Claims

1. An inhaler comprising a housing (12) to receive a strip having a plurality of blisters, each blister having a breachable lid and containing a dose of medicament for inhalation by a user, an indexing wheel (15) mounted in the housing (12) rotatable to drive a strip to sequentially move blisters into alignment with a blister piercing member, a control element (14) pivotally mounted to the housing (12) and a drive mechanism including a drive coupling member (17) for selectively coupling the control element (14) to the indexing wheel (15) so that, when coupled, the indexing wheel (15) rotates in response to rotation of the control element (14) to index the strip, the drive coupling member (17) being configured to couple the control element (14) to the indexing wheel (15) during part of the rotation of the control element (14) by a user so that the indexing wheel (15) rotates together with the control element (14), the indexing wheel (15) being rotatably mounted to the drive coupling member (17), characterised in that the drive coupling member (17) comprises an indexing wheel drive dog (26), the drive mechanism including means to move, as the control element (14) and drive coupling member (17) are rotated, the indexing wheel drive dog (26) into a position in which it cooperates with the indexing wheel (15) so that the indexing wheel (15) rotates together with the control element (14) and the drive coupling member (17).

2. An inhaler according to claim 1, wherein the control element (14) rotates relative to the housing (12) about an axis and the drive mechanism comprises a drive coupling member (17) in the housing (12) for rotation about the same axis.

3. An inhaler according to claim 2, wherein the drive coupling member (17) includes a shaft (18) having an axis coaxial with the axis of the control element (14), the indexing wheel (15) being mounted on said shaft (18) for rotation about said axis.

4. An inhaler according to any preceding claim, wherein the drive coupling member (17) is formed from a resilient material and said means for moving the indexing wheel

drive dog (26) into a position in which it cooperates with the indexing wheel (15) moves said indexing wheel drive dog (26) against a bias provided by said resilience.

5. An inhaler according to claim 4, wherein the drive coupling member (17) comprises a flange (19) that extends radially from one end of the shaft (18) across one end of the indexing wheel (15).

6. An inhaler according to claim 5, wherein the flange (19) includes a flexible flange portion (20) that resiliently bends or flexes relative to the remaining portion of the flange (19) about an axis extending substantially at right angles to the axis of the shaft (18).

7. An inhaler according to claim 6, wherein the flange (19) has an arcuate cut-out region (21) configured such that the flexible flange portion (20) is joined only to the remaining portion of the flange (19) at each end.

8. An inhaler according to claim 7, wherein the flexible flange portion (20) is hinged to the remaining portion of the flange (19) at each end.

9. An inhaler according to any of claims 6 to 8, wherein the indexing wheel drive dog (26) upstands from a surface of the flexible flange portion (20) in a direction towards the indexing wheel (15).

10. An inhaler according to claim 9, wherein the means to move the indexing wheel drive dog (26) into a position in which it cooperates with the indexing wheel (15) so that the indexing wheel (15) rotates together with the control element (14) comprises a flange deflecting dog (22) protruding from the flexible flange portion (20).

11. An inhaler according to claim 10, wherein the means to move the indexing wheel drive dog (26) into a position in which it cooperates with the indexing wheel (15) also comprises an arcuate guide track (27, 28) in the housing (12), the arcuate guide track (27, 28) having a first guide surface such that, when the drive coupling member (17) is rotated

in response to rotation of the control element (14) in a first direction, the flange deflecting dog (22) cooperates with the first guide surface to deflect the flexible flange portion (20) towards the indexing wheel (15) so that the indexing wheel drive dog (26) cooperates with the indexing wheel (15) to rotate the indexing wheel (15) together with the drive coupling member (17).

12. An inhaler according to claim 11, wherein the arcuate guide track (27, 28) is configured such that the flange deflecting dog (22) drops off the first guide surface prior to rotation of the control element (14) to its maximum extent, the resilience of the flexible flange portion (20) causing it to return to its original undeflected state so that the indexing wheel drive dog (26) no longer cooperates with the indexing wheel (15), the indexing wheel (15) now remaining stationary during continued rotation of the control element (14) and drive coupling member (17) to its maximum extent.

13. An inhaler according to claim 11 or claim 12, wherein the arcuate guide track (27, 28) comprises a second guide surface such that, when the flange deflecting dog (22) has dropped off the first guide surface and the drive coupling member (17) is rotated in response to rotation of the control element (14) in a reverse direction, the flange deflecting dog (22) cooperates with said second guide surface so that the flexible flange portion (20) is deflected in the opposite direction, away from the indexing wheel (15).

14. An inhaler according to claim 13, wherein the flange deflecting dog (22) comprises a first cooperating surface (23) to engage the first guide surface of the arcuate guide track (27, 28), and, a second cooperating surface (24) to engage the second guide surface of the arcuate guide track (27, 28).

15. An inhaler according to claim 14, wherein the first and second guide surfaces of the arcuate guide track (27, 28) extend parallel to each other but spaced from each other in an axial direction.

16. An inhaler according to claim 15, wherein the first and second guide surfaces have angled end regions (27a, 28a) such that the flange deflecting dog (22) rides up the angled end regions (27a, 28a) onto respective guide surfaces of the guide track (27, 28).

17. An inhaler according to any preceding claim, wherein the indexing wheel (15) comprises a plurality of vanes (15a, 15b, 15c, 15d) and the indexing wheel drive dog (26) contacts one of the vanes (15a, 15b, 15c, 15d) when the indexing wheel drive dog (26) is moved into a position in which it cooperates with the indexing wheel (15) so that the indexing wheel (15) rotates together with the drive coupling member (17) and the control element (14).

18. An inhaler according to any preceding claim, comprising a locking element (30, 31, 32) to prevent rotation of the indexing wheel (15) other than during cooperation of the indexing wheel drive dog (26) with the indexing wheel (15).

19. An inhaler according to claim 18, wherein the locking element (30, 31, 32) comprises a cantilevered arm (30) mounted in the housing (12) and having its free end biased against the indexing wheel (15), said free end of the cantilever arm (30) cooperating with the indexing wheel (15) so as to prevent rotation of the indexing wheel (15).

20. An inhaler according to claim 19, wherein the free end of the cantilevered arm (30) is configured such that when the indexing wheel drive dog (26) is moved towards the indexing wheel (15), further rotation of the drive coupling element (17) causes the indexing wheel drive dog (26) to engage the free end of the cantilever arm (30) and deflect it out of locking engagement with the indexing wheel (15) prior to cooperating with the indexing wheel (15) to rotate the indexing wheel (15).

21. An inhaler according to claim 20, wherein the indexing wheel drive dog (26) disengages then free end of the cantilever arm (30) when the indexing wheel drive dog (26) moves away from the indexing wheel (15) so that the free end of the cantilever arm (30) moves back towards the indexing wheel (15) to lock the indexing wheel (15) in position.

Claims

1. An inhaler comprising a housing to receive a strip having a plurality of blisters, each blister having a breachable lid and containing a dose of medicament for inhalation by a user, an indexing wheel mounted in the housing rotatable to drive a strip to sequentially move blisters into alignment with a blister piercing member, a control element pivotally mounted to the housing and a drive mechanism configured to couple the control element to the indexing wheel during part of the rotation of the control element by a user so that the indexing wheel rotates together with the control element.

2. An inhaler according to claim 1, wherein the control element rotates relative to the housing about an axis and the drive mechanism comprises a coupling member in the housing for rotation about the same axis.

3. An inhaler according to claim 2, wherein the control element and coupling member are connected so that they rotate together.

4. An inhaler according to any preceding claim, wherein the indexing wheel is rotatably mounted to the coupling member.

5. An inhaler according to claim 4, wherein the coupling member includes a shaft having an axis coaxial with the axis of the control element, the indexing wheel being mounted on said shaft for rotation about said axis.

6. An inhaler according to claim 4 or 5, wherein the coupling member comprises a indexing wheel drive dog and the drive mechanism includes means to move, as the control element and coupling member are rotated, the indexing wheel drive dog into a position in which it cooperates with the indexing wheel so that the indexing wheel rotates together with the control element and the coupling member.

7. An inhaler according to claim 6, wherein the coupling member is formed from a resilient material and said means for moving the indexing wheel drive dog into a position in which it cooperates with the indexing wheel moves said indexing wheel drive dog against a bias provided by said resilience.

8. An inhaler according to claim 7, wherein the coupling member comprises a flange that extends radially from one end of the shaft across one end of the indexing wheel.

9. An inhaler according to claim 8, wherein the flange lies in a plane extending substantially at right-angles to the axis of the shaft.

10. An inhaler according to claim 8 or claim 9, wherein the flange includes a flexible flange portion that resiliently bends or flexes relative to the remaining portion of the flange about an axis extending substantially at right angles to the axis of the shaft.

11. An inhaler according to claim 10, wherein the flange has an arcuate cut-out region configured such that the flexible flange portion is joined only to the remaining portion of the flange at each end.

12. An inhaler according to claim 11, wherein the flexible flange portion is hinged to the remaining portion of the flange at each end.

13. An inhaler according to any of claims 10 to 12, wherein the indexing wheel drive dog upstands from a surface of the flexible flange portion in a direction towards the indexing wheel.

14. An inhaler according to claim 13, wherein the means to move the indexing wheel drive dog into a position in which it cooperates with the indexing wheel so that the indexing wheel rotates together with the control element

comprises a coupling member deflecting dog protruding from the flexible flange portion.

15. An inhaler according to claim 14, wherein the means to move the indexing wheel drive dog into a position in which it cooperates with the indexing wheel also comprises an arcuate guide track in the housing, the arcuate guide track having a first guide surface such that, when the coupling member is rotated in response to rotation of the control element in a first direction, the coupling member deflecting dog cooperates with the first guide surface to deflect the flexible flange portion towards the indexing wheel so that the indexing wheel drive dog cooperates with the indexing wheel to rotate the indexing wheel together with the coupling member.

16. An inhaler according to claim 15, wherein the arcuate guide track is configured such that the coupling member deflecting dog drops off the first guide surface prior to rotation of the control element to its maximum extent, the resilience of the flexible flange portion causing it to return to its original undeflected state so that the indexing wheel drive dog no longer cooperates with the indexing wheel, the indexing wheel now remaining stationary during continued rotation of the control element and coupling member to its maximum extent.

17. An inhaler according to claim 15 or claim 16, wherein the arcuate guide track comprises a second guide surface such that, when the flange portion deflecting dog has dropped off the first guide surface and the coupling member is rotated in response to rotation of the control element in a reverse direction, the flange portion deflecting dog cooperates with said second guide surface so that the flexible flange portion is deflected in the opposite direction, away from the indexing wheel.

18. An inhaler according to claim 17, wherein the coupling member deflecting dog comprises a first cooperating surface to engage the first guide surface of the

arcuate guide track, and, a second cooperating surface to engage the second guide surface of the arcuate guide track.

19. An inhaler according to claim 18, wherein the first and second guide surfaces of the arcuate guide track extend parallel to each other but spaced from each other in an axial direction.

20. An inhaler according to claim 19, wherein the first and second guide surfaces have angled end regions such that the coupling member deflecting dog rides up the angled end regions onto respective guide surfaces.

21. An inhaler according to any of claims 6 to 20, wherein the indexing wheel comprises a plurality of vanes and the indexing wheel drive dog contacts one of the vanes when the indexing wheel drive dog is moved into a position in which it cooperates with the indexing wheel so that the indexing wheel rotates together with the coupling member and the control element.

22. An inhaler according to any of claims 6 to 20, comprising a locking element to prevent rotation of the indexing wheel other than during cooperation of the indexing wheel drive dog with the indexing wheel.

23. An inhaler according to claim 22, wherein the locking element comprises a cantilevered arm mounted in the housing and having its free end biased against the indexing wheel, said free end of the cantilever arm cooperating with the indexing wheel so as to prevent rotation of the indexing wheel.

24. An inhaler according to claim 23, wherein the free end of the cantilevered arm is configured such that when the indexing wheel drive dog is moved towards the indexing wheel, further rotation of the coupling element causes the indexing wheel drive dog to engage the free end of the cantilever arm and deflect it out of locking engagement with the indexing wheel prior to cooperating with the indexing wheel to rotate the indexing wheel.

25. An inhaler according to claim 24, wherein the indexing wheel drive dog disengages the free end of the cantilever arm when the indexing wheel drive dog moves away from the indexing wheel so that the free end of the cantilever arm moves back towards the indexing wheel to lock the indexing wheel in position.

26. An inhaler according to any of claims 23 to 25, wherein the indexing wheel comprises a plurality of vanes and the free end of the cantilever arm comprises a slot, the slot being configured to receive a tip of a vane when the free end of the cantilever arm is biased against the indexing wheel to lock the indexing wheel in position.

27. An inhaler according to claim 26, wherein each vane comprises an enlarged head portion and the slot in the free end of the cantilever arm is configured to receive said enlarged head portion.

28. An inhaler according to any of claims 23 to 26, comprising a chassis to locate a blister strip as it moves therethrough, the cantilever arm extending from said chassis.

29. An inhaler according to any preceding claim, comprising a coiled strip of blisters received within the housing and passing around the indexing wheel.