Claims

~~1. Inspection apparatus for visual inspecting elastic particles comprising~~

~~a conveyor belt (12) for feeding a plurality of particles, particularly in mainly horizontal direction,~~

~~a fall channel (14) for letting the particles fall downwards due to gravity, wherein the fall channel (14) is arranged downstream the conveyor belt (12), and~~

~~at least one flap (16) for stopping a horizontal portion of the movement of the particles leaving the conveyor belt (12), wherein the at least one flap (16) is arranged downstream the conveyor belt (12),~~

~~wherein the flap (16) is resilient in horizontal direction for dissipating at least a part, particularly a majority, of the kinetic energy of the particle aligned in horizontal direction.~~

~~2. Inspection apparatus according to claim 1 wherein the amount of an inelastic collision of the particle to the flap (16) is greater than the amount of the elastic collision of the particle to the flap (16).~~

~~3. Inspection apparatus according to claim 1 or 2 wherein the flap (16) is made from an elastic material comprising a higher elasticity than steel, wherein the flap (16) particularly comprises a tensed up sheet material, particularly comprising a rubber material and/or a plastic material provided on a textile.~~

~~4. Inspection apparatus according to anyone of claims 1 to 3 wherein the flap (16) and/or an inner surface of the fall channel (14) is coated with a coating comprising an anti stick material and/or an elastic material, particularly a silicon varnish.~~

~~5. Inspection apparatus according to anyone of claims 1 to 4 wherein a detection system (24) for detecting the color and/or the size of the particles in the fall channel (14) is provided, wherein the detection system (24) is adapted to inspect the particles from one side only.~~

~~6. Inspection apparatus according to claim 5 wherein at least a part of a channel wall (26) of the fall channel (14) is reflective for an inspection light (20) provided from the detection system (24), wherein the reflective channel wall (26) is provided opposing an entry of the inspection light (20) into the fall channel (14).~~

~~7. Inspection apparatus according to claim 5 and 6 wherein the inspection light (20) provided from the detection system (24) leaves a light generator (22) via an emission opening, wherein a light path of the inspection light (20) between the emission opening and an entry into the fall channel (14) is at least partially covered by a dust shield (36) for preventing an intrusion of particles into the emission opening.~~

~~8. Inspection apparatus according to claim 7 wherein a protective deflection means (30), particularly an air gun, for deflecting particles is provided between the emission opening and the dust shield (36).~~

~~9. Inspection apparatus according to anyone of claims 1 to 8 wherein at least one collection container (28, 34) is provided downstream the fall channel (14), wherein a distance between the maximum filling level of the collection container (28, 34) and an upper rim of the collection container (28, 34) is greater than a maximum height of a particle rebounded from a particle arrange at the maximum filling level after falling a distance of the full height of the fall channel (14) until the maximum filling level.~~

~~10. Inspection apparatus according to claim 9 wherein at least a part of the collection container (28, 34) between the maximum filling level and the upper rim is inclined with respect to the vertical direction.~~

~~11. Inspection apparatus according to anyone of claims 1 to 10 wherein the conveyor belt (12) comprises a shaking unit for shaking the particles onto the conveyor belt (12).~~

~~12. Inspection apparatus according to anyone of claims 1 to 11 wherein a sorting grit for separating too large particles out is provided, wherein particularly the sorting grit is arranged upstream the conveyor belt (12).~~

~~13. Method for inspecting elastic particles wherein~~

~~an inspection apparatus (24) according to anyone of claims 1 to 12 is fed with elastic particles,~~

~~the form and/or the color of the elastic particles are inspected inside the fall channel (14) and~~

~~particles whose form and/or color are inside or outside a set of given parameters are sorted out by deflecting these particles out of the falling path of the particles.~~

~~14. Method according to claim 13 wherein the particles are made from butyl rubber, particularly halogenated butyl rubber.~~

~~15. Method according to claim 13or 14 wherein the particles comprises a hardness h in Shore A of $40 \leq h \leq 85$ at 23°C according to DIN ISO 7619-1.~~

1. Inspection apparatus for visual inspecting elastic particles comprising

a conveyor belt (12) for feeding a plurality of particles, particularly in mainly horizontal direction, a fall channel (14) for letting the particles fall downwards due to gravity, wherein the fall channel (14) is arranged downstream the conveyor belt (12), and

at least one flap (16) for stopping a horizontal portion of the movement of the particles leaving the conveyor belt (12), wherein the at least one flap (16) is arranged downstream the conveyor belt (12),

wherein the flap (16) is resilient in horizontal direction for dissipating at least a part, particularly a majority, of the kinetic energy of the particle aligned in horizontal direction.

2. Inspection apparatus according to claim 1 wherein the amount of an inelastic collision of the particle to the flap (16) is greater than the amount of the elastic collision of the particle to the flap (16).

3. Inspection apparatus according to claim 1 or 2 wherein the flap (16) is made from an elastic material comprising a higher elasticity than steel, wherein the flap (16) particularly comprises a tensed up sheet material, particularly comprising a rubber material and/or a plastic material provided on a textile.

4. Inspection apparatus according to any one of claims 1 to 3 wherein the flap (16) and/or an inner surface of the fall channel (14) is coated with a coating comprising an anti-stick material and/or an elastic material, particularly a silicon varnish.

5. Inspection apparatus according to any one of claims 1 to 4 wherein a detection system (24) for detecting the color and/or the size of the particles in the fall channel (14) is provided, wherein the detection system (24) is adapted to inspect the particles from one side only.

6. Inspection apparatus according to claim 5 wherein at least a part of a channel wall (26) of the fall channel (14) is reflective for an inspection light (20) provided from the detection system (24), wherein the reflective channel wall (26) is provided opposing an entry of the inspection light (20) into the fall channel (14).

7. Inspection apparatus according to claim 5 and 6 wherein the inspection light (20) provided from the detection system (24) leaves a light generator (22) via an emission opening, wherein a light path of the inspection light (20) between the emission opening and an entry into the fall channel (14) is at least partially covered by a dust shield (36) for preventing an intrusion of particles into the emission opening.

8. Inspection apparatus according to claim 7 wherein a protective deflection means (30), particularly an air gun, for deflecting particles is provided between the emission opening and the dust shield (36).

9. Inspection apparatus according to any one of claims 1 to 8 wherein at least one collection container (28, 34) is provided downstream the fall channel (14), wherein a distance between the maximum filling level of the collection container (28, 34) and an upper rim of the collection container (28, 34) is greater than a maximum height of a particle rebounded from a particle arrange at the maximum filling level after falling a distance of the full height of the fall channel (14) until the maximum filling level.

10. Inspection apparatus according to claim 9 wherein at least a part of the collection container (28, 34) between the maximum filling level and the upper rim is inclined with respect to the vertical direction.

11. Inspection apparatus according to any one of claims 1 to 10 wherein the conveyor belt (12) comprises a shaking unit for shaking the particles onto the conveyor belt (12).

12. Inspection apparatus according to any one of claims 1 to 11 wherein a sorting grit for separating too large particles out is provided, wherein particularly the sorting grit is arranged upstream the conveyor belt (12).

13. Method for inspecting elastic particles wherein

an inspection apparatus (24) according to any one of claims 1 to 12 is fed with elastic particles, the form and/or the color of the elastic particles are inspected inside the fall channel (14) and particles whose form and/or color are inside or outside a set of given parameters are sorted out by deflecting these particles out of the falling path of the particles.

14. Method according to claim 13 wherein the particles are made from butyl rubber, particularly halogenated butyl rubber.

15. Method according to claim 13 or 14 wherein the particles comprises a hardness h in Shore A of $40 \leq h \leq 85$ at 23°C according to DIN ISO 7619-1.