plug wrap 22. The cool air drawn through the second air inlets reduces the temperature of the aerosol-forming substrate 6 of the smoking article ~~32~~34 according to the third embodiment of the invention during puffing by a user.

The airflow pathways through the smoking article 34 according to the third embodiment of the invention are illustrated by the dotted arrows in Figure 1c). The non-combustible, substantially air impermeable, first barrier coating 14 provided on the rear face of the combustible carbonaceous heat source 4 and the non-combustible, substantially air impermeable second barrier coating 18 provided on the inner surface of the central airflow

channel 16 isolate the combustible carbonaceous heat source 4 from the airflow pathways such that, in use, air drawn through the smoking article 234 along the airflow pathways does not directly contact the combustible carbonaceous heat source 4.

The smoking articles 36, 38 according to the fourth and fifth embodiments of the invention shown in Figures 1d) and 1e) are of largely identical construction to the smoking articles according to the second and third embodiments of the invention shown in Figures 1b) and1c), respectively, and may be assembled in an analogous manner. However, the smoking articles 36, 38 according to the fourth and fifth embodiments of the invention comprise combustible carbonaceous heat sources 3840 that do not comprise a central airflow channel 16. A non-combustible, substantially air impermeable, first barrier coating 14 is provided on the entire rear face of the combustible carbonaceous heat sources 3840 of the smoking articles 36, 38 according to the fourth and fifth embodiments of the invention.

In use, when a user draws on the mouthpiece 10 of the smoking articles 36, 38 according to the fourth and fifth embodiments of the invention, no air is drawn through the combustible carbonaceous heat sources 3840. Consequently, the aerosol-forming substrate 6 is heated exclusively by conduction through the abutting rear portion 4b of the combustible carbonaceous heat source 40 and the heat-conducting element 24.

The airflow pathways through the smoking articles 36, 38 according to the fourth and fifth embodiments of the invention are illustrated by the dotted arrows in Figures 1d and 1e). The non-combustible, substantially air impermeable, first barrier coating 14 provided on the entire rear face of the combustible carbonaceous heat sources 3840 of the smoking articles 36, 38 according to the fourth and fifth embodiments of the invention isolates the combustible carbonaceous heat sources 3840 from the airflow pathways such that, in use, air drawn through the smoking articles 36, 38 along the airflow pathways does not directly contact the combustible carbonaceous heat sources 3840.

The smoking article 42 according to the sixth embodiment of the invention shown in Figure 3 comprises a combustible carbonaceous heat source 40, an aerosol-forming substrate 6, an airflow directing element 44, an elongate expansion chamber 8 and a mouthpiece 10 in abutting coaxial alignment. The combustible carbonaceous heat source 40, aerosol-forming substrate 6, airflow directing element 44, elongate expansion chamber 8 and mouthpiece 10 are overwrapped in an outer wrapper of cigarette paper 12 of low air permeability.

As shown in Figure 3, a non-combustible, substantially air impermeable, first barrier coating 14 is provided on the entire rear face of the combustible carbonaceous heat source 40.

The aerosol-forming substrate 6 is located immediately downstream of the combustible carbonaceous heat source 40 and comprises a cylindrical plug 20 of tobacco material comprising glycerine as aerosol former and circumscribed by filter plug wrap 22.

A heat-conducting element 24 consisting of a tube of aluminium foil surrounds and is in

The smoking articles are smoked as described in Example 5, under a Health Canada smoking regime and an intense smoking regime. Before smoking, the combustible heat sources are lit using a regular yellow flame lighter. The formaldehyde, acetaldehyde, acrolein, propionaldehyde, phenol, catechol and hydroquinone in the mainstream aerosol of the smoking articles are measured as described in Example 5. The results are summarized in Table 5. As can be seen from Table 45, under both the Health Canada and intense smoking regimes, the inclusion of a non-combustible, substantially air impermeable, first barrier coating of aluminium on the rear face of the combustible heat source leads to a significant reduction of phenolics and carbonyls such as formaldehyde and acetaldehyde in the mainstream aerosol.

	(i) Health Canada smoking regime		(ii) Intense smoking regime	
Non-combustible, substantially air impermeable, first barrier coating	(a) None	(b) Aluminium	(a) None	(b) Aluminium
formaldehyde	21.2	11.6	30.4	17.8
acetaldehyde	26.6	20.9	63.7	54.0
Acrolein	2.88	1.53	4.97	4.58
propionaldehyde	1.46	0.88	3.51	2.41
Phenol	0.33	0.20	not measured	not measured
catechol	2.50	1.58	not measured	not measured
hydroquinone	<1.05	<1.05	not measured	not measured

Table 5: Amount of compounds (micrograms per sample) measured in mainstream aerosol under (i) Health Canada smoking regime and (ii) intense smoking regime for smoking articles comprising a combustible carbonaceous heat source (a) without a non-combustible, substantially air impermeable, first barrier coating and (b) with a non-combustible, substantially air impermeable, first barrier coating of aluminium.

As can be seen from Examples 7 and 8, isolating the combustible heat source of smoking articles according to the invention from the one or more airflow pathways through the smoking article by providing a non-combustible, substantially air impermeable, first barrier coating on at least substantially the entire rear face of the combustible heat source and a non-combustible, substantially air impermeable, second barrier coating on at least substantially the entire inner surface of the airflow channel through the combustible heat source results in significantly reduced formation of carbonyl compounds, such as formaldehyde, acetaldehyde, proprionaldehyde and phenolics, in the mainstream aerosol.

The embodiments and examples described above illustrate but do not limit the invention. Other embodiments of the invention may be made without departing from the spirit and scope thereof, and it is to be understood that the specific embodiments described herein are not limiting.

CLAIMS:

1. A smoking article comprising:

a combustible heat source having a front end and a rear end;

an aerosol-forming substrate downstream of the rear end of the combustible heat source;

an outer wrapper circumscribing the aerosol-forming substrate and at least a rear portion of the combustible heat source; and

one or more airflow pathways along which air may be drawn through the smoking article for inhalation by a user,

wherein the combustible heat source is isolated from the one or more airflow pathways such that, in use, air drawn through the smoking article along the one or more airflow pathways does not directly contact the combustible heat source.

2. A smoking article according to claim 1 further comprising a non-combustible, substantially air impermeable, first barrier between a downstream end of the combustible heat source and an upstream end of the aerosol-forming substrate.

3. A smoking article according to claim 2 wherein the first barrier comprises a first barrier coating provided on the rear face of the combustible heat source.

4. A smoking article according to claim 3 wherein the first barrier coating is applied to the rear face of the combustible heat source by vapour deposition.

5. A smoking article according to any one of claims 1 to 4 wherein the one or more airflow pathways comprise one or more airflow channels along the combustible heat source.

6. A smoking article according to claim 5 comprising a non-combustible, substantially air impermeable, second barrier between the combustible heat source and the one or more airflow channels.

7. A smoking article according to claim 6 wherein the second barrier comprises a second barrier coating provided on an inner surface of the one or more airflow channels.

8. A smoking article according to any preceding claim comprising one or more air inlets downstream of the rear face of the combustible heat source for drawing air into the one or more airflow pathways.

9. A smoking article according to claim 8 comprising one or more first air inlets between a downstream end of the combustible heat source and an upstream end of the aerosol-forming substrate.

10. A smoking article according to claim 8 or 9 comprising one or more second air inlets about the periphery of the aerosol-forming substrate for drawing air into the one or more airflow pathways.

11. A smoking article according to claim 8, 9 or 10 comprising one or more third air inlets downstream of the aerosol-forming substrate for drawing air into the one or more airflow pathways.

12. A smoking article according to claim 11 wherein the one or more airflow pathways comprise a first portion extending from the one or more third air inlets to the aerosol-forming substrate and a second portion extending from the aerosol-forming substrate to a mouth end of the smoking article.

13. A smoking article according to any preceding claim further comprising:

a heat-conducting element around and in direct contact with a rear portion of the combustible heat source and a front portion of the aerosol-forming substrate.

14. A smoking article according to any preceding claim further comprising:

an expansion chamber downstream of the aerosol-forming substrate.

15. A combustible heat source with opposed front and rear faces for use in a smoking article according to any preceding claim, wherein the combustible heat source has a non-combustible, substantially air impermeable first barrier provided on at least substantially the entire rear face of the combustible heat source and the first barrier is adhered or otherwise affixed to the rear face of the combustible heat source.

16. A ~~smoking article~~combustible heat source according to claim 15 wherein the first barrier coating is applied to the rear face of the combustible heat source by vapour deposition.

17. A method of reducing or eliminating increases in temperature of an aerosol-forming substrate of a smoking article during puffing, the method comprising providing a smoking article comprising:

a combustible heat source with opposed front and rear faces;