Design of egg grading machine

*# 1

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Key words : Egg grading machine, Packer holder mechanism, Quick return mechanism

1.

.

.

3

.[1]

.

2.

2.1

basket

Fig. 1 . m ,

($m\,g$) basket

.

,

, a , g

.

$$m\,g - \quad = m\,a \qquad (1)$$

basket , basket

basket

(1) $a = g$

0 . basket

basket

basket .

basket ,

basket

basket

.

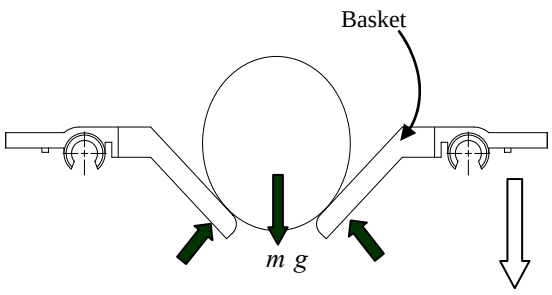

Fig. 1 ( )

basket

(2)

.

$$a < g \qquad (2)$$

Packer holder (2)

.

3.

3.1

packer holder

i) Basket

((2)) ii)

.

Slider-crank

.

.

basket ,

.

kinematic diagram Fig. 2 .

6 5

2 .[2]

1 (Fig. 2) 2

3 4 3

5 .

5 basket .

1, 3, 4

[1], [3], [4]

, 1 2 P $x_{2,\ 2}$

.

$$x_2 = {}_1\cos\theta_1 \ , \quad {}_2 = {}_1\sin\theta_1 \qquad (3)$$

3 Q $x_{3,\ 3}$

.

$$x_3 = {}_3\cos\theta_3 \ , \quad {}_3 = {}_3\sin\theta_3 + \qquad (4)$$

(4) $\cos\theta_3$ $\sin\theta_3$ Fig. 2

.

$$\cos\theta_3 = \frac{x_2}{\sqrt{x_2^{\,2} + (\ _2 - \ )^2}} \ , \ \sin\theta_3 = \frac{\ _2 - \ }{\sqrt{x_2^{\,2} + (\ _2 - \ )^2}} \qquad (5)$$

Fig. 2 θ_5 .

$$\theta_5 = \sin^{-1}\frac{3}{4} \quad (6)$$

5 x

.

$$x_5 = x_3 + {}_4\cos\theta_5 \quad (7)$$

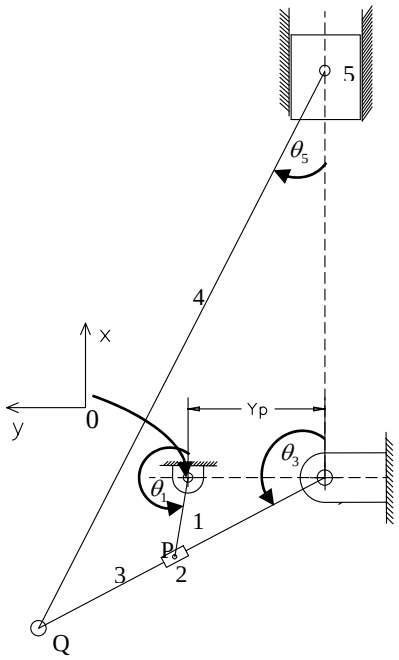

Fig. 2 kinematic diagram

5

(7) x_5 θ_1

,

ω (rad/sec) ω^2 .

3.2

basket . , (2)

.

basket

(θ_3 0) –x (Fig. 2)

+x . –x

θ_3 0

(θ_1)

5(Fig. 2) –x

.

(5) .

$$\theta_3 = \tan^{-1}\frac{2}{x_2} \quad (8)$$

(8) θ_3 = 0 $_2$ = .

(3) .

$$\theta_1 = \sin^{-1}\frac{}{1} \quad (9)$$

(9) 5 θ_1

. 5 3

(2 $_3$) . 50mm $_3$ = 25 mm

. 4 84 mm, 165rpm

.

(7) x_5 θ_1

(9) basket

. (7)

.

$_1$ = 20 mm, ^{1} = −7 mm

θ_1 -9.67 m/s^2 -20.5 .

5 θ_1 1

5

Fig. 3 .

.

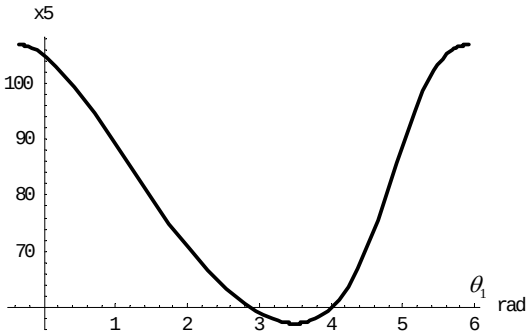

Fig. 3

3.

. Basket .

,

. basket

.

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1. . “ ,” . 2007
2. . “ ,” , Vol. 24, No.4, pp.109-114, 2007. 4.