

Match Manufacturing Plant



HJ-1000T



HJ-COMBINE34



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I. Greeting

Hwajin industry exerted for the mechanical field from 1972 has served in the composite machinery manufacturing concerned with kind of wood Match, Toothpick, chopstick and Ice Cream Spoon and so on. And it stands unchallenged in the present. I know what a blessing it is to have a wood again and I think over about the life of wood from birth to death. Getting through its growth period, it gives oxygen to the human race during several years to reach full growth and lastly it devotes us its body and close life. I wish our machine should be left over so long time of its own name, "Hwajin", as a good and useful as the life of wood. This book gives something help to user when operating this machine for making "Match" completed and elevate the quantity of production without any 1% waste of wood. So before using machine, please read this book carefully. We really appreciate for your continued interest and support. Hwajin shall be in charge of renovating newest technique and valuable goods for the all the world.

화진산업(주)는 다양한 나무제품-성냥, 이쑤시개, 젓가락, 아이스크림 스푼 등과 관련된 기계를 제작하는 업체로 1972년 창업 이래 현재까지 본 분야에 독보적인 우위성을 자랑하고 있으며 항상 최선의 노력을 다하고 있습니다. 탄생에서 죽음에 이르기까지 나무가 얼마나 우리에게 고마운 존재인지 새삼 곰곰이 생각하게 됩니다. 수년의 성장과정을 거쳐 완전히 성숙한 원목이 될 때까지 인류에게 산소를 공급해주고 마지막으로 자신의 몸체를 바치면서 생을 마감하는 나무의 인생처럼 우리의 기계 또한 “화진” 그 이름 그대로 오래도록 유익하고 좋은 기계로 남기를 바랍니다.

이 책은 완전한 “성냥”을 만들기까지 원료인 원목의 낭비를 1%미만으로 최소화시키고 생산성을 최대로 향상시키는데 조금이나마 도움을 드리기 위하여 사용자가 조작상에 필요한 내용을 담고 있습니다. 기계를 사용하기 전에 꼭 주의 깊게 읽고 사용하시기 바랍니다.

고객의 끊임없는 관심과 성원에 감사드리며 저희 화진은 첨단기술과 새로운 가치를 창출하며 전 세계에 우수한 제품을 공급하기 위하여 최선의 노력을 다할 것입니다.

Hwajin Industrial Co., Ltd.

President *Yong Seong, Kim*

II. Introduction

1. Importance of process

Match making factory is required wide space and experienced engineers because of the need of very various machines and the complicated process.

It is need for experienced engineers to operate each machine in the process. When one machine in the process makes problem, the source of the problem may not exist in the machine. Therefore each engineer find it at not only the machine but also previous machines. If one machine in the process gets out of order, the process don't make progress. So the engineer to take charge of the machine repairs promptly it for the process to return to the former condition.

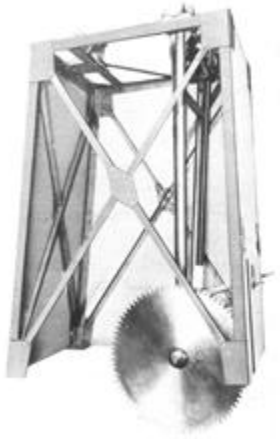
In other words, the condition of one machine affects the whole process. Therefore, all machines in the process have good condition.

2. Importance of splints

Automatic match making machine is the core of match making process and the most important processing. The quality of splints is very excellent for the automatic match making machine to give full play. The quality of splints depends on the quality of lumber and the condition of splint production. The length and thickness of splints must be regular so that it is inserted smoothly to the plate bar and easy to equip chemical dipping.

III. Match Making Equipment

1. Circular Sawing Machine



This machine is used for cutting the material wood to suitable size.(needed length) It is fit to cut in case of straight and well-grow up wood.

◀ Specification ▶

- Machine size : 1,335Lx1,800Wx3,050H
- Power : 5HP
- Diameter of Saw : 1,070mm
- Weight : 960kg

2. Wood Steam Machine

If the quality of wood is not so good, Splints needs to be processed by steam machine. In common case, it doesn't need. Hwajin will supply the drawing for manufacturing at buyer's place if it needs.

3. Barking Machine



This machine is used for barking the material wood. It is also used to remove soil, sand, knar and so on.

◀ Specification ▶

- Machine size : 850Lx900Wx1,250H
- Power : 3.75kw
- Speed : 300 ~ 350RPM
- Max Length : 450mm
- Weight : 470kgs

4. Knife Grinder



It grinds the knife of Veneer Sheeting Machine.

5. Table Grinder

It grinds the knife and drill.

◀ Specification ▶

- Wheel size : 10inch
- Power : 2HP
- Speed : 1,750rpm/min
- Weight : 30kg

6. Veneer Sheeting Machine (Peeling Machine)



The specification is as follows;

- Ⓐ This can produce veneer sheets without regard to thickness of wood by regular speed.
- Ⓑ The angle of cutting knife is controlled automatically.
- Ⓒ There is no waste and this machine is controlled by automatic wood fixing equipment which is three stages style.

This machine is designed that it can make the sheet regular(2mm) size(thickness) attached the automatic sensor by part. This is the economic machine which can produce regular products within regular time. This working is most important process determining the quality and quantity of splints.

We have been made this machine so long time because this is concerned with wood match, chopstick, toothpick, ice cream spoon and so on. And we stand the special position. This will be stressed again in chopping machine.

◀ Specification ▶

- Machine Size : 3,350L×1,100W×1,340H
- Working capacity : 200t/H(360(mm)×5t use)
- Working measure : Ø600, 200 ~ 450(mm)
- Rotation rate : match 200 ~ 350 RPM
- Power : 10HP(main), 3HP(compressor)
- Weight : 1HP(Urgent) 4,500kg

7. Auto Splint Chopping Machine



This machine cut just controlling of 0.1mm width which is attached special equipment inside and we are proud of it.

◀ Specification ▶

- Machine size : 1,050L×1,400W×1,500H
- Working capacity : 2,500,000pcs/ Hour
- Rotation rate : 180RPM
- Power : 5HP
- Net / Gross Machine weight : 1,000 / 1,300kgs

8. Impregnation Equipment

Splints is processed by chemicals for impregnation. This process protects the coming off the match head when ignition. (Buyer have to purchase this chemicals.)

9. Drying Chamber

This machine, which has been constructed under special consideration of the requirements of the match industry, guarantees an unobjectionable drying and most careful treatment of material to be dried along with a minimum ratio of waste.

Splints pass the three stages drying plate. The height of three stages arranged vertically are 250mm and 200mm respectively. Since splints pile up at each stage rolling on plates, Hwajin's know-how, it prevents splints from bending and dry equally surfaces of splints. And heating duct set up specially removes a loss of splints that it makes splints to be strong. Dependent on local condition and requirement, the drying can be regulated in an easy manner. Consumption of heat and power required are in a very favorable relation to the drying result obtained.

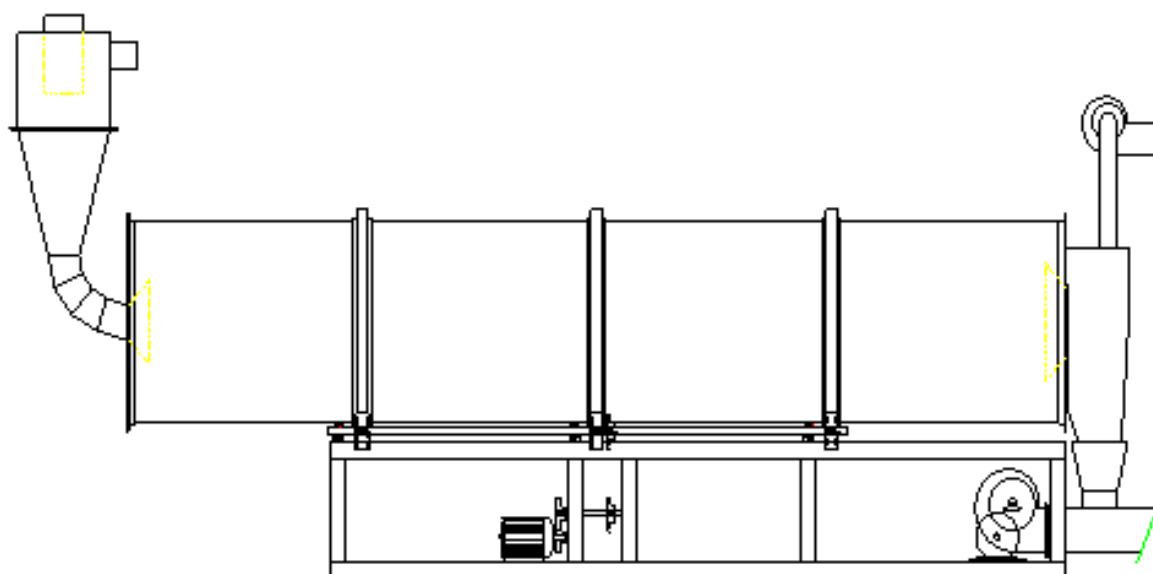
By the use of raw materials of maximum quality and by maximum workmanship, our drying plants of various sorts are in operation since decades with a minimum of upkeep and maintenance costs.



◀ Specification ▶

- Machine size : 2,000L×10,000W×2,730H (mm)
- Drying capacity : 2,500,000Pcs
- Power : 0.75kw = 1EA / 2.2kw = 4EA / 5.5kw = 1EA
- Net / Gross Weight : 5,500 / 7,000kgs

10. Splint Polishing Machine



This machine is designed for polishing splints transported by a blower after drying.

A little paraffin is inserted into the drum, diameter 150mm, be rotated and splints will consequently be polished through friction against other and inserted smoothly into plate bars.

Weak splints are broken through friction against other and generate wooden dust. It helps the machine to drive very well that the half of drum is filled with splints.

The suction fan in outlet removes dust. It's principle is to move to outlet by suction.

◀ Specification ▶

- Machine size : 7,500L×1,400W×3,000H (mm)
- Working capacity : 100rpm (2,160,000 splints/Hour)
108rpm (2,332,800 splints/hour)
120rpm (2,572,000) splints/ hour)
- Power : 3.7Kw 4pole
- Blower Motor : 2.2Kw 2pole

11. Broken & Un-uniformed Splint Selecting Machine



The Splint Selecting Machine is to sort out the broken and short splints whose length is under 40mm.

The distribution drum ensures a absolutely uniform distribution of splints on the sieving drum, in this way eliminating any troubles caused by a clogging of the apertures.

The cleaning splints are absolutely free from dust and splinters. The big loss of good splints occurring in other systems has disappeared completely.

This machine is also designed for removing too thick splints and wooden pieces. The dried splints drop on the sieving caterpillar track so that they are automatically selected for perfect splints. A cleaning device eliminates automatically too thick splints, dust and splinters etc., so there will only good splints join the production line.

◀ Specification ▶

- Machine size : 4,660Lx1,550Wx3,800H
- Working capacity : 1,200,000 ~ 1,30,000splints/Per Hour
- Main Motor : 1.5Kw 4pole
- Blower Motor : 2.2Kw 2pole
- Second Motor : 0.75Kw 4pole
- Machine weight : 1,500kg

12. Bunker



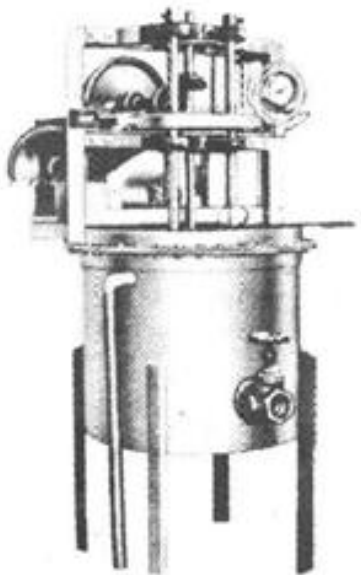
This machine is to store good splints to feed to Automatic Match Making Machine. Its appearance of upper side is cyclone form. So good splints go down to store and air or dust is effluent. Two sensors located upside and downside sense whether splints is full or not. Splint is full, post processes stop.

◀ Specification ▶

- Machine size : 2,200L×2,200W×3,500H (mm)
- Working capacity : 1,200,000 ~ 1,30,000splints/Per Hour
- Power : 2.2Kw
- Machine weight : 500kg

* Buyer have to arrange 150φ PVC pipe for connecting machine to machine for transporting splints.

13. Gelatine Melting Machine



This Machine is used for making liquid gelatine and which is supplied to ignition composition mixing and melted into liquid.

◀ Specification ▶

- Machine size : 650L×650W×1,400H (mm)
- Capacity : 2,000 Gross Boxes/8Hours
- Power : 0.4Kw
- Weight : 150kg

14. Tank for paraffin melting

Buyer has to manufacture this tank by drawing supplied by Hwajin. The firewood is used by splinters and matches which is not good for use.

15. Ignition Composition Mixing Machine



This Machine has the function to mix the liquid gelatin and various chemicals by rotating blade and make up the ignition composition.

◀ Specification ▶

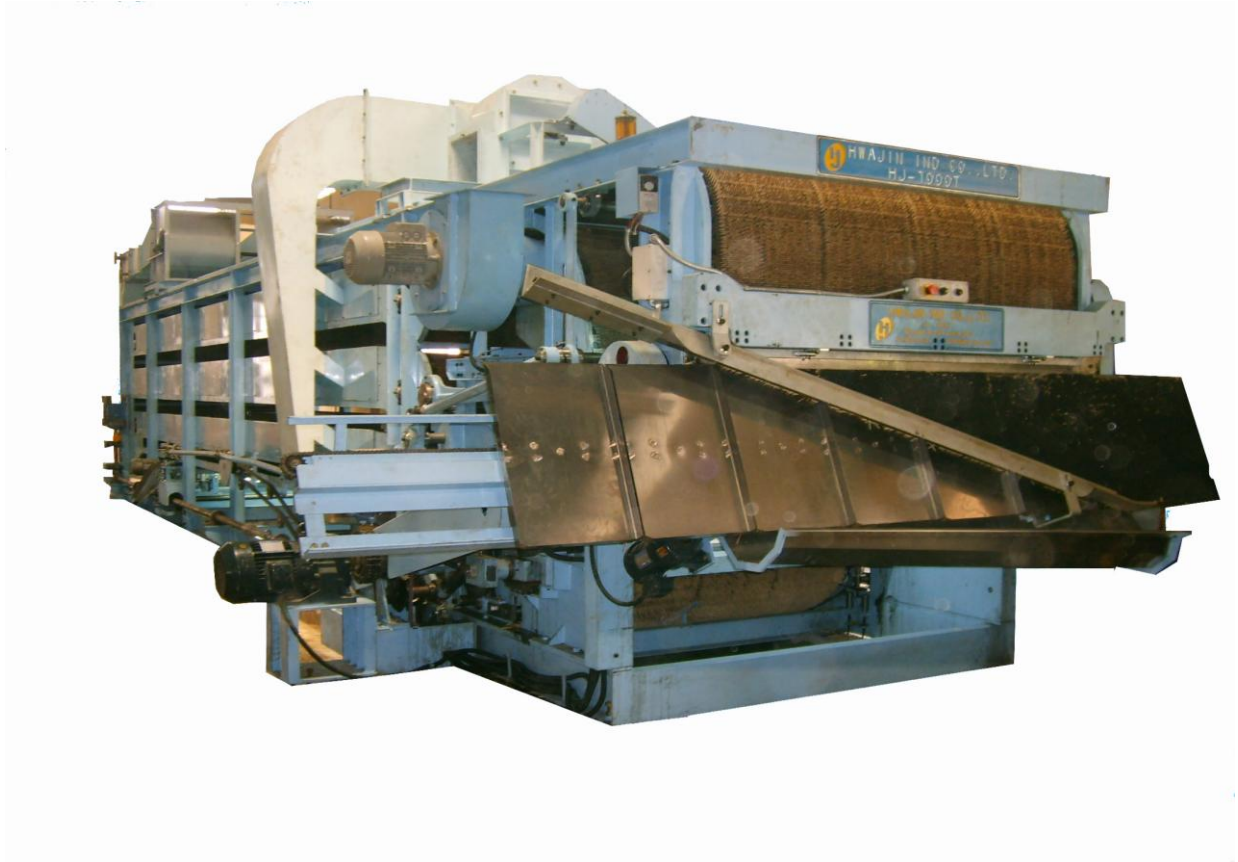
Machine size : 1000L×660W×2,000H

Capacity : 1,000 Gross Boxes/8Hours

Power required : 1.5Kw

Weight : 600kg

16. Auto Match Making Machine



MODEL : HJ-1000T

This Machine is used for making match fully automatically. The Automatic Match Machine (HJ-1000T) is designed for specially easy operation and less maintenance.

This Machine has high durability and productivity. Also, it is excellent in economy and compact construction developed by competent technology.

This M/C transform splints into matches.

These processes are as below;

- ① Regular Box (Vibrator for arranging splints)
- ② Insertion of splints
- ③ Preheating / Impregnation
- ④ Chemical dipping
- ⑤ Drying
- ⑥ Discharging

< Model : HJ-1000T >

● SPECIFICATION of HJ-1000T

1. Size of Machine : 12,000(L) X 5,500(W) X 3,200(H) (mm)

2. Speed of Main shaft : 100 – 120 RPM/min

3. Power Requirement

(1) Main Machine

a. Main Drive(15:1) 5.5KW

b. Dust removing fan 2.2KW

c. Paraffin Smoke Fan(Ventilation Fan) 3.75KW

d. Regular Box Main Motor 2.2kw

e. Drying Fan 3.75kw

f. Tray Carrying 0.4kw

g. Chemical Plate(Conveyor belt) 0.75kw

h. Screw Pump for Chemical Transporting

(Compressor : 5HP (Installation by buyer))

i. Paraffin Pump 0.4kw

j. Splint charging vibrating motor 0.75kw

(2) Heater

a. Paraffin Table(upper) Heater 3kw

b. Paraffin Tank (below) Heater 5kw x2ea

c. Pre-heater for splint 2.5kwx6ea

d. Chemical plate heater 1kwx3ea

e. Steam Boiler has to be arranged by buyer.

(3) Splint transporting (Bunker part)

a. Vibration Motor 0.37kw

b. Match Transporting Fan 1.5kw

(4) Cup Selector (OPTION)

a. 24 Cups Main Power 1.5kw

b. Match Transporting Fan 1.5kw

c. Short-Splint Selecting Motor 0.75kw

4. Capacity per Hour : 2,000,000 – 2,600,000 matches/hour

5. Bar

(1) Size of Bar : 1,820 x 56 x 8T

(2) Number of Bars : 1,370ea

(3) The number of Hole : 1 stroke 360ea x 4 time = 1,440 holes

6. Shipping Volumn : one 40"HQ and one 20" container

< Model : HJ-750T >



MODEL : HJ-750T

◀ Specification ▶

1. Size of Machine : 8,400(L) X 4,000(W) X 2,980(H) (mm)

2. Speed of Main shaft : 100 ~ 120 RPM/min

3. Power Requirement

(1) Main Machine

a. Main Drive	5.5kw
b. Regular Box Dust Fan	2.2kw
c. Paraffin Smoke Fan	0.4kw
d. Regular Box Main Motor	2.2kw
e. Drying Fan	3.75kw
f. Tray Carrying	0.4kw
g. Chemical Plate(Conveyor belt)	0.37kw
h. Air diaphragm Pump for Chemical Transporting	

(Compressor : 5HP (Installation in local by buyer))

i. Paraffin Pump 0.4kw

(2) Heater a. Paraffin Table(upper) Heater 3kw

b. Paraffin Tank (below) Heater 5kw

C. Match Head Drying Heater 15kw

(This will be used only night for drying during some times.)

(3) Splint transporting (Bunker part)

a. Vibration Motor 0.4kw

b. Match Transporting Fan 1.5kw

(4) Cup Selector (*OPTION)

a. 24 Cups Main Power 1.5kw

b. Match Transporting Fan 1.5kw

c. Short-Splint Selecting Motor 0.75kw

4. Capacity per Hour : 1,620,000 – 1,944,000 pcs/hour

(1) Size of Bar : 1,397 x 56 x 8T (3) The number of Hole : 270ea x 4

(2) Number of Bars : 970ea + 15ea (Spare)

17. Slitter

(1) Sheet Cut & Creasing Machine



The sheet (Strips) are manually loaded in the magazine and discharged each one at a time by pusher with vacuum bottom. It can adjust size easily as per requirement. Upper and lower creasing & slitting rollers are provided with a number of creasing & slitting knives with a pitch corresponding to the outer box length.

◀ Specification ▶

1. Machine Size : 3,600(L) x 1,500(W) x 1,700(H) (mm)
2. Productivity : 16 sheets/min (1,000 x n sheet/hour)
3. Cardboard strip size : Max 725 x 555 mm , Min 725 x 370 mm
4. Motor : 2.2kw
5. Workers : 2 persons
6. Weight : 650kgs

(2) Skillet Cutting Machine



This machine is to slit cut sheet produced from sheet cutting & creasing machine into outer box skillets. This machine can use as long sheet (strip) length as possible to achieve high production. The slit skillets are transferred by a pair of rollers which brings the skillets to an upright position and pushes the skillets into tray.

◀ Specification ▶

1. Machine Size : 1,700(L) x 1,000(W) x 1,200(H) (mm)
2. Productivity : 90 cut sheet x n / min
3. Cut sheet size : L : 370 – 555 mm
W : 100 – 120 mm
4. Motor : 1.5kw
5. Workers : 1 person
6. Weight : 350kgs

18. Auto Match Filling & Box Combine Machine



Model : HJ - COMBINE 34

*** Description**

HJ-COMBINE 34 is an innovated system of automatic match filling and box combining machine. Empty inner & outer boxes are filled into each bunkers after produced from inner box making machine and outer box making machine. Each inner box and outer box glide in 17+17 channel chute. This filling machine can fill matches with uniform quantity, the required number of match sticks after cleaning from short and broken pieces and head leveling by arranging chemical tips on one side.. The filled and closed match boxes are arranged and delivered in trays. The machine is completely monitored by control panel. (HJ-COMBINE 30 : 15 row * 15 row chute)

*** Special Feature**

- Compact & Rigid design
- High Productivity
- Safe from Fire
- High quality by 2 step closing
- Separate working irrespective of Match Making machine(HJ-1000T)

18-1. SPECIFICATION of HJ-COMBINE 34

*** Total Required Electric Consumption(A+B+C) : 12KW**

A. Auto Match Filling & Box Combine Machine(8.3KW)

A. Size of machine : 9,310 x 5,168 x 3,090 (mm)

B. Productivity : 23~28RPM x 17 boxes = 391 ~ 476 Match Boxes/ min (HJ-COMBINE 34)
(Productivity: 23~28RPM x 15 boxes = 345 ~ 420 Match Boxes/min (HJ-COMBINE 30))

C. Machine part

1) Inner box Feeding

- Size : 3,200(L) x 1,500(W) x 3,850(H) (mm)
- Motor : 0.4kw x 1ea, 0.2kw x 2ea -Weight : 800kgs

2) Match Supplying & Head Leveling

- Size : 6,000(L) x 2,200(W) x 2,400(H) (mm) -Weight : 2,200kgs
- Motor : 0.75kw x 1ea, 1.5kw x 1ea, 0.2kw x 2ea, Vibration motor 0.2kw x 1ea

3) Outer box feeding

- Size : 3,200(L) x 1,500(W) x 3,850(H) (mm)
- Motor : 0.4kw x 1ea, 0.2kw x 2ea -Weight : 800kgs

4) Discharging part

- Size : 2,400(L) x 1,100(W) x 1,100(H) (mm) -Weight : 600kgs

5) Filling part

- Size : 8,800(L) x 1,100(W) x 1,100(H) (mm)
- Motor : 3.75kw x 1ea, 0.1kw x1ea -Weight : 2,000kgs

B. High Speed Inner Box Making Machine(2.2KW)

- Size : 3,200(L) x 1,600(W) x 950(H) (mm)
- Motor : 2.2kw - Weight : 2,500KGS

C. High Speed Outer Box Making Machine(1.5KW)

- Size : 1,300(L) x 640(W) x 1,480(H) (mm)
- Motor : 1.5kw - Weight : 450KGS

18-2. High Speed Inner Box Making Machine (HJ-IB)



- 1) Size : 2,700(L)X800(W)X1,400(H)(mm)
- 2) Productivity: 600 – 800 pcs/min
- 3) Material supplying : Roll paper
- 4) Forming Type : By Punching
- 5) Adhesive: By glue with pressing
- 6) Motor: 3HP
- 7) Weight: 950Kg

18-3. High Speed Outer Box Making Machine (HJ-OB)



- 1) Machine size : 1,300(L) x 600(W) x 1,600(H) (mm)
- 2) Power : 1HP
- 3) Conveyor style : By Belt
- 4) Adhesive method : By Glue
- 5) Drying : Heater + Natural drying
- 6) Weight : 400kgs

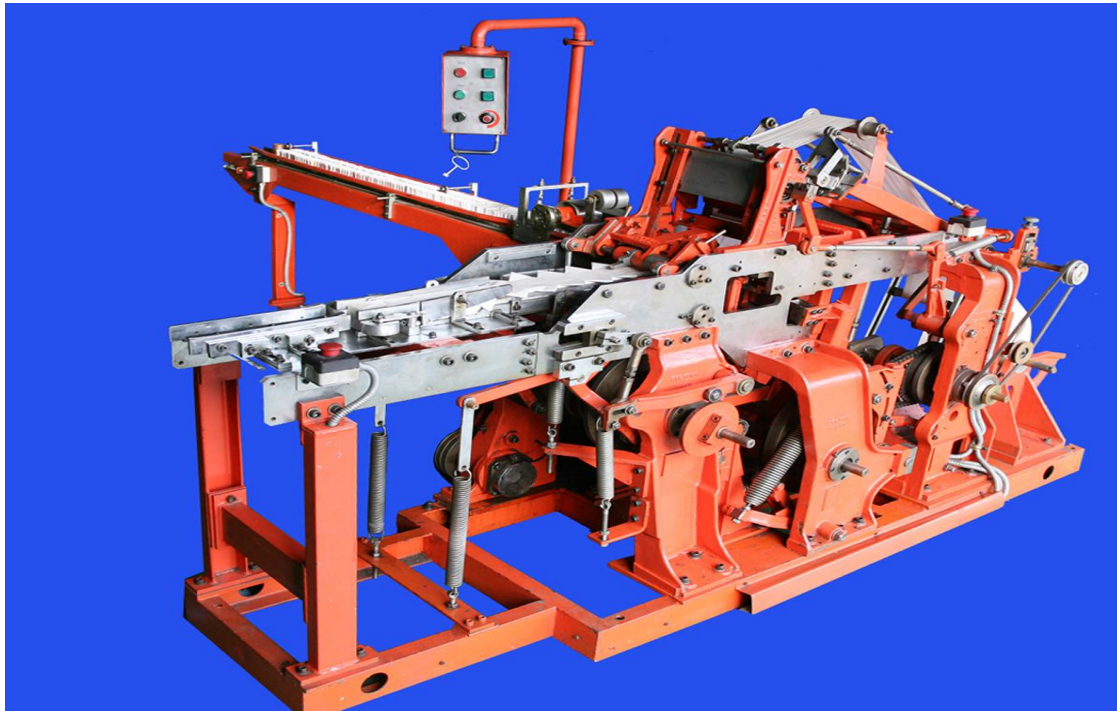
19. Chemical Grinding Machine



This Machine is used for grinding and mixing the side chemicals with water in the rotating drum and making liquid mixture. The mixture and emulsion of adhesive are mixed suitable for coating the side of box.

20. Match Box Paper Packing Machine

It packs 10 match box by paper.



◀ Specification ▶

- Machine size : 3,390L x 650W x 1,400H (mm)
- Capacity : 60 - 70 ea/min
- Power : 1HP
- Packing material : Paper
- Packing match box per time : 10ea
- Adhesive method : By Glue
- Weight : 500kgs

21. Shrink Film Packing Machine

It packs packed match box after processing paper packing by film by manual. It can pack 1 pack (10 match box) to 10 pack. This is very good to see with in eyeshot and it prevent packed goods from contamination.

* 1 pack : 10 match box ~ 10 x 10 match box

* Capacity : 35-45 pack/min(by manual)

◀ Specification ▶

1. 1st stage : Film Sealing Machine

- Machine size : 1,620(L) X 690(W) X 1,250(H) (mm)
- Power : 440V, 50HZ, 2.2KW
- Sealing size : 350 X 450 X 150 (mm)
- Weight : 200kgs

2. 2nd stage : Shrink Tunnel Machine

- Machine size : 1,160(L) X 600(W) X 1,248(H) (mm)
- Tunnel size : 850 X 370 X 230 (mm)
- Speed of Conveyer : 0.5 - 10m/min
- Weight : 300kgs